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Computing AFQT Scores From Historical Data

Paul W. Mayberry
Catherine M. Hiatt

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Computing AFQT Scores From Historical Data

Paul W. Mayberry
Catherine M. Hiatt

Operations and Support Division

50 Years
CNA 1992

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ABSTRACT

The Armed Forces Qualification Test (AFQT) serves as an initial screen for military selection. AFQT scores must accurately reflect the quality of recruits who enter the services and must maintain the same meaning and interpretation over time. Unfortunately, several changes in the AFQT and other problems make such historical computations and score interpretations difficult. This research memorandum details these past problems and presents solutions that will allow for the proper computation of current AFQT scores from historical databases.

EXECUTIVE SUMMARY

The Armed Services Vocational Aptitude Battery (ASVAB) is the selection test administered to military applicants to determine their eligibility for service and to classify individuals into jobs they are likely to perform successfully. The Armed Forces Qualification Test (AFQT) is a part of the ASVAB and is the initial screen for military selection. Applicants must exceed certain minimum AFQT standards to be considered for enlistment. This test is also used as the primary indicator of recruit quality, assisting military manpower managers in monitoring the enlisted force and establishing recruiting goals for future accession cohorts.

Military selection and classification testing has an extensive history dating back to World War I. The AFQT was initially developed and implemented in 1950 as a joint-service selection instrument. During the early 1970s, the services departed from using a common AFQT. When a new testing program for all military applicants began in 1976, all services again began using a common AFQT.

Over time the AFQT experienced many changes and problems: addition/deletion of ASVAB subtests, changes in the ASVAB score scale, changes in subtest score metrics used to compute the AFQT, and changes in AFQT subtests. These changes are detailed in table I. Despite efforts to maintain the consistency of AFQT scores, such dramatic changes and problems have negatively affected the historical consistency of AFQT scores. The scores recorded in historical databases tend to be incompatible. Therefore, AFQT scores of record tend not to be directly comparable over time, should not be aggregated, and may result in inconsistent research findings.

In order to obtain an accurate AFQT score that is comparable across time and ASVAB forms, it is necessary to use a common set of subtests to define the AFQT and to compute all scores on the same score scale. The current AFQT definition (2VE + AR + MK)¹ on the 1980 score scale is the common base to which all other AFQT form-score scale combinations should be equated.

The only accurate means of obtaining AFQT scores equivalent to the current definition and score scale is to work with subtest raw scores (not standard scores) and recompute subtest standard scores and the correct AFQT percentile score. One cannot adjust the AFQT scores of record so that they reflect the current definition and score scale. Computer programs and detailed instructions for computing the AFQT are presented in this paper.

1. VE is the verbal composite, which consists of the sum of the Word Knowledge and Paragraph Comprehension subtests. AR and MK are the Arithmetic Reasoning and Math Knowledge subtests, respectively.

Table I. Changes in AFQT definition, score scale, and subtest metric for all ASVAB forms

ASVAB forms	Administration dates	AFQT definition	Score scale	Subtest metric for computing AFQT
5/6/7	Jan 1976 - Sep 1980	WK + AR + SP	World War II	Raw scores
8/9/10	Oct 1980 - Sep 1984	VE + AR + NO/2	World War II	Raw scores
11/12/13/14	Oct 1984 - Dec 1988	VE + AR + NO/2	1980	Raw scores
15/16/17	Jan 1989 - Present	2VE + AR + MK	1980	Standard scores

NOTE: The abbreviations for the ASVAB subtests defining the AFQT are as follows: WK = Word Knowledge, AR = Arithmetic Reasoning, SP = Space Perception, PC = Paragraph Comprehension, NO = Numerical Operations, VE = Verbal Composite (WK + PC).

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INTRODUCTION

The Armed Services Vocational Aptitude Battery (ASVAB) is the selection test administered to military applicants to determine their eligibility for service. Scores from the ASVAB are also used to classify individuals into jobs they are likely to perform successfully. The ASVAB is administered each year to about 1 million people who apply for enlistment and to about another million students in high schools and post-secondary institutions who are making career decisions and exploring vocational possibilities.

The Armed Forces Qualification Test (AFQT) is a part of the ASVAB and is the initial screen for military selection. Applicants must exceed certain minimum AFQT standards to be considered for enlistment. The test is also used as the primary indicator of recruit quality, assisting military manpower managers in monitoring the enlisted force and establishing recruiting goals for future accession cohorts.

This research memorandum documents the history of the AFQT and notes events that have adversely affected its interpretation and computation. Detailed information and computer programs are provided so that consistent AFQT scores can be computed from historical databases that reflect the current AFQT subtest definition and score scale.

BACKGROUND

Military selection and classification testing has an extensive history, dating back to World War I. However, the first joint-service requirements for testing were not mandated until 1948 with the passage of the Selective Service Act. Subsequently, the AFQT was developed and, in 1950, was implemented as the joint-service selection instrument to determine the eligibility of military draftees and volunteers. Though the services used a common AFQT for selection decisions, each service developed and administered its own test battery for job classification.

In the 1960s, the Department of Defense (DOD) developed a common selection and classification test (the ASVAB) for use in the nation's high schools. The intent was to provide the high schools with a viable and informative testing program while supplying the services with information that would be helpful for recruiting high school students. The ASVAB high school testing program began in 1968 with the introduction of ASVAB form 1.

Between 1973 and 1975, the services departed from using a common AFQT. Instead, each service was allowed to develop its own procedures for computing AFQT scores from its respective battery of aptitude tests. In 1974, efforts were begun to consolidate the testing programs across the services to eliminate duplicate testing for individuals applying to multiple services, to facilitate interservice referrals of applicants, and to allow researchers to focus their attention on developing a single

accession test. Based on the success of ASVAB testing in the high schools, a joint-service program, called the production testing program, was developed to replicate the high school approach of a common test battery to address the testing requirements for all military applicants.

The new production testing program introduced two ASVAB forms in 1976 (forms 6 and 7). Based on these new ASVAB forms, all services again used a common set of tests to define the AFQT. The production and the high school testing programs have continued to produce revised forms of the ASVAB and to conduct research to monitor the quality of the tests and the stability of score interpretation over time.

Content of ASVAB

The ASVAB is composed of a number of subtests that measure specific aptitudes. The content of the ASVAB has evolved over time to reflect advances in the measurement of mental aptitudes and the findings from extensive validation research. Table 1 documents the subtest composition of all ASVAB forms. The most extensive revisions in content occurred with the introduction of ASVAB forms 8/9/10:

- Space Perception, Attention to Detail, General Information, and the Classification Inventory were dropped.
- Two subtests were added (Paragraph Comprehension and Coding Speed).
- Two 5/6/7 subtests (Automotive Information and Shop Information) were combined to form one 8/9/10 subtest (Auto Shop).
- The subtests common to all test forms were typically lengthened by five to ten items with the introduction of forms 8/9/10 (except for Numerical Operations, which remained the same, and Electronics Information, which was shortened by ten items).

All test forms subsequent to ASVAB 8/9/10 have been parallel in subtest content and length. Detailed subtest specifications that describe the explicit rules for test construction have been developed, and are periodically revised, to assist in the development of new ASVAB forms.

Equating of ASVAB Forms

New forms of the ASVAB are implemented on a periodic basis to guard against test compromise and to update the vocabulary and test content of subtests. It is important that the new subtests maintain equivalence of aptitude measurement across different test forms to retain their traditional meaning and interpretation of scores. Such historical continuity

Table 1. Subtest composition of ASVAB by test form

Forms 5/6/7			Forms 8/9/10, 11/12/13/14, and 15/16/17		
Subtest	Number of items	Time limit ^a	Subtest	Number of items	Time limit
GI General Information	15	7	GS General Science	25	11
NO Numerical Operations	50	3	AR Arithmetic Reasoning	30	36
AD Attention to Detail	30	5	WK Word Knowledge	35	11
WK Word Knowledge	30	10	PC Paragraph Comprehension	15	13
AR Arithmetic Reasoning	20	20	NO Numerical Operations	50	3
SP Space Perception	20	12	CS Coding Speed	84	7
MK Mathematics Knowledge	20	20	AS Auto and Shop Information	25	11
EI Electronics Information	30	15	MK Mathematical Knowledge	25	24
MC Mechanical Comprehension	20	15	MC Mechanical Comprehension	25	19
GS General Science	20	10	EI Electronics Information	20	9
SI Shop Information	20	8			
AI Automotive Information	20	10			
Classification Inventory ^b	87	20			

a. The time limit is expressed in minutes.

b. The Classification Inventory was not part of ASVAB 5.

in the measurement of aptitudes is achieved by using statistical equating procedures so that all test forms are interchangeable. Table 2 notes the administration dates for each ASVAB form for both the student-testing and production-testing programs.

Table 2. Dates of administration for each ASVAB form

Student-testing program		Production-testing program	
Form	Administration dates	Form	Administration dates
1	Sep 1968 to Aug 1973	3/4	Sep 1973 to Dec 1975 ^a
2	Sep 1973 to Dec 1976	6/7	Jan 1976 to Sep 1980
5	Jan 1976 to Jun 1984	8/9/10	Oct 1980 to Sep 1984
14	Jul 1984 to present	11/12/13	Oct 1984 to Dec 1988
18/19	Scheduled for Jul 1992	15/16/17	Jan 1989 to present
		20/21/22	Scheduled for 1993

a. Used by the Air Force and Marine Corps only.

One technique commonly used to put tests on the same scale of measurement is called equipercentile equating. This procedure involves comparing the score distributions for examinees¹ so that score points on the two tests are considered equivalent if they represent the same cumulative percentage within the samples. For example, if 80 percent of the examinees score at least 18 on the math knowledge (MK) reference subtest and 80 percent of the examinees score at least 19 on the new form of the MK subtest, then a score of 18 on the reference MK subtest and a score of 19 on the new MK subtest are equated to the same standard score. Other methods of equating, besides equipercentile, have also been used to establish equivalent score scales for ASVAB subtests and composites.

Because of potential problems associated with comparing score distributions (e.g., limited number of discrete score points, many individuals achieving the same total score, few individuals scoring in the extremes of the distributions), it is necessary to smooth the score distributions before equating them. Smoothing of score distributions attempts to reduce the random influence of such potential problems.

1. The examinees can either be a sample who is administered both tests in counterbalanced order or two equivalent samples who are administered only one of the tests.

Therefore, all equatings¹ of the AFQT performed in this research memorandum are based on an equipercentile procedure with a three-point moving-average smoothing of the score distributions.²

ASVAB Score Scale

An individual's test score is meaningless without a reference against which to judge its acceptability. The basis against which test score interpretations are made must be a stable reference group that is representative of the population to which the test results wish to be generalized. A stable score scale also retains its meaning in terms of predicted performance regardless of changes in the abilities of the people who are tested or changes in the test forms. With a stable score scale, qualification standards can be set to select people with the appropriate aptitudes, and the meaning of the standards is retained as long as the predictive validity of the test remains the same. Given an appropriate score scale and proper equating across test forms, qualification standards need to be changed only when job requirements change and not when the recruiting environment or test forms change.

With the introduction of the AFQT in 1950, the services capitalized on the extensive testing of servicemen who fought in World War II (WWII) to develop such a stable score scale for the interpretation of ASVAB scores. Statistical equating procedures were used to establish the link between AFQT scores and the selection test scores of all WWII servicemen to produce the World War II score scale. The AFQT score scale thus became a reasonably accurate description of the aptitudes of the mobilization population during the early 1950s, and enlistment standards for initial skill training could be established with confidence.

With ensuing educational and cultural changes during the 1960s and 1970s, the appropriateness of the WWII score scale as an indicator of the aptitude of the current mobilization population was questioned. The

1. To be technically correct, equating refers to establishing the equivalence between subtests or composites that are strictly parallel in terms of content and measurement properties. Establishing the equivalence of similar but not parallel measures is often called test calibration (for example, the number of items for a subtest changes or a new definition of the AFQT is implemented). Converting the sum of subtest raw or standard scores to percentiles of a standard reference population is called test normalization. Throughout this research memorandum, the term "equating" will be used to refer to all three of these conditions for establishing the equivalence of measurement across alternative test forms.

2. Smoothing of score distributions attempts to minimize the influence of fluctuations in or extreme values for observed frequencies. A three-point moving average achieves this by averaging adjacent frequency values (above and below) to determine the actual frequency for that score point.

WWII score scale was based on males only; each of the services was beginning to enlist more females. The services were no longer able to determine the quality of their current accessions relative to the quality of the population of potential applicants. In 1980, DOD conducted an extensive study in which the ASVAB was administered to a nationally representative sample of American youth, ages 16 to 23 years. From this study, a subsample of enlistment-eligible males and females (ages 18 to 23 years) was used to construct a new ASVAB score scale, called the 1980 score scale.¹ The 1980 score scale provides the reference against which all ASVAB scores are currently interpreted.

Subtest and AFQT Score Metrics

It is important to understand the metrics in which subtests are recorded in historical databases, because this has serious implications for the proper computation of the AFQT and service aptitude composites. Subtests are stored either as raw scores or standard scores.

Raw scores, which are simply the number of items correctly answered for the subtest, range from 0 to the total number of items on the subtest (see table 1). The main disadvantage of raw scores is that they are not directly comparable across different ASVAB forms. However, raw scores are the basis from which all conversions, adjustments, or corrections can be accurately and retroactively made (i.e., all subsequent subtest scores can always be correctly reproduced from raw scores; such is not the case for subtest standard scores). Raw scores are not affected by problems encountered in subtest equating or by changes in the score scale.

Subtest standard scores are a transformation of the raw scores. Conversion tables are used to rescale the subtest raw scores so that they have a common mean and standard deviation in the reference population. Subtest standard scores have a mean of 50 and a standard deviation of 10 in the 1980 Youth Population. In this manner, scores have a common basis for interpretation and are therefore equivalent across ASVAB forms. The primary disadvantage of subtest standard scores of record is that they may be historically incorrect. The aptitude information of historical databases is usually not updated to correct problems that have been encountered with the ASVAB since the original standard scores were recorded.

To assist in its interpretation, the AFQT has historically been expressed in a percentile metric, not a raw score or standard score metric. The AFQT is computed by summing subtest scores, and the total is then converted to a percentile score. Percentiles are interpreted as an individual's relative standing to others in the reference population. A percentile score of 75 on the AFQT indicates that the examinee scored

1. See CNA Report 116, *The ASVAB Score Scales: 1980 and World War II*, by Milton H. Maier and William Sims, Jul 1986.

the same as or better than 75 percent of the individuals in the reference population. The percentile metric is the basis for military selection and is used in validation research.

To facilitate reporting of recruit quality trends and establishing accession goals, the AFQT percentile scale is often aggregated into several larger categories. Table 3 summarizes these AFQT categories and the associated percentile ranges that define the categories. Category V individuals are legally unqualified for military service, and category IV non-high school diploma graduates are also typically not accepted.

Table 3. Definition of AFQT categories

AFQT category	Percentile range
I	93-100
II	65-92
IIIA	50-64
IIIB	31-49
IV	10-30
V	1-9

Changes in AFQT Definition and Computation

As noted earlier, the subtests of the ASVAB have evolved over time. The combination of subtests used to define the AFQT has also changed. Based on extensive validation research conducted by each of the services, the definition of the AFQT has changed so that it remains a stable predictor of success in initial skill training courses. Table 4 documents these changes in the subtests composing the AFQT since ASVAB forms 5/6/7.

The AFQT computed for ASVAB forms 5/6/7 included verbal, math, and spatial subtests. However, the Space Perception (SP) subtest was found to have significant gender differences that were not reflected in training success. The SP subtest was dropped from the AFQT (and the ASVAB) with the introduction of ASVAB forms 8/9/10. The verbal component of the AFQT was supplemented with the Paragraph Comprehension (PC) subtest and the math component was augmented with Numerical Operations (NO). Despite other changes to the AFQT that are discussed below, its subtests remained the same for ASVAB forms 11/12/13/14. Because of score inflation primarily due to the coachability of the NO subtest, the AFQT definition was again changed when ASVAB forms 15/16/17 were implemented; NO was replaced with MK. This definition maintained the emphasis on verbal and mathematical requirements for training individuals for military occupations.

Table 4. Historical changes in AFQT definition, score scale, and subtest metric

<u>ASVAB forms</u>	<u>AFQT definition</u>	<u>Score scale</u>	<u>Subtest metric for computing AFQT</u>
5/6/7	WK + AR + SP	World War II	Raw scores
8/9/10	VE + AR + NO/2	World War II	Raw scores
11/12/13/14	VE + AR + NO/2	1980	Raw scores
15/16/17	2VE + AR + MK	1980	Standard scores

NOTE: The abbreviations for the ASVAB subtests defining the AFQT are as follows: WK - Word Knowledge, AR - Arithmetic Reasoning, SP - Space Perception, PC - Paragraph Comprehension, NO - Numerical Operations, VE - Verbal composite (WK + PC).

In addition to changes of the subtests defining the AFQT, the score scale and the subtest metric for computing the AFQT have also been revised (see table 4). The reference population was updated with the introduction of ASVAB forms 11/12/13/14. Changing from the WWII score scale to the 1980 score scale resulted in a four-point raw score difference at the median. In other words, the average (median) person scored four raw score points higher on the 1980 score scale than did the average (median) person on the WWII score scale.

Historically, the AFQT has been computed by summing the raw scores of the respective subtests then converting that sum into the AFQT percentile score. However, with the introduction of ASVAB 15/16/17, the subtest metric used to compute the AFQT changed to subtest standard scores. For the current definition of the AFQT, standard scores for each subtest are first computed from the raw scores, the standard scores are summed, and then the sum of subtest standard scores is converted into the AFQT percentile. The primary reason for changing the subtest metric was to ensure that each subtest received proper weighting in the summation of subtest scores.

The verbal composite (VE) used to compute the AFQT requires further discussion. The ASVAB has no VE subtest; rather, the VE composite is computed from the Word Knowledge (WK) and Paragraph Comprehension (PC) subtests. For ASVAB forms 8/9/10 and 11/12/13/14, the raw scores for these two subtests are first summed to compute VE, and the composite is combined with AR and NO. Likewise for ASVAB forms 15/16/17: VE is computed by summing the raw scores for WK and PC, but then the VE sum is converted to a standard score before it is combined with the standard scores for the AR and MK subtests.

PROBLEM

Given its role as a primary indicator of recruit quality, the AFQT is vitally important in analyses relating recruit quality to observed military outcomes. Military researchers are continually demonstrating the implications and benefits resulting from recruit quality. The AFQT also assists manpower managers in documenting historical trends of recruit quality as well in establishing future recruiting requirements. Therefore, it is necessary that AFQT scores accurately reflect the quality of recruits who have entered the services and that the scores maintain the same meaning and interpretation over time. Unfortunately, the ASVAB has undergone several changes, and problems have been noted that make such historical computations and interpretation of AFQT scores difficult.

Many of the changes in and problems with the AFQT were briefly discussed in the previous sections: addition or deletion of ASVAB subtests, changes in the ASVAB score scale, changes in subtest score metrics used to compute the AFQT, changes in AFQT subtests, etc. Despite efforts to maintain the consistency of AFQT scores over time, such dramatic changes and problems have negatively affected the historical consistency of AFQT scores. For example, simply changing from the WWII score scale to the 1980 score scale (with all other conditions held constant) resulted in a shift of four raw score AFQT points at the median. Given such events that have adversely affected the AFQT, the scores recorded in historical data bases tend to be incompatible. Therefore, AFQT scores of record tend not to be directly comparable over time, should not be aggregated, and may result in inconsistent research findings.

SOLUTION

In order to obtain an accurate AFQT score that is comparable across time and ASVAB forms, it is necessary to use a common set of subtests to define the AFQT and to compute all scores on the same score scale. The current AFQT definition (2VE + AR + MK) on the 1980 score scale is the common base to which all other AFQT form-score scale combinations will be equated.

The only accurate means of obtaining AFQT scores equivalent to the current definition and score scale is to work with subtest raw scores (not standard scores) and totally recompute subtest standard scores and the correct AFQT percentile score. One cannot adjust the AFQT scores of record so that they reflect the current definition and score scale. Many grandfathering policies were implemented as changes were made to the AFQT so as to not adversely affect individuals already tested but not enlisted into a service (ASVAB scores can be used for enlistment up to two years after administration or a person may enter the Delayed

Entry Program) and for other special cases.¹ Given these varying policies for different people and no variables in the historical records to indicate which policy was applied, AFQT scores of record cannot be adjusted properly.

The next section discusses the procedure for computing AFQT scores equivalent to the current definition and on the 1980 score scale from subtest raw scores. The discussion focuses on the procedures required to compute accurate AFQT scores, not on the process or data sets used to develop the intermediate equating tables. The appendixes document such background materials. Attention to detail in applying the appropriate conversion tables can not be overemphasized; it is very easy to make mistakes in conducting the score conversions.

Computing Current AFQT from Historical Subtest Raw Scores

Recomputing a current AFQT percentile score from historical subtest raw scores is the only appropriate way to obtain accurate AFQT information. To make such calculations, the ASVAB form and version codes and date of test administration are also needed for each individual.² As a matter of policy, the Marine Corps includes subtest raw scores as part of its historical databases in the event that problems are later identified that require correction. Most other services retain only subtest standard scores and not raw scores. If subtest raw scores, the ASVAB

1. For examples, see Joint-Service Selection and Classification Working Group, *A Review of the Development and Implementation of the Armed Services Vocational Aptitude Battery Forms 11, 12, and 13*, May 1986.

2. The ASVAB form code is a numerical variable representing which test form was administered. Form numbers typically range from 5 to 17. Earlier forms are possible, but such values should be rare and only for individuals with substantial time in service. ASVAB forms 18 through 21 are scheduled to be implemented soon (see table 2). The ASVAB version code is a character variable. Typical values for the version code include a, b, and c, although other values may also be valid (r, t, x, and y). Both the ASVAB form and version codes are required to determine the appropriate conversion table to apply to the raw scores to compute subtest standard scores. Different conversion tables are used depending on the form and version of the test. The date of test administration is also important, as it can be used to check the correctness of the form code. For example, problems have been noted in the past in confusing one- and two-digit form codes (e.g., form 15 was read as form 5, form 16 as form 6, and so on). Cross-tabulations of ASVAB form by date of test administration provide a rough quality check of the form values. See table 2 for correct test administration dates for each ASVAB form. Another means of distinguishing between questionable form codes from historical records is to examine the specific subtests for which information is available (e.g., form 5 will have valid scores for the space perception subtest; form 15 will have valid scores for the coding speed and auto/shop subtests).

form, or version codes are not available, the Defense Manpower Data Center (DMDC) can be requested to provide such information.

Table 5 details the historical problems that have been experienced with each ASVAB form and notes step-by-step instructions to computing an accurate and current AFQT percentile score. The basic logic for computing current AFQT percentile scores from subtest raw scores is to:

- Compute subtest standard score on the 1980 score scale. (For ASVAB forms 5/6/7, it is also necessary to account for a missing AFQT subtest that was not administered as part of these forms.)
- Sum these subtest standard scores.
- Convert the 1980 sum of subtest standard scores to an AFQT percentile.

These steps are explained separately for each ASVAB form.

The conversion tables necessary to conduct the above steps are reported in appendix A. To facilitate making accurate computations, each conversion table has also been programmed in both SAS and COBOL and stored on CNA's computer system. The names, logic, and documentation for these programs are presented in appendix B. Most of the conversion tables were produced by the DOD Executive Agent for the ASVAB testing program. However, CNA developed some conversion tables to address specific problems for which official DOD conversions tables do not exist. Appendix C discusses the methodology and data sets that CNA used to create these unofficial conversion tables.

ASVAB Forms 5/6/7

The current definition of AFQT (2VE + AR + MK) requires a subtest that was not administered in ASVAB forms 5/6/7: paragraph comprehension (PC). The verbal composite (VE) is a sum of subtest raw scores for PC and word knowledge (WK). To account for these subtest differences across ASVAB forms, the WK subtest is substituted as a content-similar subtest to approximate VE. As table 5 outlines, raw scores for WK, AR, and MK are converted to subtest standard scores (SS) based on table A-1. The subtest standard scores are summed, giving WK a weight of 2.

The sum of subtest standard scores (SSS) are on the WWII score scale. To convert these scores to the 1980 score scale, table A-2 is applied. CNA developed this table (there is no official DOD table). Appendix C presents details of the development of this table.

The final step is to convert the 1980 sum of subtest standard scores to an AFQT percentile score. This conversion is accomplished in table A-3. The entire procedure results in an approximation of the current AFQT percentile score on the 1980 score scale for individuals who were administered ASVAB forms 5/6/7.

Table 5. Computing current AFQT from historical subtest raw scores

<u>ASVAB form</u>	<u>Problem</u>	<u>Solution</u>
5/6/7	- Current AFQT (2VE + AR + MK) includes a subtest (PC) that was not administered in forms 5/6/7 - AFQT score scale changes from WWII to 1980 reference	- Use content-similar subtest to approximate current VE score - Compute subtest standard scores for WK, AR, and MK in WWII score scale from table A-1 - Sum subtest standard scores (2WK + AR + MK) - Convert WWII sum of subtest standard scores to 1980 sum of subtest standard scores using table A-2 - Convert 1980 sum of subtest standard scores to AFQT percentile score using table A-3
8/9/10	- AFQT score scale changes from WWII to 1980 reference - Current AFQT differs from AFQT definition for these ASVAB forms	- Compute subtest standard scores on 1980 score scale for current AFQT subtests (VE, AR, and MK) using table A-4 - Sum standard scores for current AFQT subtests (2VE + AR + MK) and convert sum to AFQT percentile score using table A-3
11/12/13/14	Current AFQT differs from AFQT definition for these ASVAB forms	Compute subtest standard scores for current AFQT subtests using appropriate conversion table

<u>ASVAB form</u>	<u>Conversion table</u>
13c/14	A-4
11/12b/13	A-5
12a	A-6

1b.	Sum standard scores for current AFQT subtests (2VE + AR + MK) and convert sum to AFQT percentile score using table A-3
-----	--

Table 5. (Continued)

ASVAB form	Problem	Solution																
15/16/17	1. No problem with AFQT score of record (except for person tested in the IOT&E)	1a. Compute subtest standard scores for current AFQT subtests using appropriate conversion table																
		<table><tr><th>ASVAB form</th><th>Conversion table</th></tr><tr><td>15a</td><td>A-7</td></tr><tr><td>15c</td><td>A-4</td></tr><tr><td>15b</td><td>A-8</td></tr><tr><td>16a</td><td>A-9</td></tr><tr><td>16b</td><td>A-10</td></tr><tr><td>17a</td><td>A-11</td></tr><tr><td>17b</td><td>A-12</td></tr></table>	ASVAB form	Conversion table	15a	A-7	15c	A-4	15b	A-8	16a	A-9	16b	A-10	17a	A-11	17b	A-12
ASVAB form	Conversion table																	
15a	A-7																	
15c	A-4																	
15b	A-8																	
16a	A-9																	
16b	A-10																	
17a	A-11																	
17b	A-12																	
		1b. Sum standard scores for current AFQT subtests (2VE + AR + MK) and convert sum to AFQT percentile score using table A-3																

All Other ASVAB Forms

All ASVAB forms since 8/9/10 have had the same complement of subtests. Although the subtest definition of the AFQT has changed during this period, the actual subtests of the ASVAB have not. Therefore, one can directly compute the current definition of the AFQT for all forms since 8/9/10.

As shown in table 5, the initial step is to convert raw scores to standard scores on the 1980 score scale for the subtests of the current AFQT. Official DOD conversion tables accomplish this conversion by putting all standard scores on the 1980 score scale. However, the appropriate conversion table to be applied to the raw scores depends on the respective ASVAB form that was administered. The number of conversion tables has multiplied with the introduction of the more recent ASVAB forms: forms 8/9/10, 13c, 14, and 15c use a single table (A-4); forms 11/12b/13 use one table (A-5); form 12a has a separate table (A-6); and each version (a and b) of forms 15/16/17 has its own table (tables A-7 through A-12).¹

Next, the subtest standard scores are aggregated, giving VE a weight of 2. The same table (A-3) that was applied earlier for forms 5/6/7 is applied again here to the 1980 sum of subtest standard scores to determine the correct AFQT percentile score.

The prior procedures for computing a current AFQT required that subtest raw scores, ASVAB version and form codes, and test administration date be available for each examinee. Often such raw score information is not available. The appropriate solution is to request these data from DMDC so that estimations of the current AFQT will be accurate.

SUMMARY

The AFQT has been the historical measure of recruit quality. Its definition and the method by which it has been computed have evolved so that longitudinal comparisons are not warranted unless a common definition and computational formula are used. This research memorandum has explained many of the past ASVAB testing problems and AFQT modifications and has provided conversion tables so that the current AFQT definition and score scale can be computed for individuals who have been administered any ASVAB forms since 5/6/7.

1. Essentially all AFQT scores of record for forms 15/16/17 are based on the current AFQT definition and computational procedures. However, some applicants who participated in the Initial Operational Test and Evaluation (IOT&E) for forms 15/16/17 may have the old AFQT definition and score scale in their record. If subtest raw scores are available for individuals who were administered form 15/16/17 before January 1989, we recommend that the current AFQT percentile be recomputed.

Table 5 is the blueprint for understanding the problems with historical data sets and how to compute the current AFQT. The only accurate method is to recompute the current AFQT from the subtest raw scores. Although computationally complex, this method ensures the most accurate estimate of the current AFQT. If subtest information is not available, we recommend that such data be requested from DMDC.

This research memorandum provides considerable details to accomplish the AFQT score conversions. The conversion tables are listed in appendix A and have also been put on the CNA computer system to assist researchers in computing AFQT scores from historical databases and to ensure that the necessary conversions are accurately applied.

APPENDIX A

**CONVERSION TABLES REQUIRED FOR COMPUTING CURRENT
AFQT FROM HISTORICAL SUBTEST RAW SCORES**

APPENDIX A

CONVERSION TABLES REQUIRED FOR COMPUTING CURRENT AFQT FROM HISTORICAL SUBTEST RAW SCORES

Table 5 of the main text details the procedures that are required to apply tables A-1 through A-12 to produce current AFQT percentile scores. The computer programs to implement these procedures can be found in appendix B.

Table A-1. ASVAB 5/6/7 subtest conversion table in WWII metric

Raw score	Subtest standard score												Raw score
	GI	WK	AR	SP	AD	MK	EI	MC	GS	AI	SI	NO	
0	20	23	23	20	20	26	20	25	24	26	20	20	0
1	24	24	25	21	20	28	20	27	26	28	21	20	1
2	27	26	27	24	20	30	21	30	29	30	23	21	2
3	30	27	29	26	21	32	22	32	31	32	25	22	3
4	33	28	32	28	24	35	24	34	33	34	28	23	4
5	36	30	34	31	26	37	26	37	36	36	30	24	5
6	39	31	36	33	29	39	27	39	38	38	32	25	6
7	42	33	38	35	31	41	29	41	40	40	35	26	7
8	45	34	40	38	34	43	31	43	42	42	37	27	8
9	48	35	42	40	36	45	32	46	45	44	39	28	9
10	51	37	44	42	39	47	34	48	47	46	42	29	10
11	54	38	46	45	41	49	36	50	49	48	44	30	11
12	57	39	48	47	44	51	37	53	52	50	46	31	12
13	60	41	51	50	46	53	39	55	54	52	48	32	13
14	63	42	53	52	49	55	41	57	56	55	51	33	14
15	66	44	55	54	51	57	42	60	58	57	53	34	15
16		45	57	57	54	59	44	62	61	59	55	35	16
17		46	59	59	57	61	46	64	63	61	58	36	17
18		48	61	61	59	63	48	66	65	63	60	37	18
19		49	63	64	62	65	49	69	68	65	62	38	19
20		50	65	66	64	67	51	71	70	67	65	39	20
21		52			67		53					40	21
22		53			69		54					41	22
23		55			72		56					42	23
24		56			74		58					43	24
25		57			77		59					44	25
26		59			79		61					45	26
27		60			80		63					46	27
28		62			80		64					47	28
29		63			80		66					48	29
30		64			80		68					49	30
31												50	31
32												51	32
33												52	33
34												53	34
35												54	35
36												55	36
37												56	37
38												57	38
39												58	39
40												59	40
41												60	41
42												61	42
43												62	43
44												63	44
45												64	45
46												65	46
47												66	47
48												67	48
49												68	49
50												69	50

SOURCE: DOD 1304.12W (1 Oct 1980).

**Table A-2. Converting WWII subtest standard scores
(2WK+AR+MK) to 1980 subtest standard scores (2VE+AR+MK)**

WWII	1980	WWII	1980	WWII	1980	WWII	1980
95	96	146	145	196	194	246	240
96	96	147	146	197	195	247	241
97	97	148	147	198	196	248	242
98	98	149	147	199	197	249	243
99	99	150	148	200	198	250	244
100	100	151	148	201	199	251	245
101	101	152	149	202	200	252	246
102	103	153	150	203	201	253	247
103	104	154	151	204	202	254	248
104	105	155	152	205	203	255	249
105	106	156	153	206	203	256	250
106	106	157	153	207	204	257	251
107	107	158	154	208	205	258	252
108	108	159	155	209	206	259	253
109	108	160	155	210	207	260	254
110	109	161	156	211	208	261	257
111	110	162	158	212	209	262	258
112	111	163	159	213	210	263	258
113	111	164	160	214	211	264	258
114	112	165	161	215	212		
115	113	166	162	216	213		
116	114	167	163	217	214		
117	115	168	165	218	215		
118	115	169	166	219	215		
119	116	170	167	220	216		
120	117	171	168	221	217		
121	118	172	169	222	218		
122	119	173	170	223	219		
123	121	174	171	224	219		
124	122	175	172	225	220		
125	122	176	173	226	221		
126	123	177	174	227	222		
127	124	178	176	228	223		
128	125	179	177	229	224		
129	126	180	178	230	225		
130	127	181	179	231	227		
131	128	182	180	232	228		
132	129	183	181	233	228		
133	130	184	182	234	229		
134	131	185	183	235	230		
135	132	186	184	236	231		
136	133	187	185	237	232		
137	134	188	186	238	233		
138	135	189	187	239	234		
139	136	190	188	240	235		
140	137	191	190	241	236		
141	138	192	191	242	237		
142	139	193	192	243	238		
143	140	194	192	244	238		
144	141	195	193	245	239		
145	144						

SOURCE: CNA (see appendix C).

Table A-3. AFQT standard score to 1980 percentile score conversions

Standard score	Percentile	Standard Score	Percentile	Standard score	Percentile
80-120	1	166	21	211	56
121	2	167	21	212	57
122	2	168	22	213	58
123	2	169	22	214	59
124	2	170	23	215	61
125	3	171	23	216	62
126	3	172	24	217	63
127	3	173	25	218	64
128	4	174	25	219	65
129	4	175	26	220	66
130	4	176	27	221	67
131	4	177	27	222	68
132	5	178	28	223	69
133	5	179	29	224	70
134	5	180	29	225	71
135	6	181	30	226	72
136	6	182	31	227	73
137	6	183	32	228	74
138	7	184	32	229	75
139	7	185	33	230	76
140	8	186	34	231	77
141	8	187	35	232	78
142	8	188	35	233	79
143	9	189	36	234	80
144	9	190	37	235	80
145	10	191	38	236	81
146	10	192	39	237	82
147	11	193	40	238	84
148	11	194	41	239	84
149	12	195	42	240	85
150	12	196	42	241	86
151	13	197	43	242	87
152	13	198	44	243	88
153	13	199	45	244	89
154	14	200	46	245	90
155	15	201	47	246	91
156	15	202	48	247	92
157	16	203	49	248	93
158	16	204	50	249	94
159	17	205	51	250	95
160	17	206	52	251	96
161	18	207	53	252	97
162	18	208	53	253	98
163	19	209	54	254-320	99
164	19	210	55		
165	20				

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-4. Conversion of test raw scores to 1980 standard score equivalents (ASVAB forms 8A/8B/9A/9B/10A/10B/10X/10Y/13C/14A/14B/14C/15C)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	24	29	24	23	20	00
01	20	27	20	20	20	22	26	30	25	25	20	01
02	22	28	20	23	20	23	28	32	27	27	20	02
03	24	30	20	26	20	23	30	33	29	30	20	03
04	26	31	21	29	20	24	31	35	31	32	20	04
05	28	32	22	32	20	25	33	37	33	34	20	05
06	30	34	24	35	21	25	35	38	35	37	20	06
07	32	35	25	38	22	26	37	40	37	39	21	07
08	34	36	26	41	23	26	39	41	38	42	22	08
09	36	38	28	44	24	27	40	43	40	44	23	09
10	38	39	29	47	25	28	42	44	42	46	24	10
11	40	40	30	50	26	28	44	46	44	49	25	11
12	42	42	31	53	27	29	46	48	46	51	26	12
13	44	43	33	56	28	29	48	49	48	53	27	13
14	46	45	34	59	28	30	49	51	50	56	28	14
15	48	46	35	62	29	31	51	52	52	58	29	15
16	50	47	37		30	31	53	54	53	60	30	16
17	52	49	38		31	32	55	55	55	63	31	17
18	54	50	39		32	32	57	57	57	65	32	18
19	56	51	41		33	33	58	58	59	68	33	19
20	58	53	42		34	34	60	60	61	70	34	20
21	60	54	43		35	34	62	62	63		35	21
22	62	55	44		36	35	64	63	65		36	22
23	64	57	46		37	35	66	65	67		37	23
24	66	58	47		38	36	67	66	68		37	24
25	68	59	48		39	37	69	68	70		38	25
26		61	50		40	37					39	26
27		62	51		41	38					40	27
28		64	52		41	38					41	28
29		65	54		42	39					42	29
30		66	55		43	39					43	30
31			56		44	40					44	31
32			57		45	41					45	32
33			59		46	41					46	33
34			60		47	42					47	34
35			61		48	42					48	35
36					49	43					49	36
37					50	44					50	37
38					51	44					51	38
39					52	45					52	39
40					53	45					53	40
41					53	46					54	41
42					54	47					54	42
43					55	47					55	43
44					56	48					56	44

Table A-4. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					57	48					57	45
46					58	49					58	46
47					59	50					59	47
48					60	50					60	48
49					61	51					61	49
50					62	51					62	50
51						52						51
52						53						52
53						53						53
54						54						54
55						54						55
56						55						56
57						56						57
58						56						58
59						57						59
60						57						60
61						58						61
62						59						62
63						59						63
64						60						64
65						60						65
66						61						66
67						62						67
68						62						68
69						63						69
70						63						70
71						64						71
72						65						72
73						65						73
74						66						74
75						66						75
76						67						76
77						68						77
78						68						78
79						69						79
80						69						80
81						70						81
82						71						82
83						71						83
84						72						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-5. Conversion of test raw scores to 1980 standard score equivalents (ASVAB forms 11A/11B/12B/13A/13B)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	21	26	22	21	20	22	26	30	24	23	21	00
01	23	26	23	24	20	22	27	32	24	26	21	01
02	25	27	24	26	20	23	29	33	25	28	22	02
03	26	28	25	29	20	23	31	35	27	30	23	03
04	28	30	26	32	21	24	32	36	29	32	24	04
05	30	31	27	34	22	24	34	38	31	35	25	05
06	32	32	28	37	23	25	36	39	33	37	25	06
07	33	34	30	40	24	26	37	41	35	39	26	07
08	35	35	31	42	24	26	39	42	37	42	27	08
09	37	36	32	45	25	27	41	44	39	44	28	09
10	39	38	33	48	26	27	43	45	41	46	29	10
11	40	39	34	50	27	28	44	47	43	48	30	11
12	42	40	35	53	28	29	46	48	45	51	30	12
13	44	42	36	56	29	29	48	50	47	53	31	13
14	46	43	37	58	30	30	49	51	49	55	32	14
15	48	44	39	61	31	30	51	52	51	58	33	15
16	49	46	40		32	31	53	54	53	60	34	16
17	51	47	41		33	31	54	55	55	62	34	17
18	53	48	42		34	32	56	57	57	64	35	18
19	55	50	43		35	33	58	58	59	67	36	19
20	56	51	44		36	33	60	60	61	69	37	20
21	58	52	45		36	34	61	61	63		38	21
22	59	54	47		37	34	63	63	65		39	22
23	62	55	48		38	35	65	64	67		39	23
24	63	56	49		39	36	66	66	69		40	24
25	65	58	50		40	36	68	67	70		41	25
26		59	51		41	37					42	26
27		60	52		42	37					43	27
28		62	53		43	38					44	28
29		63	55		44	39					44	29
30		64	56		45	39					45	30
31			57		46	40					46	31
32			58		47	40					47	32
33			59		48	41					48	33
34			60		48	41					48	34
35			61		49	42					49	35
36					50	43					50	36
37					51	43					51	37
38					52	44					52	38
39					53	44					53	39
40					54	45					53	40
41					55	46					54	41
42					56	46					55	42
43					57	47					56	43
44					58	47					57	44

Table A-5. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					59	48					57	45
46					60	48					58	46
47					61	49					59	47
48					61	50					60	48
49					62	50					61	49
50					62	51					62	50
51						51						51
52						52						52
53						53						53
54						53						54
55						54						55
56						54						56
57						55						57
58						56						58
59						56						59
60						57						60
61						57						61
62						58						62
63						58						63
64						59						64
65						60						65
66						60						66
67						61						67
68						61						68
69						62						69
70						63						70
71						63						71
72						64						72
73						64						73
74						65						74
75						66						75
76						66						76
77						67						77
78						67						78
79						68						79
80						68						80
81						69						81
82						70						82
83						70						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-6. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 12A)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	27	30	24	23	20	00
01	20	26	20	20	20	22	28	32	26	24	20	01
02	21	28	20	24	20	23	30	34	28	26	20	02
03	23	29	21	28	20	23	32	36	29	29	20	03
04	25	30	23	32	21	24	34	37	31	31	20	04
05	28	32	25	36	22	24	36	39	33	34	21	05
06	30	33	26	39	23	25	37	40	34	36	22	06
07	32	34	28	42	24	26	39	42	36	38	23	07
08	34	36	30	45	25	26	41	43	38	41	24	08
09	36	37	31	48	26	27	42	45	39	43	25	09
10	38	38	33	51	27	28	44	46	41	45	27	10
11	40	39	34	53	28	28	45	47	43	47	28	11
12	42	41	36	55	29	29	47	49	45	50	29	12
13	43	42	37	58	30	29	48	50	47	52	30	13
14	45	43	38	59	31	30	50	51	49	54	31	14
15	47	44	39	61	32	31	51	52	51	56	32	15
16	48	45	40		33	31	53	54	53	59	33	16
17	50	47	42		34	32	55	55	55	61	34	17
18	52	48	43		35	33	56	56	57	63	36	18
19	54	49	44		36	33	58	58	59	66	37	19
20	56	50	45		37	34	60	59	61	68	38	20
21	58	52	46		38	34	62	61	63		38	21
22	60	53	47		39	35	64	63	65		39	22
23	62	55	48		40	35	66	64	67		40	23
24	64	56	49		41	36	68	66	69		41	24
25	67	57	50		42	37	69	68	70		42	25
26		59	51		44	37					43	26
27		61	52		45	38					44	27
28		62	53		46	38					45	28
29		64	54		47	39					46	29
30		66	55		48	40					46	30
31			57		49	40					47	31
32			58		50	41					48	32
33			59		50	41					49	33
34			60		51	42					50	34
35			61		52	42					50	35
36					53	43					51	36
37					54	44					52	37
38					55	44					53	38
39					56	45					54	39
40					57	45					54	40
41					57	46					55	41
42					58	46					56	42
43					59	47					56	43
44					60	47					57	44

Table A-6. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					60	48					58	45
46					61	49					59	46
47					61	49					59	47
48					62	50					60	48
49					62	50					61	49
50					62	51					62	50
51						51						51
52						52						52
53						52						53
54						53						54
55						54						55
56						54						56
57						55						57
58						55						58
59						56						59
60						56						60
61						57						61
62						58						62
63						58						63
64						59						64
65						59						65
66						60						66
67						61						67
68						61						68
69						62						69
70						62						70
71						63						71
72						64						72
73						64						73
74						65						74
75						65						75
76						66						76
77						67						77
78						67						78
79						68						79
80						69						80
81						69						81
82						70						82
83						71						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-7. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 15A)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	21	20	20	22	25	29	24	23	20	00
01	20	26	22	20	20	22	27	30	26	23	20	01
02	22	27	23	20	20	23	29	31	27	26	20	02
03	24	28	24	23	20	23	31	33	29	28	21	03
04	26	30	25	26	21	24	32	34	31	31	21	04
05	28	31	26	29	22	24	34	36	32	33	22	05
06	30	33	28	32	23	25	36	38	34	36	23	06
07	32	34	29	35	24	26	38	39	36	38	24	07
08	34	35	30	38	25	26	39	41	37	41	25	08
09	36	37	31	41	26	27	41	42	39	43	26	09
10	38	38	32	44	26	27	43	44	41	46	27	10
11	40	40	33	47	27	28	45	46	43	48	27	11
12	42	41	34	51	28	29	46	47	44	51	28	12
13	44	42	36	54	29	29	48	49	46	53	29	13
14	46	44	37	57	30	30	50	50	48	56	30	14
15	47	45	38	60	31	30	52	52	50	59	31	15
16	49	47	39		32	31	53	53	52	61	32	16
17	51	48	40		33	32	55	55	54	64	33	17
18	53	49	41		34	32	57	57	56	66	33	18
19	55	51	42		34	33	59	58	58	69	34	19
20	57	52	44		35	33	61	60	60	70	35	20
21	59	54	45		36	34	62	61	62		36	21
22	61	55	46		37	35	64	63	65		37	22
23	63	56	47		38	35	66	65	67		38	23
24	65	58	48		39	36	68	66	69		39	24
25	67	59	49		40	36	69	68	70		39	25
26		61	50		41	37					40	26
27		62	52		42	37					41	27
28		63	53		42	38					42	28
29		65	54		43	39					43	29
30		66	55		44	39					44	30
31			56		45	40					45	31
32			57		46	40					45	32
33			58		47	41					46	33
34			60		48	42					47	34
35			61		49	42					48	35
36					50	43					49	36
37					51	43					50	37
38					51	44					50	38
39					52	45					51	39
40					53	45					52	40
41					54	46					53	41
42					55	46					54	42
43					56	47					55	43
44					57	48					56	44

Table A-7. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					58	48					56	45
46					59	49					57	46
47					59	49					58	47
48					60	50					59	48
49					61	51					60	49
50					62	51					61	50
51						52						51
52						52						52
53						53						53
54						53						54
55						54						55
56						55						56
57						55						57
58						56						58
59						56						59
60						57						60
61						58						61
62						58						62
63						59						63
64						59						64
65						60						65
66						61						66
67						61						67
68						62						68
69						62						69
70						63						70
71						64						71
72						64						72
73						65						73
74						65						74
75						66						75
76						66						76
77						67						77
78						68						78
79						68						79
80						69						80
81						69						81
82						70						82
83						71						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-8. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 15B)

Raw	GS	AR	WK	PC	NO	GS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	25	29	24	23	20	00
01	20	26	20	20	20	22	27	30	26	23	20	01
02	22	27	20	21	20	23	29	31	27	26	20	02
03	24	28	22	24	20	23	31	33	29	28	20	03
04	26	30	23	27	20	24	32	34	31	31	20	04
05	28	31	24	30	21	24	34	36	32	33	21	05
06	30	33	25	33	22	25	36	38	34	36	22	06
07	32	34	27	36	23	26	38	39	36	38	22	07
08	34	35	28	39	24	26	39	41	37	41	23	08
09	36	37	29	42	25	27	41	42	39	43	24	09
10	38	38	30	45	26	27	43	44	41	46	25	10
11	40	40	32	48	26	28	45	46	43	48	26	11
12	42	41	33	51	27	29	46	47	44	51	27	12
13	44	42	34	54	28	29	48	49	46	53	28	13
14	46	44	35	57	29	30	50	50	48	56	29	14
15	47	45	37	60	30	30	52	52	50	59	30	15
16	49	46	38		31	31	53	53	52	61	31	16
17	51	48	39		32	32	55	55	54	64	31	17
18	53	49	40		33	32	57	57	56	66	32	18
19	55	51	42		34	33	59	58	58	69	33	19
20	57	52	43		35	33	61	60	60	70	34	20
21	59	53	44		36	34	62	61	62		35	21
22	61	55	45		36	35	64	63	65		36	22
23	63	56	47		37	35	66	65	67		37	23
24	65	58	48		38	36	68	66	69		38	24
25	67	59	49		39	36	69	68	70		39	25
26		60	50		40	37					40	26
27		62	52		41	37					41	27
28		63	53		42	38					41	28
29		64	54		43	39					42	29
30		66	55		44	39					43	30
31			57		45	40					44	31
32			58		46	40					45	32
33			59		47	41					46	33
34			60		47	42					47	34
35			61		48	42					48	35
36					49	43					49	36
37					50	43					50	37
38					51	44					50	38
39					52	45					51	39
40					53	45					52	40
41					54	46					53	41
42					55	46					54	42
43					56	47					55	43
44					57	48					56	44

Table A-8. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					57	48					57	45
46					58	49					58	46
47					59	49					59	47
48					60	50					60	48
49					61	51					60	49
50					62	51					61	50
51						52						51
52						52						52
53						53						53
54						53						54
55						54						55
56						55						56
57						55						57
58						56						58
59						56						59
60						57						60
61						58						61
62						58						62
63						59						63
64						59						64
65						60						65
66						61						66
67						61						67
68						62						68
69						62						69
70						63						70
71						64						71
72						64						72
73						65						73
74						65						74
75						66						75
76						66						76
77						67						77
78						68						78
79						68						79
80						69						80
81						69						81
82						70						82
83						71						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-9. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 16A)

Raw	GS	AR	WK	PC	NO	CS	AS	M	MC	EI	VE	Raw
00	20	26	20	20	20	22	29	29	24	23	20	00
01	22	26	20	20	20	22	31	30	25	25	20	01
02	24	26	20	22	20	22	32	32	27	27	20	02
03	26	27	21	25	20	23	34	33	28	29	20	03
04	28	29	22	28	20	23	35	35	30	32	20	04
05	29	30	23	31	20	24	37	37	32	34	20	05
06	31	32	25	34	20	25	38	38	33	36	21	06
07	33	33	26	36	20	25	40	40	35	39	22	07
08	35	35	27	39	21	26	41	41	37	41	23	08
09	37	36	28	42	22	26	43	43	39	43	24	09
10	39	38	30	45	23	27	45	44	40	45	25	10
11	41	39	31	48	24	28	46	46	42	48	26	11
12	42	40	32	51	25	28	48	47	44	50	27	12
13	44	42	33	53	26	29	49	49	46	52	28	13
14	46	43	35	56	27	29	51	50	48	55	28	14
15	48	45	36	59	28	30	52	52	50	57	29	15
16	50	46	37		29	31	54	54	52	59	30	16
17	52	48	39		30	31	55	55	54	61	31	17
18	54	49	40		31	32	57	57	56	64	32	18
19	55	51	41		32	32	58	58	58	66	33	19
20	57	52	42		33	33	60	60	60	68	34	20
21	59	54	44		33	34	62	61	62		35	21
22	61	55	45		34	34	63	63	64		36	22
23	63	56	46		35	35	65	64	67		37	23
24	65	58	47		36	35	66	66	69		38	24
25	67	59	49		37	36	68	67	70		38	25
26		61	50		38	37					39	26
27		62	51		39	37					40	27
28		64	53		40	38					41	28
29		65	54		41	39					42	29
30		66	55		42	39					43	30
31			56		43	40					44	31
32			58		44	40					45	32
33			59		45	41					46	33
34			60		46	42					47	34
35			61		47	42					48	35
36					48	43					48	36
37					49	43					49	37
38					50	44					50	38
39					51	45					51	39
40					52	45					52	40
41					53	46					53	41
42					54	46					54	42
43					55	47					55	43
44					55	48					56	44

Table A-9. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					56	48					57	45
46					57	49					57	46
47					58	49					58	47
48					59	50					59	48
49					60	51					60	49
50					61	51					61	50
51						52						51
52						52						52
53						53						53
54						54						54
55						54						55
56						55						56
57						55						57
58						56						58
59						57						59
60						57						60
61						58						61
62						59						62
63						59						63
64						60						64
65						60						65
66						61						66
67						62						67
68						62						68
69						63						69
70						63						70
71						64						71
72						65						72
73						65						73
74						66						74
75						66						75
76						67						76
77						68						77
78						68						78
79						69						79
80						69						80
81						70						81
82						71						82
83						71						83
84						72						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-10. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 16B)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	29	29	24	23	20	00
01	22	26	20	20	20	22	31	30	25	25	20	01
02	24	28	20	21	20	22	32	32	27	27	20	02
03	26	29	20	24	20	23	34	33	28	29	20	03
04	28	30	21	27	20	23	35	35	30	32	20	04
05	29	32	22	30	20	24	37	37	32	34	20	05
06	31	33	23	33	20	25	38	38	33	36	20	06
07	33	35	25	36	21	25	40	40	35	39	21	07
08	35	36	26	39	22	26	41	41	37	41	22	08
09	37	37	27	42	23	26	43	43	39	43	23	09
10	39	39	29	45	24	27	45	44	40	45	24	10
11	41	40	30	48	25	28	46	46	42	48	25	11
12	42	41	31	51	26	28	48	47	44	50	26	12
13	44	43	33	54	27	29	49	49	46	52	26	13
14	46	44	34	57	28	29	51	50	48	55	27	14
15	48	45	35	60	29	30	52	52	50	57	28	15
16	50	47	36		30	31	54	54	52	59	29	16
17	52	48	38		31	31	55	55	54	61	30	17
18	54	49	39		32	32	57	57	56	64	31	18
19	55	51	40		33	32	58	58	58	66	32	19
20	57	52	42		34	33	60	60	60	68	33	20
21	59	54	43		35	34	62	61	62		34	21
22	61	55	44		35	34	63	63	64		35	22
23	63	56	46		36	35	65	64	67		36	23
24	65	58	47		37	35	66	66	69		37	24
25	67	59	48		38	36	68	67	70		38	25
26		60	50		39	37					39	26
27		62	51		40	37					40	27
28		63	52		41	38					41	28
29		64	54		42	39					42	29
30		66	55		43	39					43	30
31			56		44	40					44	31
32			58		45	40					44	32
33			59		46	41					45	33
34			60		47	42					46	34
35			61		48	42					47	35
36					49	43					48	36
37					50	43					49	37
38					51	44					50	38
39					52	45					51	39
40					53	45					52	40
41					53	46					53	41
42					54	46					54	42
43					55	47					55	43
44					56	48					56	44

Table A-10. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					57	48					57	45
46					58	49					58	46
47					59	49					59	47
48					60	50					60	48
49					61	51					61	49
50					62	51					62	50
51						52						51
52						52						52
53						53						53
54						54						54
55						54						55
56						55						56
57						55						57
58						56						58
59						57						59
60						57						60
61						58						61
62						59						62
63						59						63
64						60						64
65						60						65
66						61						66
67						62						67
68						62						68
69						63						69
70						63						70
71						64						71
72						65						72
73						65						73
74						66						74
75						66						75
76						67						76
77						68						77
78						68						78
79						69						79
80						69						80
81						70						81
82						71						82
83						71						83
84						72						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-11. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 17A)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	26	29	25	23	20	00
01	21	27	21	20	20	22	28	29	26	26	20	01
02	23	28	22	22	20	22	29	30	27	28	20	02
03	25	30	23	25	20	22	31	32	29	30	20	03
04	27	31	24	28	20	23	33	34	30	32	21	04
05	28	32	25	31	20	24	34	35	31	35	22	05
06	30	34	27	34	21	24	36	37	33	37	23	06
07	32	35	28	37	22	25	38	39	35	39	24	07
08	34	36	29	40	22	25	39	40	36	41	25	08
09	36	38	30	42	23	26	41	42	38	44	25	09
10	38	39	31	45	24	27	43	44	40	46	26	10
11	40	40	33	48	25	27	45	45	42	48	27	11
12	42	42	34	51	26	28	46	47	44	50	28	12
13	44	43	35	54	27	29	48	49	46	53	29	13
14	46	44	36	57	28	29	50	50	48	55	30	14
15	48	46	37	60	29	30	51	52	50	57	31	15
16	50	47	38		30	30	53	54	52	60	31	16
17	52	48	40		31	31	55	55	54	62	32	17
18	54	50	41		32	32	56	57	56	64	33	18
19	56	51	42		33	32	58	58	58	66	34	19
20	58	52	43		34	33	60	60	60	69	35	20
21	60	53	44		35	33	61	62	63		36	21
22	62	55	45		36	34	63	63	65		37	22
23	64	56	47		37	35	65	65	67		37	23
24	65	57	48		37	35	66	67	69		38	24
25	67	59	49		38	36	68	68	70		39	25
26		60	50		39	36					40	26
27		61	51		40	37					41	27
28		63	53		41	38					42	28
29		64	54		42	38					43	29
30		65	55		43	39					44	30
31			56		44	39					44	31
32			57		45	40					45	32
33			58		46	41					46	33
34			60		47	41					47	34
35			61		48	42					48	35
36					49	42					49	36
37					50	43					50	37
38					51	44					50	38
39					51	44					51	39
40					52	45					52	40
41					53	45					53	41
42					54	46					54	42
43					55	47					55	43
44					56	47					56	44

Table A-11. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					57	48					57	45
46					58	48					57	46
47					59	49					58	47
48					60	50					59	48
49					61	50					60	49
50					62	51					61	50
51						52						51
52						52						52
53						53						55
54						53						54
55						54						55
56						55						56
57						55						57
58						56						58
59						56						59
60						57						60
61						58						61
62						58						62
63						59						63
64						59						64
65						60						65
66						61						66
67						61						67
68						62						68
69						62						69
70						63						70
71						64						71
72						64						72
73						65						73
74						65						74
75						66						75
76						67						76
77						67						77
78						68						78
79						68						79
80						69						80
81						70						81
82						70						82
83						71						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

Table A-12. Conversion of test raw scores to 1980 standard score equivalents (ASVAB form 17B)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
00	20	26	20	20	20	22	26	29	25	23	20	00
01	21	26	20	20	20	22	28	29	26	26	20	01
02	23	28	20	20	20	22	29	30	27	28	20	02
03	25	29	22	23	20	22	31	32	29	30	20	03
04	27	31	23	26	20	23	33	34	30	32	20	04
05	28	32	24	30	20	24	34	35	31	35	20	05
06	30	33	25	33	21	24	36	37	33	37	21	06
07	32	35	27	36	22	25	38	39	35	39	22	07
08	34	36	28	39	23	25	39	40	36	41	23	08
09	36	37	29	42	23	26	41	42	38	44	24	09
10	38	39	30	45	24	27	43	44	40	46	25	10
11	40	40	32	48	25	27	45	45	42	48	26	11
12	42	42	33	51	26	28	46	47	44	50	27	12
13	44	43	34	54	27	29	48	49	46	53	28	13
14	46	44	35	58	28	29	50	50	48	55	28	14
15	48	46	36	61	29	30	51	52	50	57	29	15
16	50	47	38		30	30	53	54	52	60	30	16
17	52	48	39		31	31	55	55	54	62	31	17
18	54	50	40		32	32	56	57	56	64	32	18
19	56	51	41		33	32	58	58	58	66	33	19
20	58	53	43		34	33	60	60	60	69	34	20
21	60	54	44		35	33	61	62	63		35	21
22	62	55	45		36	34	63	63	65		36	22
23	64	57	46		37	35	65	65	67		37	23
24	65	58	47		38	35	66	67	69		38	24
25	67	59	49		38	36	68	68	70		38	25
26		61	50		39	36					39	26
27		62	51		40	37					40	27
28		63	52		41	38					41	28
29		65	54		42	38					42	29
30		66	55		43	39					43	30
31			56		44	39					44	31
32			57		45	40					45	32
33			58		46	41					46	33
34			60		47	41					47	34
35			61		48	42					48	35
36					49	42					49	36
37					50	43					49	37
38					51	44					50	38
39					52	44					51	39
40					53	45					52	40
41					53	45					53	41
42					54	46					54	42
43					55	47					55	43
44					56	47					56	44

Table A-12. (Continued)

Raw	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI	VE	Raw
45					57	48					57	45
46					58	48					58	46
47					59	49					59	47
48					60	50					59	48
49					61	50					60	49
50					62	51					61	50
51						52						51
52						52						52
53						53						53
54						53						54
55						54						55
56						55						56
57						55						57
58						56						58
59						56						59
60						57						60
61						58						61
62						58						62
63						59						63
64						59						64
65						60						65
66						61						66
67						61						67
68						62						68
69						62						69
70						63						70
71						64						71
72						64						72
73						65						73
74						65						74
75						66						75
76						67						76
77						67						77
78						68						78
79						68						79
80						69						80
81						70						81
82						70						82
83						71						83
84						71						84

SOURCE: DOD 1304.12W (1 Jan 1989).

APPENDIX B

**COMPUTER PROGRAMS TO COMPUTE CURRENT AFQT
FROM HISTORICAL SUBTEST RAW SCORES**

APPENDIX B

COMPUTER PROGRAMS TO COMPUTE CURRENT AFQT FROM HISTORICAL SUBTEST RAW SCORES

The computer program provided here will help in converting subtest raw scores to the current AFQT percentile scores for ASVAB forms 5 through 17. Two versions of the program exist, one in COBOL [CONVERT_RAW.COB] and the other in SAS [CONVERT_RAW.SAS]. The COBOL program also computes subtest standard scores for forms 8 through 17 as well as for the four Marine Corps aptitude composites and AFQT. The SAS program makes the necessary conversion only for the AFQT, not for the other subtests or composites. All converted scores are standardized to a common mean and standard deviation in the 1980 Youth Population.

The sources of aptitude information for Marines are many. Specific Marine Corps databases may include: RAMS (Recruit Accession Management System), which contains information for accessions between 1976 and 1984; ARMS (the Automated Recruit Management System), consisting of multiple data files used to derive the GRANDRAMS, which contains aptitude data for individuals from 1985 to present; or HMF (Headquarters Master File), which contains the aptitude scores of record, not necessarily the enlistment scores. Aptitude data may also be requested from the Defense Management Data Center (DMDC). Before applying the conversion program, it will be necessary to modify the program to include the proper data format.

The conversion of subtest raw scores to subtest standard scores depends on the specific ASVAB test form and version¹ that the individual was administered. A different conversion table is applied for most form and version combinations.

Many data problems can be encountered with respect to ASVAB form and version codes. The form and version for some individuals may be miscoded or missing. The data set may contain a record for individuals who entered the service before 1976. Standard scores cannot be computed for such cases. Some form values can have several meanings. For example, the code "3A" can refer to the high school form 3A (for which standard scores cannot be computed) or it can refer to form 13A. Unfortunately, the ASVAB form and version codes can also vary by data source (ARMS, RAMS, HMF, and DMDC) and are not always straightforward. That is, the mapping of the values for the form variable into the appropriate ASVAB form is not always obvious. Likewise, these codes are not always

1. The ASVAB form is a numerical value that typically ranges from 5 through 17. However, other values are also acceptable as valid form identifiers. Each ASVAB form also has a version, an alphabetical value, which is usually a, b, or c. Again, many other version codes are valid entries.

consistent across databases (DMDC uses different values for the form numbers than do the other databases).

Given these difficulties, the initial step in the conversion program is to check the legitimacy of values for each form and version. The form and version combination for each individual is compared to a list of acceptable codes.¹ The COBOL program writes all cases with form identification problems or out-of-range raw score values to a separate file for further review and processing. The SAS program assigns missing values to the form and AFQT variables, but writes all records to the same file.

For some data records, the values for test form or version will be incomplete. This is usually due to past coding problems where the test form was recorded but the version was not. The following rules apply for such cases with missing version information. Separate conversion tables have been developed for ASVAB forms 12 and 15 through 17 based on both the form number and the test version. However, in most cases using the conversion for either version will yield the same standard score for the aptitude composites and the AFQT. Therefore, when the version identifier is missing, all form 12 records are processed as if they are form 12B, and all forms 15 through 17 are assigned to version A. Any record that is still missing the form identifier is not processed.

In three of the data sources (RAMS, ARMS, and DMDC), subtest scores are recorded in the data files in the order in which the subtests were administered, called answer-sheet order. However, as noted in table 1 of the text, substantial changes in the composition of the ASVAB subtests were made with the introduction of forms 8/9/10. Given these changes, the answer sheets for the ASVAB have likewise changed. Unfortunately, this change means that the same data fields within a database contain different subtest information, depending on whether the test form was 5/6/7 or 8 through 17.² For example, the first subtest field on a data record for forms 8 through 17 will be GL (General Science), but if the data record is for forms 5/6/7, the first subtest field would be GI (General Information, a subtest that was dropped in later ASVAB forms). Table B-1 shows the mapping of the form 5/6/7 testing order to the form 8 through 17 testing order.

1. As noted, the values for form and version codes can vary depending on the source of the aptitude information. The acceptable codes included in the conversion program are those values typically noted in processing, ARMS, RAMS, and HMF data sets. Such codes do not necessarily apply to data sets obtained from DMDC. We recommend that the analyst consult appropriate sources for further clarification or information when problems are encountered with an abundance of individuals being classified as having unacceptable ASVAB form and version codes.

2. This issue of the consistent order of subtests varying by test form does not apply to data sets from the HMF. Headquarters, Marine Corps, has already made all of the necessary adjustments to correct the subtest order problem for all historical records.

**Table B-1. Mapping of test order
from ASVAB forms 5/6/7 to ASVAB
forms 8 through 17**

<u>Form 8-17</u> <u>test order</u>	<u>Form 5/6/7</u> <u>test order</u>
GS	GI
AR	NO
WK	AD
PC	WK
NO	AR
CS	SP
AS	MK
MK	EI
MC	MC
EI	GS
	SI
	AI

The easiest way to correct for this problem is to change the variable names in the computation of ASVAB 5/6/7 scores to include the field names referring to the forms 8 through 17 testing order. Table B-2 details the procedure that will implement such changes.

Table B-2. Procedures for changing order of ASVAB forms 5/6/7 subtest

<u>Program name</u>	<u>Change procedures for ASVAB forms 5/6/7</u>	<u>Lines to be substituted for in the program by the change procedure</u>
CONVERT_RAW.COB	CHANGE_FORMS5.COB	879-899
CONVERT_RAW.SAS	CHANGE_FORMS.SAS	269-272

The code of the change procedures simply needs to be substituted in the program file for the affected lines to implement the necessary subtest renaming.

All program files can be found in CNA6:[HIATTC.CONVERSION] and are listed on the following pages:

CONVERT_RAW.COB: B-6 - B-21
 CONVERT_RAW.SAS: B-22 - B-28
 CHANGE_FORM5.COB: B-29
 CHANGE_FORM5.SAS: B-29

CNA6:[HIATTC.CONVERSION]CONVERT_RAW.COB
IDENTIFICATION DIVISION.

PROGRAM-ID. COMPOSITE-TABLE.
AUTHOR. CATHY HIATT
INSTALLATION. CNA.
DATE-WRITTEN. 03/04/92.
DATE-COMPILED.
SECURITY. UNCLASSIFIED.

THIS PROGRAM WILL CONVERT SUBTEST RAW SCORES TO
SUBTEST STANDARD SCORE AND COMPUTE COMPOSITE STANDARD
SCORES AND AFQT PERCENTILE SCORES FOR ASVAB FORMS
5/6/7 8/9/10 11/12/13/14 AND 15/16/17.

NOTE THAT FORM 5/6/7 SUBTEST STANDARD SCORES ARE ON
THE WWII SCORE SCALE. COMPOSITES AND AFQT FOR 5/6/7
HAVE BEEN CONVERTED TO THE 1980 SCALE. SUBTEST SCORES
FOR FORMS 5/6/7 SHOULD NOT BE COMBINED WITH OTHER
FORMS DUE TO THE SCORE SCALE DIFFERENCE.

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.

SOURCE-COMPUTER. VAX-11.
OBJECT-COMPUTER. VAX-11.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT INFILE ASSIGN TO "INFILE".
SELECT OUTFILE ASSIGN TO "OUTFILE".
SELECT OUTFILE2 ASSIGN TO "OUTFILE2".
SELECT PRINTFILE ASSIGN TO "PRINTFILE".

DATA DIVISION.

FILE SECTION.

FD INFILE

BLOCK 200 RECORDS
RECORD CONTAINS 29 CHARACTERS.

01 INREC.

* Variable names:

* ADBD Active Duty Base Date
* AFORM ASVAB form
* AVER ASVAB version
* NOS NO subtest

05 ADBD PIC 9(4).
05 AFORM PIC XX.
05 AVER PIC X.
05 GS PIC 9(2).
05 AR PIC 9(2).
05 WK PIC 9(2).
05 PC PIC 9(2).
05 NOS PIC 9(2).
05 CS PIC 9(2).
05 AS PIC 9(2).
05 MK PIC 9(2).
05 MC PIC 9(2).
05 EI PIC 9(2).
05 AI PIC 9(2).

FD OUTFILE

BLOCK 200 RECORDS

RECORD CONTAINS 44 CHARACTERS.

01 OUTREC.

05 ADBD-OUT	PIC 9(4).
05 FORMID	PIC XXX.
05 GS-S	PIC 9(2).
05 AR-S	PIC 9(2).
05 WK-S	PIC 9(2).
05 PC-S	PIC 9(2).
05 NO-S	PIC 9(2).
05 CS-S	PIC 9(2).
05 AS-S	PIC 9(2).
05 MK-S	PIC 9(2).
05 MC-S	PIC 9(2).
05 EI-S	PIC 9(2).
05 VE-S	PIC 9(2).
05 GT-S	PIC 9(3).
05 CL-S	PIC 9(3).
05 MM-S	PIC 9(3).
05 EL-S	PIC 9(3).
05 P-AFQT	PIC 999.

FD OUTFILE2

BLOCK 200 RECORDS

RECORD CONTAINS 35 CHARACTERS.

01 OUTREC2.

05 ADBD-OUT2	PIC 9(4).
05 AFORM-OUT	PIC XX.
05 AVER-OUT	PIC X.
05 GS-OUT	PIC 9(2).
05 AR-OUT	PIC 9(2).
05 WK-OUT	PIC 9(2).
05 PC-OUT	PIC 9(2).
05 NOS-OUT	PIC 9(2).
05 CS-OUT	PIC 9(2).
05 AS-OUT	PIC 9(2).
05 MK-OUT	PIC 9(2).
05 MC-OUT	PIC 9(2).
05 EI-OUT	PIC 9(2).
05 AI-OUT	PIC 9(2).
05 FORMID2	PIC X(3).
05 FORM-OUT	PIC XX.
05 VER-OUT	PIC X.

FD PRINTFILE

RECORD CONTAINS 132 CHARACTERS.

01 OUT-LINE.

05 FILLER	PIC X(132).
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WORKING-STORAGE SECTION.

01 EOF-FLAG	PIC 9 VALUE 0.
01 TFORM	PIC X(3).
01 VE	PIC 9(3).
01 GSN	PIC 9(3).
01 ARN	PIC 9(3).
01 WKN	PIC 9(3).
01 PCN	PIC 9(3).
01 NON	PIC 9(3).
01 CSN	PIC 9(3).
01 ASN	PIC 9(3).
01 MKN	PIC 9(3).
01 MCN	PIC 9(3).
01 EIN	PIC 9(3).
01 VEN	PIC 9(3).
01 AIN	PIC 9(3).

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01 GTSUM                PIC 9(3).
01 CLSUM                PIC 9(3).
01 ELSUM                PIC 9(3).
01 MMSUM                PIC 9(3).
01 GSUM1                PIC 9(3).
01 CSUM1                PIC 9(3).
01 ESUM1                PIC 9(3).
01 MSUM1                PIC 9(3).
01 AFQTSUM              PIC 9(3).
01 GTS                  PIC 9(3).
01 CLS                  PIC 9(3).
01 ELS                  PIC 9(3).
01 MMS                  PIC 9(3).
01 AFQTN                PIC 9(3).
01 AFQTN1               PIC 9(3).
01 PAFQT                PIC 999.
01 COUNTERS.
    03 NUMBER-OF-RECORDS-READ          PIC 9(9) VALUE 0.
    03 NUMBER-OF-RECORDS-WRITTEN1      PIC 9(9) VALUE 0.
    03 NUMBER-OF-RECORDS-WRITTEN2      PIC 9(9) VALUE 0.
01 TOTAL-RECORDS-LINE.
    03 FILLER PIC X(13) VALUE "TOTAL RECORDS".
    03 FILLER PIC X(9) VALUE " READ ".
    03 NINRECS1 PIC 2(8)9.
    03 FILLER PIC X(12) VALUE " CONVERTED: ".
    03 NOUTRECS1 PIC 2(8)9.
    03 FILLER PIC X(16) VALUE " NOT CONVERTED:".
    03 NOUTRECS2 PIC 2(8)9.
01 AFQT-KEY
    05 FILLER PIC X(20) VALUE "01020202020303030404".
    05 FILLER PIC X(20) VALUE "04040505050606060707".
    05 FILLER PIC X(20) VALUE "08080809091010111112".
    05 FILLER PIC X(20) VALUE "12131313141515161617".
    05 FILLER PIC X(20) VALUE "17181819192021212222".
    05 FILLER PIC X(20) VALUE "23232425252627272829".
    05 FILLER PIC X(20) VALUE "29303132323334353536".
    05 FILLER PIC X(20) VALUE "37383940414242434445".
    05 FILLER PIC X(20) VALUE "46474849505152535354".
    05 FILLER PIC X(20) VALUE "55565758596162636465".
    05 FILLER PIC X(20) VALUE "66676869707172737475".
    05 FILLER PIC X(20) VALUE "76777879808081828484".
    05 FILLER PIC X(20) VALUE "85868788899091929394".
    05 FILLER PIC X(10) VALUE "9596979899".
01 AFQT-ARRAY REDEFINES AFQT-KEY.
    05 AFQT-PER PIC 9(2) OCCURS 135 TIMES.
01 FORM8A-KEY.
    05 FILLER PIC X(20) VALUE "20202224262830323436".
    05 FILLER PIC X(20) VALUE "38404244464850525456".
    05 FILLER PIC X(20) VALUE "58606264666826272830".
    05 FILLER PIC X(20) VALUE "31323435363839404243".
    05 FILLER PIC X(20) VALUE "45464749505153545557".
    05 FILLER PIC X(20) VALUE "58596162646566202020".
    05 FILLER PIC X(20) VALUE "20212224252628293031".
    05 FILLER PIC X(20) VALUE "33343537383941424344".
    05 FILLER PIC X(20) VALUE "46474850515254555657".
    05 FILLER PIC X(20) VALUE "59606120202326293235".
    05 FILLER PIC X(20) VALUE "38414447505356596220".
    05 FILLER PIC X(20) VALUE "20202020202122232425".
    05 FILLER PIC X(20) VALUE "26272828293031323334".
    05 FILLER PIC X(20) VALUE "35363738394041414243".
    05 FILLER PIC X(20) VALUE "44454647484950515253".
    05 FILLER PIC X(20) VALUE "53545556575859606162".
    05 FILLER PIC X(20) VALUE "2222323242525262627".

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05 FILLER PIC X(20) VALUE "28282929303131323233".
05 FILLER PIC X(20) VALUE "34343535363737383839".
05 FILLER PIC X(20) VALUE "39404141424243444445".
05 FILLER PIC X(20) VALUE "45464747484849505051".
05 FILLER PIC X(20) VALUE "51525353545455565657".
05 FILLER PIC X(20) VALUE "57585959606061626263".
05 FILLER PIC X(20) VALUE "63646565666667686869".
05 FILLER PIC X(20) VALUE "69707171722426283031".
05 FILLER PIC X(20) VALUE "33353739404244464849".
05 FILLER PIC X(20) VALUE "51535557586062646667".
05 FILLER PIC X(20) VALUE "69293032333537384041".
05 FILLER PIC X(20) VALUE "43444648495152545557".
05 FILLER PIC X(20) VALUE "58606263656668242527".
05 FILLER PIC X(20) VALUE "29313335373840424446".
05 FILLER PIC X(20) VALUE "48505253555759616365".
05 FILLER PIC X(20) VALUE "67687023252730323437".
05 FILLER PIC X(20) VALUE "39424446495153565860".
05 FILLER PIC X(20) VALUE "63656870202020202020".
05 FILLER PIC X(20) VALUE "20212223242526272829".
05 FILLER PIC X(20) VALUE "30313233343536373738".
05 FILLER PIC X(20) VALUE "39404142434445464748".
05 FILLER PIC X(20) VALUE "495051525354555657".
05 FILLER PIC X(10) VALUE "5859606162".
01 ARRAY-8A REDEFINES FORM8A-KEY.
    05 8A-SS PIC 9(2) OCCURS 395 TIMES.
.1 FORM11-KEY.
    05 FILLER PIC X(20) VALUE "21232526283032333537".
    05 FILLER PIC X(20) VALUE "39404244464849515355".
    05 FILLER PIC X(20) VALUE "56585962636526262728".
    05 FILLER PIC X(20) VALUE "30313234353638394042".
    05 FILLER PIC X(20) VALUE "43444647485051525455".
    05 FILLER PIC X(20) VALUE "56585960626364222324".
    05 FILLER PIC X(20) VALUE "25262728303132333435".
    05 FILLER PIC X(20) VALUE "36373940414243444547".
    05 FILLER PIC X(20) VALUE "48495051525355565758".
    05 FILLER PIC X(20) VALUE "59606121242629323437".
    05 FILLER PIC X(20) VALUE "40424548505356586120".
    05 FILLER PIC X(20) VALUE "20202021222324242526".
    05 FILLER PIC X(20) VALUE "27282930313233343536".
    05 FILLER PIC X(20) VALUE "36373839404142434445".
    05 FILLER PIC X(20) VALUE "46474848495051525354".
    05 FILLER PIC X(20) VALUE "55565758596061616262".
    05 FILLER PIC X(20) VALUE "22222323242425262627".
    05 FILLER PIC X(20) VALUE "27282929303031313233".
    05 FILLER PIC X(20) VALUE "33343435363637373839".
    05 FILLER PIC X(20) VALUE "39404041414243434444".
    05 FILLER PIC X(20) VALUE "45464647474848495050".
    05 FILLER PIC X(20) VALUE "51515253535454555656".
    05 FILLER PIC X(20) VALUE "57575858596060616162".
    05 FILLER PIC X(20) VALUE "63636464656666676768".
    05 FILLER PIC X(20) VALUE "68697070712627293132".
    05 FILLER PIC X(20) VALUE "34363739414344464849".
    05 FILLER PIC X(20) VALUE "51535456586061636566".
    05 FILLER PIC X(20) VALUE "68303233353638394142".
    05 FILLER PIC X(20) VALUE "44454748505152545557".
    05 FILLER PIC X(20) VALUE "58606163646667242425".
    05 FILLER PIC X(20) VALUE "27293133353739414345".
    05 FILLER PIC X(20) VALUE "47495153555759616365".
    05 FILLER PIC X(20) VALUE "67697023262930323537".
    05 FILLER PIC X(20) VALUE "39424446485153555860".
    05 FILLER PIC X(20) VALUE "62646769212122232425".
    05 FILLER PIC X(20) VALUE "25262728293030313233".
    05 FILLER PIC X(20) VALUE "34343536373839394041".

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05 FILLER PIC X(20) VALUE "42434444454647484849".
05 FILLER PIC X(20) VALUE "50513253535455565757".
05 FILLER PIC X(10) VALUE "5859606162".
01 ARRAY-11 REDEFINES FORM11-KEY.
05 11-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM12A-KEY.
05 FILLER PIC X(20) VALUE "20202123252830323436".
05 FILLER PIC X(20) VALUE "38404243454748505254".
05 FILLER PIC X(20) VALUE "56586062646726262829".
05 FILLER PIC X(20) VALUE "30323334363738394142".
05 FILLER PIC X(20) VALUE "43444547484950525355".
05 FILLER PIC X(20) VALUE "56575961626466202020".
05 FILLER PIC X(20) VALUE "21232526283031333435".
05 FILLER PIC X(20) VALUE "37383940424344454647".
05 FILLER PIC X(20) VALUE "48495051525354555758".
05 FILLER PIC X(20) VALUE "59606120202428323639".
05 FILLER PIC X(20) VALUE "42434851535558596120".
05 FILLER PIC X(20) VALUE "20202021222324252627".
05 FILLER PIC X(20) VALUE "28293031323334353637".
05 FILLER PIC X(20) VALUE "38394041424445464748".
05 FILLER PIC X(20) VALUE "49505051525354555657".
05 FILLER PIC X(20) VALUE "57585960606161626262".
05 FILLER PIC X(20) VALUE "22222323242425262627".
05 FILLER PIC X(20) VALUE "28282929303131323333".
05 FILLER PIC X(20) VALUE "34343535363737383839".
05 FILLER PIC X(20) VALUE "40404141424243444445".
05 FILLER PIC X(20) VALUE "45464647474849495050".
05 FILLER PIC X(20) VALUE "51515252535454555556".
05 FILLER PIC X(20) VALUE "56575858595960616162".
05 FILLER PIC X(20) VALUE "626364646565666676768".
05 FILLER PIC X(20) VALUE "69697071712728303234".
05 FILLER PIC X(20) VALUE "36373941424445474850".
05 FILLER PIC X(20) VALUE "51535556586062646668".
05 FILLER PIC X(20) VALUE "69303234363739404243".
05 FILLER PIC X(20) VALUE "45464749505152545556".
05 FILLER PIC X(20) VALUE "58596163646668242628".
05 FILLER PIC X(20) VALUE "29313334363839414345".
05 FILLER PIC X(20) VALUE "47495153555759616365".
05 FILLER PIC X(20) VALUE "67697023242629313436".
05 FILLER PIC X(20) VALUE "38414345475052545659".
05 FILLER PIC X(20) VALUE "61636668202020202021".
05 FILLER PIC X(20) VALUE "12232425272829303132".
05 FILLER PIC X(20) VALUE "33343637383839404142".
05 FILLER PIC X(20) VALUE "43444546464748495050".
05 FILLER PIC X(20) VALUE "51525354545556565758".
05 FILLER PIC X(10) VALUE "5959606162".
01 ARRAY-12A REDEFINES FORM12A-KEY.
05 12A-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM15A-KEY.
05 FILLER PIC X(20) VALUE "20202224262830323436".
05 FILLER PIC X(20) VALUE "38404244464749515355".
05 FILLER PIC X(20) VALUE "56586163656726262728".
05 FILLER PIC X(20) VALUE "30313334353738404142".
05 FILLER PIC X(20) VALUE "44454748495152545556".
05 FILLER PIC X(20) VALUE "58596162636566212223".
05 FILLER PIC X(20) VALUE "24252628293031323334".
05 FILLER PIC X(20) VALUE "36373839404142444546".
05 FILLER PIC X(20) VALUE "47484950525354555657".
05 FILLER PIC X(20) VALUE "58606120202023262932".
05 FILLER PIC X(20) VALUE "35384144475154576020".
05 FILLER PIC X(20) VALUE "20202021222324252626".
05 FILLER PIC X(20) VALUE "27282930313233343435".
05 FILLER PIC X(20) VALUE "36373839404142424344".

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05 FILLER PIC X(20) VALUE "45464748495051515253".
05 FILLER PIC X(20) VALUE "54555657585959606162".
05 FILLER PIC X(20) VALUE "22222323242425262627".
05 FILLER PIC X(20) VALUE "27282929303031323233".
05 FILLER PIC X(20) VALUE "33343535363637373839".
05 FILLER PIC X(20) VALUE "39404041424243434445".
05 FILLER PIC X(20) VALUE "45464647484849495051".
05 FILLER PIC X(20) VALUE "51525253535455555656".
05 FILLER PIC X(20) VALUE "57585859596061616262".
05 FILLER PIC X(20) VALUE "63646465656666676868".
05 FILLER PIC X(20) VALUE "696970717172527293132".
05 FILLER PIC X(20) VALUE "34363839414345464850".
05 FILLER PIC X(20) VALUE "52535557596162646668".
05 FILLER PIC X(20) VALUE "69293031333436383941".
05 FILLER PIC X(20) VALUE "42444647495052535557".
05 FILLER PIC X(20) VALUE "58606163656668242627".
05 FILLER PIC X(20) VALUE "29313234363739414344".
05 FILLER PIC X(20) VALUE "46485052545658606265".
05 FILLER PIC X(20) VALUE "67697023232628313336".
05 FILLER PIC X(20) VALUE "38414346485153565961".
05 FILLER PIC X(20) VALUE "64666970202020212122".
05 FILLER PIC X(20) VALUE "23242526272728293031".
05 FILLER PIC X(20) VALUE "32333334353637383939".
05 FILLER PIC X(20) VALUE "40414243444545464748".
05 FILLER PIC X(20) VALUE "49505051525354555656".
05 FILLER PIC X(10) VALUE "5758596061".
01 ARRAY-15A REDEFINES FORM15A-KEY.
    05 15A-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM15B-KEY.
    05 FILLER PIC X(20) VALUE "20202224262830323436".
    05 FILLER PIC X(20) VALUE "38404244464749515355".
    05 FILLER PIC X(20) VALUE "57596163656726262728".
    05 FILLER PIC X(20) VALUE "30313334353738404142".
    05 FILLER PIC X(20) VALUE "44454648495152535556".
    05 FILLER PIC X(20) VALUE "58596062636466202020".
    05 FILLER PIC X(20) VALUE "22232425272829303233".
    05 FILLER PIC X(20) VALUE "34353738394042434445".
    05 FILLER PIC X(20) VALUE "47484950525354555758".
    05 FILLER PIC X(20) VALUE "59606120202124273033".
    05 FILLER PIC X(20) VALUE "36394245485154576020".
    05 FILLER PIC X(20) VALUE "20202020212223242526".
    05 FILLER PIC X(20) VALUE "26272829303132333435".
    05 FILLER PIC X(20) VALUE "36363738394041424344".
    05 FILLER PIC X(20) VALUE "45464747484950515253".
    05 FILLER PIC X(20) VALUE "54555657575859606162".
    05 FILLER PIC X(20) VALUE "22222323242425262627".
    05 FILLER PIC X(20) VALUE "27282929303031323233".
    05 FILLER PIC X(20) VALUE "33343535363637373839".
    05 FILLER PIC X(20) VALUE "39404041424243434445".
    05 FILLER PIC X(20) VALUE "45464647484849495051".
    05 FILLER PIC X(20) VALUE "51525253535455555656".
    05 FILLER PIC X(20) VALUE "57585859596061616262".
    05 FILLER PIC X(20) VALUE "63646465656666676868".
    05 FILLER PIC X(20) VALUE "696970717172527293132".
    05 FILLER PIC X(20) VALUE "34363839414345464850".
    05 FILLER PIC X(20) VALUE "52535557596162646668".
    05 FILLER PIC X(20) VALUE "69293031333436383941".
    05 FILLER PIC X(20) VALUE "42444647495052535557".
    05 FILLER PIC X(20) VALUE "58606163656668242627".
    05 FILLER PIC X(20) VALUE "29313234363739414344".
    05 FILLER PIC X(20) VALUE "46485052545658606265".
    05 FILLER PIC X(20) VALUE "67697023232628313336".
    05 FILLER PIC X(20) VALUE "38414346485153565961".

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05 FILLER PIC X(20) VALUE "64666970202020202021".
05 FILLER PIC X(20) VALUE "22222324252627282930".
05 FILLER PIC X(20) VALUE "31313233343536373839".
05 FILLER PIC X(20) VALUE "40414142434445464748".
05 FILLER PIC X(20) VALUE "49505051525354555657".
05 FILLER PIC X(10) VALUE "5859606061".
01 ARRAY-15B REDEFINES FORM15B-KEY.
    05 15B-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM16A-KEY.
    05 FILLER PIC X(20) VALUE "20222426282931333537".
    05 FILLER PIC X(20) VALUE "39414244464850525455".
    05 FILLER PIC X(20) VALUE "57596163656726262627".
    05 FILLER PIC X(20) VALUE "29303233353638394042".
    05 FILLER PIC X(20) VALUE "43454648495152545556".
    05 FILLER PIC X(20) VALUE "58596162646566202020".
    05 FILLER PIC X(20) VALUE "21222325262728303132".
    05 FILLER PIC X(20) VALUE "33353637394041424445".
    05 FILLER PIC X(20) VALUE "46474950515354555658".
    05 FILLER PIC X(20) VALUE "59606120202225283134".
    05 FILLER PIC X(20) VALUE "36394245485153565920".
    05 FILLER PIC X(20) VALUE "20202020202020212223".
    05 FILLER PIC X(20) VALUE "24252627282930313233".
    05 FILLER PIC X(20) VALUE "33343536373839404142".
    05 FILLER PIC X(20) VALUE "43444546474849505152".
    05 FILLER PIC X(20) VALUE "53545555565758596061".
    05 FILLER PIC X(20) VALUE "2222223232425252626".
    05 FILLER PIC X(20) VALUE "27282829293031313232".
    05 FILLER PIC X(20) VALUE "33343435353637373839".
    05 FILLER PIC X(20) VALUE "39404041424243434445".
    05 FILLER PIC X(20) VALUE "45464647484849495051".
    05 FILLER PIC X(20) VALUE "51525253545455555657".
    05 FILLER PIC X(20) VALUE "57585959606061626263".
    05 FILLER PIC X(20) VALUE "63646565666667686869".
    05 FILLER PIC X(20) VALUE "69707171722931323435".
    05 FILLER PIC X(20) VALUE "37384041434546484951".
    05 FILLER PIC X(20) VALUE "52545557586062636566".
    05 FILLER PIC X(20) VALUE "68293032333537384041".
    05 FILLER PIC X(20) VALUE "43444647495052545557".
    05 FILLER PIC X(20) VALUE "58606163646667242527".
    05 FILLER PIC X(20) VALUE "28303233353739404244".
    05 FILLER PIC X(20) VALUE "46485052545658606264".
    05 FILLER PIC X(20) VALUE "67697023252729323436".
    05 FILLER PIC X(20) VALUE "39414345485052555759".
    05 FILLER PIC X(20) VALUE "61646668202020202020".
    05 FILLER PIC X(20) VALUE "21222324252627282829".
    05 FILLER PIC X(20) VALUE "30313233343536373838".
    05 FILLER PIC X(20) VALUE "39404142434445464748".
    05 FILLER PIC X(20) VALUE "48495051525354555657".
    05 FILLER PIC X(10) VALUE "5758596061".
01 ARRAY-16A REDEFINES FORM16A-KEY.
    05 16A-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM16B-KEY.
    05 FILLER PIC X(20) VALUE "20222426282931333537".
    05 FILLER PIC X(20) VALUE "39414244464850525455".
    05 FILLER PIC X(20) VALUE "57596163656726262829".
    05 FILLER PIC X(20) VALUE "30323335363739404143".
    05 FILLER PIC X(20) VALUE "44454748495152545556".
    05 FILLER PIC X(20) VALUE "58596062636466202020".
    05 FILLER PIC X(20) VALUE "20212223252627293031".
    05 FILLER PIC X(20) VALUE "33343536383940424344".
    05 FILLER PIC X(20) VALUE "46474850515254555658".
    05 FILLER PIC X(20) VALUE "59606120202124273033".
    05 FILLER PIC X(20) VALUE "36394245485154576020".

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05 FILLER PIC X(20) VALUE "20202020202021222324".
05 FILLER PIC X(20) VALUE "25262728293031323334".
05 FILLER PIC X(20) VALUE "35353637383940414243".
05 FILLER PIC X(20) VALUE "44454647484950515253".
05 FILLER PIC X(20) VALUE "53545556575859606162".
05 FILLER PIC X(20) VALUE "222222232324252627".
05 FILLER PIC X(20) VALUE "272829292930313233".
05 FILLER PIC X(20) VALUE "333434353536373839".
05 FILLER PIC X(20) VALUE "394040414242434445".
05 FILLER PIC X(20) VALUE "454646474848495051".
05 FILLER PIC X(20) VALUE "51525253545455555657".
05 FILLER PIC X(20) VALUE "57585959606061626263".
05 FILLER PIC X(20) VALUE "63646565666667686869".
05 FILLER PIC X(20) VALUE "69707171722931323435".
05 FILLER PIC X(20) VALUE "37384041434546484951".
05 FILLER PIC X(20) VALUE "52545557586062636566".
05 FILLER PIC X(20) VALUE "68293032333537384041".
05 FILLER PIC X(20) VALUE "43444647495052545557".
05 FILLER PIC X(20) VALUE "58606163646667242527".
05 FILLER PIC X(20) VALUE "28303233353739404244".
05 FILLER PIC X(20) VALUE "46485052545658606264".
05 FILLER PIC X(20) VALUE "67697023252729323436".
05 FILLER PIC X(20) VALUE "39414345485052555759".
05 FILLER PIC X(20) VALUE "61646668202020202020".
05 FILLER PIC X(20) VALUE "20212223242526262728".
05 FILLER PIC X(20) VALUE "29303132333435363738".
05 FILLER PIC X(20) VALUE "39404142434444454647".
05 FILLER PIC X(20) VALUE "48495051525354555657".
05 FILLER PIC X(20) VALUE "5859606162".
01 ARRAY-16B REDEFINES FORM16B-KEY.
    05 16B-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM17A-KEY.
    05 FILLER PIC X(20) VALUE "20212325272830323436".
    05 FILLER PIC X(20) VALUE "38404244464850525456".
    05 FILLER PIC X(20) VALUE "58606264666726272830".
    05 FILLER PIC X(20) VALUE "31323435363839404243".
    05 FILLER PIC X(20) VALUE "44464748505152535556".
    05 FILLER PIC X(20) VALUE "57596061636465202122".
    05 FILLER PIC X(20) VALUE "23242527282930313334".
    05 FILLER PIC X(20) VALUE "35363738404142434445".
    05 FILLER PIC X(20) VALUE "47484950515354555657".
    05 FILLER PIC X(20) VALUE "58606120202225283134".
    05 FILLER PIC X(20) VALUE "37404245485154576020".
    05 FILLER PIC X(20) VALUE "20202020202122222324".
    05 FILLER PIC X(20) VALUE "25262728293031323334".
    05 FILLER PIC X(20) VALUE "35363737383940414243".
    05 FILLER PIC X(20) VALUE "44454647484950515152".
    05 FILLER PIC X(20) VALUE "53545556575859606162".
    05 FILLER PIC X(20) VALUE "22222222232424252627".
    05 FILLER PIC X(20) VALUE "272728292930313233".
    05 FILLER PIC X(20) VALUE "33333435353636373838".
    05 FILLER PIC X(20) VALUE "39394041414242434444".
    05 FILLER PIC X(20) VALUE "45454647474848495050".
    05 FILLER PIC X(20) VALUE "51525253535455555656".
    05 FILLER PIC X(20) VALUE "57585859596061616262".
    05 FILLER PIC X(20) VALUE "636464656566676868".
    05 FILLER PIC X(20) VALUE "69707071712628293133".
    05 FILLER PIC X(20) VALUE "34363839414345464850".
    05 FILLER PIC X(20) VALUE "51535556586061636566".
    05 FILLER PIC X(20) VALUE "68292930323435373940".
    05 FILLER PIC X(20) VALUE "42444547495052545557".
    05 FILLER PIC X(20) VALUE "58606263656768252627".
    05 FILLER PIC X(20) VALUE "29303133353638404244".

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05 FILLER PIC X(20) VALUE "46485052545658606365".
05 FILLER PIC X(20) VALUE "67697023262830323537".
05 FILLER PIC X(20) VALUE "39414446485053555760".
05 FILLER PIC X(20) VALUE "62646669202020202122".
05 FILLER PIC X(20) VALUE "23242525262728293031".
05 FILLER PIC X(20) VALUE "31323334353637373839".
05 FILLER PIC X(20) VALUE "40414243444445464748".
05 FILLER PIC X(20) VALUE "49505051525354555657".
05 FILLER PIC X(10) VALUE "5758596061".
01 ARRAY-17A REDEFINES FORM17A-KEY.
    05 17A-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM17B-KEY.
    05 FILLER PIC X(20) VALUE "20212325272830323436".
    05 FILLER PIC X(20) VALUE "38404244464850525456".
    05 FILLER PIC X(20) VALUE "58606264656726262829".
    05 FILLER PIC X(20) VALUE "31323335363739404243".
    05 FILLER PIC X(20) VALUE "44464748505153545557".
    05 FILLER PIC X(20) VALUE "58596162636566202020".
    05 FILLER PIC X(20) VALUE "22232425272829303233".
    05 FILLER PIC X(20) VALUE "34353638394041434445".
    05 FILLER PIC X(20) VALUE "46474950515254555657".
    05 FILLER PIC X(20) VALUE "58606120202023263033".
    05 FILLER PIC X(20) VALUE "36394245485154586120".
    05 FILLER PIC X(20) VALUE "20202020202122232324".
    05 FILLER PIC X(20) VALUE "25262728293031323334".
    05 FILLER PIC X(20) VALUE "35363738383940414243".
    05 FILLER PIC X(20) VALUE "44454647484950515253".
    05 FILLER PIC X(20) VALUE "53545556575859606162".
    05 FILLER PIC X(20) VALUE "22222222232424252526".
    05 FILLER PIC X(20) VALUE "27272829293030313232".
    05 FILLER PIC X(20) VALUE "33333435353636373838".
    05 FILLER PIC X(20) VALUE "39394041414242434444".
    05 FILLER PIC X(20) VALUE "45454647474848495050".
    05 FILLER PIC X(20) VALUE "51525253535455555656".
    05 FILLER PIC X(20) VALUE "57585859596061616262".
    05 FILLER PIC X(20) VALUE "63646465656667676868".
    05 FILLER PIC X(20) VALUE "697070717172628293133".
    05 FILLER PIC X(20) VALUE "34363839414345464850".
    05 FILLER PIC X(20) VALUE "51535556586061636566".
    05 FILLER PIC X(20) VALUE "68292930323435373940".
    05 FILLER PIC X(20) VALUE "42444547495052545557".
    05 FILLER PIC X(20) VALUE "58606263656768252627".
    05 FILLER PIC X(20) VALUE "29303133353638404244".
    05 FILLER PIC X(20) VALUE "46485052545658606365".
    05 FILLER PIC X(20) VALUE "67697023262830323537".
    05 FILLER PIC X(20) VALUE "39414446485053555760".
    05 FILLER PIC X(20) VALUE "62646669202020202020".
    05 FILLER PIC X(20) VALUE "21222324252627282829".
    05 FILLER PIC X(20) VALUE "30313233343536373838".
    05 FILLER PIC X(20) VALUE "39404142434445464748".
    05 FILLER PIC X(20) VALUE "49495051525354555657".
    05 FILLER PIC X(10) VALUE "5859596061".
01 ARRAY-17B REDEFINES FORM17B-KEY.
    05 17B-SS PIC 9(2) OCCURS 395 TIMES.
01 FORM5-KEY.
    05 FILLER PIC X(20) VALUE "24262931333638404245".
    05 FILLER PIC X(20) VALUE "47495254565861636568".
    05 FILLER PIC X(20) VALUE "70232527293234363840".
    05 FILLER PIC X(20) VALUE "42444648515355575961".
    05 FILLER PIC X(20) VALUE "63652324262728303133".
    05 FILLER PIC X(20) VALUE "34353738394142444546".
    05 FILLER PIC X(20) VALUE "48495052535556575960".
    05 FILLER PIC X(20) VALUE "62636420202122232425".

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05 FILLER PIC X(20) VALUE "26272829303132333435".
05 FILLER PIC X(20) VALUE "36373839404142434445".
05 FILLER PIC X(20) VALUE "46474849505152535455".
05 FILLER PIC X(20) VALUE "56575859606162636465".
05 FILLER PIC X(20) VALUE "66676869262830323436".
05 FILLER PIC X(20) VALUE "38404244464850525557".
05 FILLER PIC X(20) VALUE "59616365672628303235".
05 FILLER PIC X(20) VALUE "37394143454749515355".
05 FILLER PIC X(20) VALUE "57596163656720202122".
05 FILLER PIC X(20) VALUE "24262729313234363739".
05 FILLER PIC X(20) VALUE "41424446484951535456".
05 FILLER PIC X(20) VALUE "58596163646668252730".
05 FILLER PIC X(20) VALUE "32343739414346485053".
05 FILLER PIC X(16) VALUE "5557606264666971".
01 ARRAY-5 REDEFINES FORM3-KEY.
05 5-SS PIC 9(2) OCCURS 218 TIMES.
01 AFQT1-CONVERT.
05 FILLER PIC X(21) VALUE "096096097098099100101".
05 FILLER PIC X(21) VALUE "103104105106106107108".
05 FILLER PIC X(21) VALUE "108109110111111112113".
05 FILLER PIC X(21) VALUE "114115115116117118119".
05 FILLER PIC X(21) VALUE "121122122123124125126".
05 FILLER PIC X(21) VALUE "127128129130131132133".
05 FILLER PIC X(21) VALUE "134135136137138139140".
05 FILLER PIC X(21) VALUE "141144145146147147148".
05 FILLER PIC X(21) VALUE "148149150151152153153".
05 FILLER PIC X(21) VALUE "154155155156153159160".
05 FILLER PIC X(21) VALUE "161162163165166167168".
05 FILLER PIC X(21) VALUE "169170171172173174176".
05 FILLER PIC X(21) VALUE "177178179180181182183".
05 FILLER PIC X(21) VALUE "184185186187188190191".
05 FILLER PIC X(21) VALUE "192192193194195196197".
05 FILLER PIC X(21) VALUE "198199200201202203203".
05 FILLER PIC X(21) VALUE "204205206207208209210".
05 FILLER PIC X(21) VALUE "211212213214215215216".
05 FILLER PIC X(21) VALUE "217218219219220221222".
05 FILLER PIC X(21) VALUE "223224225227228228229".
05 FILLER PIC X(21) VALUE "230231232233234235236".
05 FILLER PIC X(21) VALUE "237238238239240241242".
05 FILLER PIC X(21) VALUE "243244245246247248249".
05 FILLER PIC X(21) VALUE "250251252253254257258".
05 FILLER PIC X(6) VALUE "258258".
01 ARRAY-AFQT1 REDEFINES AFQT1-CONVERT.
05 AFQT1 PIC 9(3) OCCURS 170 TIMES.
PROCEDURE DIVISION.
MAIN SECTION.
OPEN-FILES.
OPEN INPUT INFIL.
OPEN OUTPUT OUTFILE OUTFILE2 PRINTFILE.
MOVE SPACES TO OUTREC.
MOVE SPACES TO OUT-LINE.

```

```

*
*   There are different conversion tables for each test form group.
*   This program has one conversion array per test form group for forms
*   5-17. All conversion arrays are in answer sheet order (GS AR WK PC NO CS
*   AS MK MC EI) followed by VE. Each subtest can have a valid score of 0,
*   so the number of conversions per subtest is equal to the
*   number of test items plus 1. The conversions
*   are made using the raw test scores to compute the array subscripts.
*   Array elements 1-26 are the standard scores equivalents for GS raw
*   scores of 0 to 25 (subscript = GS + 1). Elements 27-57 reflect
*   the AR score conversions from 0-30, the subscript for AR is computed
*   as the raw AR score + 27. Subscripts are computed for all other

```

* subtests accordingly.
 * Any records with subtest raw scores that are out of range are
 * written to a separate file--they are NOT PROCESSED!!
 *

START-UP.

PERFORM PROCESS-DATA UNTIL EOF-FLAG = 1.

PROCESS-DATA.

READ INFILE AT END MOVE 1 TO EOF-FLAG.

ADD 1 TO NUMBER-OF-RECORDS-READ.

IF EOF-FLAG = 1 PERFORM EOJ-SECTION.

MOVE SPACES TO OUTREC.

MOVE SPACES TO OUTREC2.

*
 * Check input file for leading spaces--fill with zeros.
 *

INSPECT GS REPLACING LEADING SPACES BY ZEROS.
 INSPECT AR REPLACING LEADING SPACES BY ZEROS.
 INSPECT WK REPLACING LEADING SPACES BY ZEROS.
 INSPECT PC REPLACING LEADING SPACES BY ZEROS.
 INSPECT NOS REPLACING LEADING SPACES BY ZEROS.
 INSPECT CS REPLACING LEADING SPACES BY ZEROS.
 INSPECT AS REPLACING LEADING SPACES BY ZEROS.
 INSPECT MK REPLACING LEADING SPACES BY ZEROS.
 INSPECT MC REPLACING LEADING SPACES BY ZEROS.
 INSPECT EI REPLACING LEADING SPACES BY ZEROS.
 INSPECT AI REPLACING LEADING SPACES BY ZEROS.

* Assign test form group. Note that different data bases
 * have different coding for test form. this recode is based
 * on ARMS data--different files in ARMS can also have different
 * values for test form. the first step in the conversion
 * process is to check a frequency distribution of test form.
 *

IF AFORM = "00" OR AFORM = " " OR AFORM = "19" OR AFORM = "8C" OR
 (AFORM = "7A" AND ADBD = 7601) OR (AFORM = "7B" AND ADBD = 7601) OR
 (AFORM = "3A" AND ADBD = 8010) THEN MOVE " " TO TFORM

ELSE IF AFORM = "11" OR (AFORM = "12" AND AVER NOT = "A") OR AFORM = "13" OR
 AFORM = "01" OR AFORM = "2B" OR AFORM = "3S" OR
 AFORM = "02" OR AFORM = "03" OR (AFORM = "3A" AND ADBD = 8009) OR
 AFORM = "3B" OR
 AFORM = "3X" OR AFORM = " 3" OR AFORM = "2C" OR AFORM = "2N" OR
 AFORM = "20" OR AFORM = "2R" OR AFORM = "2S" OR AFORM = "2X"
 THEN MOVE " 11" TO TFORM

ELSE IF AFORM = "2A" OR (AFORM = "12" AND AVER = "A") THEN
 MOVE "12A" TO TFORM

ELSE IF AFORM = "09" OR AFORM = "10" OR AFORM = "1Q" OR AFORM = "1R" OR
 AFORM = "1X" OR AFORM = "1Y" OR AFORM = "3C" OR AFORM = "08" OR
 AFORM = " 8" OR AFORM = "8Y" OR AFORM = "9R" OR AFORM = "9V" OR
 AFORM = "9Y" OR AFORM = "14" OR AFORM = "1C" OR AFORM = "1D" OR
 AFORM = "8A" OR AFORM = "8B" OR AFORM = "9A" OR AFORM = "9B" OR
 AFORM = "9S" OR AFORM = "9T" OR AFORM = "9X" OR AFORM = "1S" OR
 AFORM = "4A" OR AFORM = "4B" OR AFORM = "4C" OR AFORM = "4N" OR
 AFORM = "4R" OR AFORM = "4X" OR AFORM = "0A" OR AFORM = "0B" OR
 AFORM = "0X" OR AFORM = "0Y" OR AFORM = "0C" OR AFORM = "00" OR
 AFORM = "0Q" OR AFORM = "0R" OR AFORM = "0S" OR AFORM = "0T" OR
 AFORM = "0U" OR AFORM = " 1" OR AFORM = "1B" OR AFORM = "1A" OR
 AFORM = "1T" OR AFORM = "1V" OR AFORM = "12" OR AFORM = "80" OR
 AFORM = "8D" OR AFORM = "8S" OR AFORM = "8T" OR
 AFORM = "04" OR (AFORM = "15" AND AVER = "C")
 THEN MOVE " 8" TO TFORM

```

ELSE IF AFORM = "05" OR AFORM = "5A" OR AFORM = "5B" OR AFORM = "5C" OR
AFORM = "5R" OR AFORM = "5E" OR AFORM = "5K" OR AFORM = "5" OR
AFORM = "6B" OR AFORM = "06" OR AFORM = "5X" OR
AFORM = "6A" OR AFORM = "6C" OR AFORM = "6E" OR AFORM = "6R" OR
AFORM = "70" OR AFORM = "7C" OR AFORM = "7D" OR
AFORM = "7E" OR AFORM = "7R" OR (AFORM = "7A" AND ADBD , 7512) OR
(AFORM = "7B" AND ADBD , 7512)
THEN MOVE " 5" TO TFORM

```

```

ELSE IF AFORM = "15" AND AVER NOT = "B" THEN MOVE "15A" TO TFORM
ELSE IF AFORM = "15" AND AVER = "B" THEN MOVE "15B" TO TFORM
ELSE IF AFORM = "16" AND AVER NOT = "B" THEN MOVE "16A" TO TFORM
ELSE IF AFORM = "16" AND AVER = "B" THEN MOVE "16B" TO TFORM
ELSE IF AFORM = "17" AND AVER NOT = "B" THEN MOVE "17A" TO TFORM
ELSE IF AFORM = "17" AND AVER = "B" THEN MOVE "17B" TO TFORM.

```

```

MOVE TFORM TO FORMID.
MOVE TFORM TO FORMID2.
MOVE AFORM TO FORM-OUT.
MOVE AVER TO VER-OUT.
IF TFORM = " 5" PERFORM PROCESS-FORM5 ELSE NEXT SENTENCE.

```

* Write records with ANY out-of-range subtest raw scores to
 * a separate file. These records are not processed!

```

IF GS < 0 OR GS > 25 PERFORM OUT-OF-RANGE.
IF AR < 0 OR AR > 30 PERFORM OUT-OF-RANGE.
IF WK < 0 OR WK > 35 PERFORM OUT-OF-RANGE.
IF PC < 0 OR PC > 15 PERFORM OUT-OF-RANGE.
IF NOS < 0 OR NOS > 50 PERFORM OUT-OF-RANGE.
IF CS < 0 OR CS > 84 PERFORM OUT-OF-RANGE.
IF AS < 0 OR AS > 23 PERFORM OUT-OF-RANGE.
IF MK < 0 OR MK > 25 PERFORM OUT-OF-RANGE.
IF MC < 0 OR MC > 25 PERFORM OUT-OF-RANGE.
IF EI < 0 OR EI > 20 PERFORM OUT-OF-RANGE.
IF VE < 0 OR VE > 50 PERFORM OUT-OF-RANGE.
IF (GS + AR + VE + NOS + CS + AS + MK + MC + EI) = 0
PERFORM OUT-OF-RANGE.

```

* Compute array subscripts from the raw scores.

```

COMPUTE VE = WK + PC.
COMPUTE GSN = GS + 1.
COMPUTE ARN = AR + 27.
COMPUTE WKN = WK + 58.
COMPUTE PCN = PC + 94.
COMPUTE NON = NOS + 110.
COMPUTE CSN = CS + 161.
COMPUTE ASN = AS + 246.
COMPUTE MKN = MK + 272.
COMPUTE MCN = MC + 298.
COMPUTE EIN = EI + 324.
COMPUTE VEN = VE + 345.

```

* Select conversion table based on test form--records with unknown forms
 * are skipped.
 * The 8A table is for forms: 8A/8B/9A/9B/10A/10B/10X/10Y/13C/14A/14B/14C/15C
 * The 11 table is for forms: 11A/11B/12B/13A/13B
 * The 12A through 17B tables are only for the forms in the table name.

```

IF TFORM = " 8" PERFORM CONVERT-8A ELSE

```

```

IF TFORM = "11" PERFORM CONVERT-11 ELSE
IF TFORM = "12A" PERFORM CONVERT-12A ELSE
IF TFORM = "15A" PERFORM CONVERT-15A ELSE
IF TFORM = "15B" PERFORM CONVERT-15B ELSE
IF TFORM = "16A" PERFORM CONVERT-16A ELSE
IF TFORM = "16B" PERFORM CONVERT-16B ELSE
IF TFORM = "17A" PERFORM CONVERT-17A ELSE
IF TFORM = "17B" PERFORM CONVERT-17B ELSE
PERFORM OUT-OF-RANGE.
PERFORM COMPUTE-SUMS.
PERFORM COMPUTE-COMPOSITES.

```

- * Compute current AFQT(2VE + AR + MK) percentile score and
- * the aptitude composite standard scores. Note that a score of 0 is assigned
- * to AFQT if the sum of subtest standard scores < 80--this 0 is an invalid
- * score and will need to be excluded from analyses.

COMPUTE-SUMS.

```

COMPUTE AFQTSUM = ((2 * VE-S) + AR-S + MK-S).
COMPUTE AFQTN = AFQTSUM - 119.
IF AFQTN > 134 MOVE 134 TO AFQTN.
IF AFQTSUM < 121 MOVE 1 TO AFQTN.
COMPUTE GTSUM = VE-S + AR-S + MC-S.
COMPUTE CLSUM = VE-S + MK-S + CS-S.
COMPUTE ELSUM = AR-S + MK-S + EI-S + GS-S.
COMPUTE MMSUM = AR-S + EI-S + MC-S + AS-S.

```

COMPUTE-COMPOSITES.

```

COMPUTE PAFQT = AFQT-PER(AFQTN).
COMPUTE MMS ROUNDED = (100 + 20 * ((MMSUM - 199.909) / 34.992)).
COMPUTE CLS ROUNDED = (100 + 20 * ((CLSUM - 149.951) / 25.575)).
COMPUTE GTS ROUNDED = (100 + 20 * ((GTSUM - 149.928) / 26.468)).
COMPUTE ELS ROUNDED = (100 + 20 * ((ELSUM - 199.845) / 35.359)).
IF MMS < 40 MOVE 40 TO MMS.
IF CLS < 40 MOVE 40 TO CLS.
IF ELS < 40 MOVE 40 TO ELS.
IF GTS < 40 MOVE 40 TO GTS.
IF MMS > 160 MOVE 160 TO MMS.
IF CLS > 160 MOVE 160 TO CLS.
IF ELS > 160 MOVE 160 TO ELS.
IF GTS > 160 MOVE 160 TO GTS.
IF AFQTSUM < 80 MOVE 0 TO PAFQT.
MOVE MMS TO MM-S
MOVE GTS TO GT-S
MOVE CLS TO CL-S
MOVE ELS TO EL-S
MOVE PAFQT TO P-AFQT.

```

- * Write subtest and composite standard scores.

```

MOVE ADBD TO ADBD-OUT
WRITE OUTREC.
ADD 1 TO NUMBER-OF-RECORDS-WRITTEN1.
GO TO PROCESS-DATA.

```

CONVERT-8A.

```

MOVE 8A-SS(GSN) TO GS-S.
MOVE 8A-SS(ARN) TO AR-S.
MOVE 8A-SS(WKN) TO WK-S.
MOVE 8A-SS(PCN) TO PC-S.
MOVE 8A-SS(NON) TO NO-S.
MOVE 8A-SS(CSN) TO CS-S.
MOVE 8A-SS(ASN) TO AS-S.
MOVE 8A-SS(MKN) TO MK-S.
MOVE 8A-SS(MCN) TO MC-S.

```

MOVE 8A-SS(EIN) TO EI-S.
 MOVE 8A-SS(VEN) TO VE-S.
 CONVERT-11.
 MOVE 11-SS(GSN) TO GS-S.
 MOVE 11-SS(ARN) TO AR-S.
 MOVE 11-SS(WKN) TO WK-S.
 MOVE 11-SS(PCN) TO PC-S.
 MOVE 11-SS(NON) TO NO-S.
 MOVE 11-SS(CSN) TO CS-S.
 MOVE 11-SS(ASN) TO AS-S.
 MOVE 11-SS(MKN) TO MK-S.
 MOVE 11-SS(MCN) TO MC-S.
 MOVE 11-SS(EIN) TO EI-S.
 MOVE 11-SS(VEN) TO VE-S.
 CONVERT-12A.
 MOVE 12A-SS(GSN) TO GS-S.
 MOVE 12A-SS(ARN) TO AR-S.
 MOVE 12A-SS(WKN) TO WK-S.
 MOVE 12A-SS(PCN) TO PC-S.
 MOVE 12A-SS(NON) TO NO-S.
 MOVE 12A-SS(CSN) TO CS-S.
 MOVE 12A-SS(ASN) TO AS-S.
 MOVE 12A-SS(MKN) TO MK-S.
 MOVE 12A-SS(MCN) TO MC-S.
 MOVE 12A-SS(EIN) TO EI-S.
 MOVE 12A-SS(VEN) TO VE-S.
 CONVERT-15A.
 MOVE 15A-SS(GSN) TO GS-S.
 MOVE 15A-SS(ARN) TO AR-S.
 MOVE 15A-SS(WKN) TO WK-S.
 MOVE 15A-SS(PCN) TO PC-S.
 MOVE 15A-SS(NON) TO NO-S.
 MOVE 15A-SS(CSN) TO CS-S.
 MOVE 15A-SS(ASN) TO AS-S.
 MOVE 15A-SS(MKN) TO MK-S.
 MOVE 15A-SS(MCN) TO MC-S.
 MOVE 15A-SS(EIN) TO EI-S.
 MOVE 15A-SS(VEN) TO VE-S.
 CONVERT-15B.
 MOVE 15B-SS(GSN) TO GS-S.
 MOVE 15B-SS(ARN) TO AR-S.
 MOVE 15B-SS(WKN) TO WK-S.
 MOVE 15B-SS(PCN) TO PC-S.
 MOVE 15B-SS(NON) TO NO-S.
 MOVE 15B-SS(CSN) TO CS-S.
 MOVE 15B-SS(ASN) TO AS-S.
 MOVE 15B-SS(MKN) TO MK-S.
 MOVE 15B-SS(MCN) TO MC-S.
 MOVE 15B-SS(EIN) TO EI-S.
 MOVE 15B-SS(VEN) TO VE-S.
 CONVERT-16A.
 MOVE 16A-SS(GSN) TO GS-S.
 MOVE 16A-SS(ARN) TO AR-S.
 MOVE 16A-SS(WKN) TO WK-S.
 MOVE 16A-SS(PCN) TO PC-S.
 MOVE 16A-SS(NON) TO NO-S.
 MOVE 16A-SS(CSN) TO CS-S.
 MOVE 16A-SS(ASN) TO AS-S.
 MOVE 16A-SS(MKN) TO MK-S.
 MOVE 16A-SS(MCN) TO MC-S.
 MOVE 16A-SS(EIN) TO EI-S.
 MOVE 16A-SS(VEN) TO VE-S.
 CONVERT-16B.

```

MOVE 16B-SS(GSN) TO GS-S.
MOVE 16B-SS(ARN) TO AR-S.
MOVE 16B-SS(WKN) TO WK-S.
MOVE 16B-SS(PCN) TO PC-S.
MOVE 16B-SS(NON) TO NO-S.
MOVE 16B-SS(CSN) TO CS-S.
MOVE 16B-SS(ASN) TO AS-S.
MOVE 16B-SS(MKN) TO MK-S.
MOVE 16B-SS(MCN) TO MC-S.
MOVE 16B-SS(EIN) TO EI-S.
MOVE 16B-SS(VEIN) TO VE-S.
CONVERT-17A.
MOVE 17A-SS(GSN) TO GS-S.
MOVE 17A-SS(ARN) TO AR-S.
MOVE 17A-SS(WKN) TO WK-S.
MOVE 17A-SS(PCN) TO PC-S.
MOVE 17A-SS(NON) TO NO-S.
MOVE 17A-SS(CSN) TO CS-S.
MOVE 17A-SS(ASN) TO AS-S.
MOVE 17A-SS(MKN) TO MK-S.
MOVE 17A-SS(MCN) TO MC-S.
MOVE 17A-SS(EIN) TO EI-S.
MOVE 17A-SS(VEIN) TO VE-S.
CONVERT-17B.
MOVE 17B-SS(GSN) TO GS-S.
MOVE 17B-SS(ARN) TO AR-S.
MOVE 17B-SS(WKN) TO WK-S.
MOVE 17B-SS(PCN) TO PC-S.
MOVE 17B-SS(NON) TO NO-S.
MOVE 17B-SS(CSN) TO CS-S.
MOVE 17B-SS(ASN) TO AS-S.
MOVE 17B-SS(MKN) TO MK-S.
MOVE 17B-SS(MCN) TO MC-S.
MOVE 17B-SS(EIN) TO EI-S.
MOVE 17B-SS(VEIN) TO VE-S.
PROCESS-FORM5.
* Select out records with out-of-range scores--DO NOT PROCESS!.
IF GS < 0 OR GS > 20 PERFORM OUT-OF-RANGE.
IF AR < 0 OR AR > 20 PERFORM OUT-OF-RANGE.
IF WK < 0 OR WK > 30 PERFORM OUT-OF-RANGE.
IF NOS < 0 OR NOS > 50 PERFORM OUT-OF-RANGE.
IF MK < 0 OR MK > 30 PERFORM OUT-OF-RANGE.
IF MC < 0 OR MC > 20 PERFORM OUT-OF-RANGE.
IF EI < 0 OR EI > 30 PERFORM OUT-OF-RANGE.
IF AI < 0 OR AI > 20 PERFORM OUT-OF-RANGE.
IF (GS + AR + WK + NOS + MK + MC + EI + AI) = 0 PERFORM
OUT-OF-RANGE.

* Assign subscripts from raw scores.
COMPUTE GSN = GS + 1.
COMPUTE ARN = AR + 22.
COMPUTE WKN = WK + 43.
COMPUTE NON = NOS + 74.
COMPUTE AIN = AI + 125.
COMPUTE MKN = MK + 146.
COMPUTE EIN = EI + 167.
COMPUTE MCN = MC + 198.

* Convert raw scores to standard scores.
MOVE 5-SS(GSN) TO GS-S.
MOVE 5-SS(ARN) TO AR-S.
MOVE 5-SS(WKN) TO WK-S.
MOVE 5-SS(NON) TO NO-S.
MOVE 5-SS(AIN) TO AS-S.

```

```

      MOVE 5-SS(MKN) TO MK-S.
      MOVE 5-SS(MCN) TO MC-S.
      MOVE 5-SS(EIN) TO EI-S.
* Compute AFQT and composites. make adjustments from
* WWII scale to 1980 scale.
      COMPUTE AFQTSUM = ((2 * WK-S) - AR-S + MK-S);
      COMPUTE AFQTN1 = AFQTSUM - 94.
      IF AFQTN1 > 167 MOVE 167 TO AFQTN1.
      IF AFQTSUM < 95 MOVE 1 TO AFQTN1.
      COMPUTE AFQTN = AFQTN1(AFQTN1) - 119.
*Compute composite sums of subtest standard scores (WWII scale).
      COMPUTE MSUM1 = AR-S + AS-S + MC-S + EI-S.
      COMPUTE CSUM1 = WK-S + MK-S + NO-S.
      COMPUTE ESUM1 = GS-S + AR-S + MK-S + EI-S.
      COMPUTE GSUM1 = WK-S + AR-S + MC-S.
*Compute 5/6/7 composite scores in 1980 metric--still need to compute
* standard scores on 1980 score scale.
      COMPUTE MMSUM ROUNDED = (5.313 + (1.013 * MSUM1)).
      COMPUTE ELSUM ROUNDED = (2.810 + (0.986 * ESUM1)).
      COMPUTE CLSUM ROUNDED = (4.848 + (0.943 * CSUM1)).
      COMPUTE GTSUM ROUNDED = (0.270 + (1.006 * GSUM1)).
      GO TO COMPUTE-COMPOSITES.
.
OUT-OF-RANGE.
      MOVE ADED TO ADED-OUT2
      MOVE AFORM TO AFORM-OUT
      MOVE AVER TO AVER-OUT
      MOVE GS TO GS-OUT
      MOVE AR TO AR-OUT
      MOVE WK TO WK-OUT
      MOVE PC TO PC-OUT
      MOVE NOS TO NOS-OUT
      MOVE CS TO CS-OUT
      MOVE AS TO AS-OUT
      MOVE MK TO MK-OUT
      MOVE MC TO MC-OUT
      MOVE EI TO EI-OUT
      MOVE AI TO AI-OUT.
      WRITE OUTREC2.
      ADD 1 TO NUMBER-OF-RECORDS-WRITTEN2.
      GO TO PROCESS-DATA.
.
EOJ-SECTION.
      MOVE NUMBER-OF-RECORDS-READ TO NINRECS1.
      MOVE NUMBER-OF-RECORDS-WRITTEN1 TO NOUTRECS1.
      MOVE NUMBER-OF-RECORDS-WRITTEN2 TO NOUTRECS2.
      WRITE OUT-LINE FROM TOTAL-RECORDS-LINE.
      CLOSE INFILE, OUTFILE, OUTFILE2, PRINTFILE.
      STOP RUN.

```

FILENAME RAWDATA CNA6.[HIATTC CONVERSIONT]RAW_ASVAB_SCORES.DAT';
 FILENAME OUTDATA CNA6.[HIATTC CONVERSIONT]AFQT_PERC.DAT';

DATA ARMS. INFILE RAWDATA; OPTIONS LINESIZE=80; FILE OUTDATA;
 INPUT

ADBD \$ 1-4
 AFORM \$ 5-6
 AVER \$ 7
 @8(GS AR WK PC NO CS AS MX MC EI AI)(2.);

*Group values for ASVAB forms for those that share common conversion tables. This may be a unique process depending on the data set--step 1 (Completed before this program) is to get a frequency of test forms in the original data and group all values(or as many as possible). In some data sets only a 12 is reported in test form with no version identifier. In this case the form 12B tables are used. by the time subtest standard scores are summed and converted to a percentile score the differences in 12A and 12B tables are very small. This same problem occurs for the 15/16/17 series as the form letter was not being entered when the test was first administered. Again the differences in AFQT percentile scores is minimal between the two forms;

IF AFORM = '00' OR AFORM = ' ' OR AFORM = '19' OR AFORM = '8C' OR
 (AFORM = '7A' AND ADBD = 7601) OR (AFORM = '7B' AND ADBD = 7601) OR
 (AFORM = '3A' AND ADBD = 8010) THEN FORM = ' ';

IF AFORM = '11' OR (AFORM = '12' AND ATESTF NE 'A') OR AFORM = '13' OR
 AFORM = '01' OR AFORM = '2B' OR AFORM = '3C' OR
 AFORM = '02' OR AFORM = '03' OR (AFORM = '3A' AND ADBD = 8009) OR
 AFORM = '3B' OR
 AFORM = '3X' OR AFORM = '3' OR AFORM = '2C' OR AFORM = '2N' OR
 AFORM = '20' OR AFORM = '2R' OR AFORM = '2S' OR AFORM = '2X'
 THEN FORM = '11';

IF AFORM = '2A' OR (AFORM = '12' AND ATESTF = 'A') THEN FORM = '12A';

IF AFORM = '09' OR AFORM = '10' OR AFORM = '1Q' OR AFORM = '1R' OR
 AFORM = '1X' OR AFORM = '1Y' OR AFORM = '3C' OR AFORM = '08' OR
 AFORM = '8' OR AFORM = '8Y' OR AFORM = '9R' OR AFORM = '9V' OR
 AFORM = '9Y' OR AFORM = '14' OR AFORM = '1C' OR AFORM = '1D' OR
 AFORM = '8A' OR AFORM = '8B' OR AFORM = '9A' OR AFORM = '9B' OR
 AFORM = '9S' OR AFORM = '9T' OR AFORM = '9X' OR AFORM = '1S' OR
 AFORM = '4A' OR AFORM = '4B' OR AFORM = '4C' OR AFORM = '4N' OR
 AFORM = '4R' OR AFORM = '4X' OR AFORM = '0A' OR AFORM = '0B' OR
 AFORM = '0X' OR AFORM = '0Y' OR AFORM = '0C' OR AFORM = '00' OR
 AFORM = '0Q' OR AFORM = '0R' OR AFORM = '0S' OR AFORM = '0T' OR
 AFORM = '0U' OR AFORM = '1' OR AFORM = '1B' OR AFORM = '1A' OR
 AFORM = '1T' OR AFORM = '1V' OR AFORM = '1Z' OR AFORM = '80' OR
 AFORM = '8D' OR AFORM = '8S' OR AFORM = '8T' OR
 AFORM = '04' OR (AFORM = '15' AND ATESTF = 'C')
 THEN FORM = '8';

IF AFORM = '05' OR AFORM = '5A' OR AFORM = '5B' OR AFORM = '5C' OR
 AFORM = '5R' OR AFORM = '5E' OR AFORM = '5K' OR AFORM = '5' OR
 AFORM = '6B' OR AFORM = '06' OR AFORM = '5X' OR
 AFORM = '6A' OR AFORM = '6C' OR AFORM = '6E' OR AFORM = '6R' OR
 AFORM = '70' OR AFORM = '7C' OR AFORM = '7D' OR
 AFORM = '7E' OR AFORM = '7R' OR (AFORM = '7A' AND ADBD = 7512) OR

(AFORM = '7B' AND ADBD = 7512)
THEN FORM = '5';

IF AFORM = '15' AND ATESTF NE 'B' THEN FORM = '15A';
IF AFORM = '15' AND ATESTF = 'B' THEN FORM = '15B';

IF AFORM = '16' AND ATESTF NE 'B' THEN FORM = '16A';
IF AFORM = '16' AND ATESTF = 'B' THEN FORM = '16B';

IF AFORM = '17' AND ATESTF NE 'B' THEN FORM = '17A';
IF AFORM = '17' AND ATESTF = 'B' THEN FORM = '17B';

ARRAY STEST AR MK VE;

*Create subtest standard score arrays for forms 11-17 (only those tests
in the AFQT are included here);

ARRAY STDAR_11 AR1-AR31 (26 26 27 28 30 31 32 34 35 36 38 39 40 42 43 44
46 47 48 50 51 52 54 55 56 58 59 60 62 63 64);

ARRAY STDME_11 MK1-MK26 (30 32 33 35 36 38 39 41 42 44 45 47 48 50 51 52
54 55 57 58 60 61 63 64 66 67);

ARRAY STDVE_11 VE1-VE51 (21 21 22 23 24 25 25 26 27 28 20 30 30 31 32 33 34
34 35 36 37 38 39 39 40 41 42 43 44 44 45 46 47 48
48 49 50 51 52 53 53 54 55 56 57 57 58 59 60 61 62);

ARRAY STAR_12A AAR1-AAR31 (26 26 28 29 30 32 33 34 36 37 38 39 41 42 43 44 45
47 48 49 50 52 53 55 56 57 59 61 62 64 66);

ARRAY STME_12A AMK1-AMK26 (30 32 34 36 37 39 40 42 43 45 46 47 49 50 51 52 54
55 56 58 59 61 63 64 66 68);

ARRAY STVE_12A AVE1-AVE51 (20 20 20 20 20 21 22 23 24 25 27 28 29 30 31 32 33
34 36 37 38 38 39 40 41 42 43 44 45 46 46 47 48 49
50 50 51 52 53 54 54 55 56 56 57 58 59 59 60 61 62);

ARRAY STAR_15A BAR1-BAR31 (26 26 27 28 30 31 33 34 35 37 38 40 41 42
44 45 47 48 49 51 52 54 55 56 58 59 61 62 63 65 66);

ARRAY STME_15A BMK1-BMK26 (29 30 31 33 34 36 38 39 41 42 44 46 47 49
50 52 53 55 57 58 60 61 63 65 66 68);

ARRAY STVE_15A BVE1-BVE51 (20 20 20 21 21 22 23 24 25 26 27 27 28 29
30 31 32 33 33 34 35 36 37 38 39 39 40 41 42 43 44 45 45
46 47 48 49 50 50 51 52 53 54 55 56 56 57 58 59 60 61);

ARRAY STAR_15B CAR1-CAR31 (26 26 27 28 30 31 33 34 35 37 38 40 41 42 44 45 46
48 49 51 52 53 55 56 58 59 60 62 63 64 66);

ARRAY STME_15B CMK1-CMK25 (29 30 31 33 34 36 38 39 41 42 44 46 47 49 50 52 53
55 57 58 60 61 63 65 66 68);

ARRAY STVE_15B CVE1-CVE51 (20 20 20 20 20 21 22 22 23 24 25 26 27 28 29 30 31
31 32 33 34 35 36 37 38 39 40 41 41 42 43 44 45 46
47 48 49 50 50 51 52 53 54 55 56 57 58 59 60 60 61);

ARRAY STAR_16A DAR1-DAR31 (26 26 26 27 29 30 32 33 35 36 38 39 40 42 43 45 46
48 49 51 52 54 55 56 58 59 61 62 64 65 66);

ARRAY STME_16A DMK1-DMK26 (29 30 32 33 35 37 38 40 41 43 44 46 47 49 50 52 54
55 57 58 60 61 63 64 66 67);

ARRAY STVE_16A DVE1-DVE51 (20 20 20 20 20 20 21 22 23 24 25 26 27 28 28 29 30
31 32 33 34 35 36 37 38 38 39 40 41 42 43 44 45 46
47 48 48 49 50 51 52 53 54 55 56 57 57 58 59 60 61);

ARRAY STAR_16B EAR1-EAR31 (26 26 28 29 30 32 33 35 36 37 39 40 41 43 44 45 47
48 49 51 52 54 55 56 58 59 60 62 63 64 66);

ARRAY STME_16B EMK1-EMK26 (29 30 32 33 35 37 38 40 41 43 44 46 47 49 50 52 54

```

55 57 58 60 61 63 64 66 67);
ARRAY STVE_16B EVE1-EVE51 (20 20 20 20 20 20 20 21 22 23 24 25 26 26 27 28 29
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 44 45
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62);

ARRAY STAR_17A FAR1-FAR31 (26 27 28 30 31 32 34 35 36 38 39 40 42 43 44 46 47
48 50 51 52 53 55 56 57 59 60 61 63 64 65);
ARRAY STMK_17A FMK1-FMK26 (29 29 30 32 34 35 37 39 40 42 44 45 47 49 50 52 54
55 57 58 60 62 63 65 67 68);
ARRAY STVE_17A FVE1-FVE51 (20 20 20 20 21 22 23 24 25 25 26 27 28 29 30 31 31
32 33 34 35 36 37 37 38 39 40 41 42 43 44 44 45 46
47 48 49 50 50 51 52 53 54 55 56 57 57 58 59 60 61);

ARRAY STAR_17B GAR1-GAR31 (26 26 28 29 31 32 33 35 36 37 39 40 42 43 44 46 47
48 50 51 53 54 55 57 58 59 61 62 63 65 66);
ARRAY STMK_17B GMK1-GMK26 (29 29 30 32 34 35 37 39 40 42 44 45 47 49 50 52 54
55 57 58 60 62 63 65 67 68);
ARRAY STVE_17B GVE1-GVE51 (20 20 20 20 20 20 21 22 23 24 25 26 27 28 28 29 30
31 32 33 34 35 36 37 38 38 39 40 41 42 43 44 45 46
47 48 49 49 50 51 52 53 54 55 56 57 58 59 59 60 61);

```

*Bind values for subtest scores by setting out-of-range to 0.
New variables are created so that the raw scores retain their values.
After the conversion loop is completed these standard scores will be
set to missing for all the out of range raw scores;

```

VE = WK + PC;
SAR = AR;
SMK = MK;
SVE = VE;

```

```

IF FORM NE ' 5' THEN DO;
IF AR > 30 OR AR = . THEN SAR=0;
IF MK > 25 OR MK = . THEN SMK=0;
IF VE > 50 OR VE = . THEN SVE=0;   END;

```

*Compute subtest standard scores for Form 11. Standard scores are not
computed for WK and PC separately, as they are not used in the
composites--only VE(WK+PC) is used. The conversion is completed using
the raw test score as the index in the standard score array. The first
standard score in the array corresponds to the raw score of 0. Since 0
is a valid raw score, but cannot be used as an array subscript the
subscript values are computed as the raw score + 1;

```

IF FORM = ' 11' THEN DO;
I = SAR + 1;
STDAR = STDAR_11[I];
I = SMK + 1;
STDMK = STDMK_11[I];
I = SVE + 1;
STDVE = STDVE_11[I];
END;

```

*Compute subtest standard scores for Form 12A;

```

IF FORM = ' 12A' THEN DO;
I = SAR + 1;
STDAR = STAR_12A[I];
I = SMK + 1;
STDMK = STMK_12A[I];
I = SVE + 1;
STDVE = STVE_12A[I];

```

END;

*Compute subtest standard scores for Form 15A:

IF FORM = '15A' THEN DO;

I = SAR + 1;

STDAR = STAR_15A[I];

I = SMK + 1;

STDMK = STMK_15A[I];

I = SVE + 1;

STDVE = STVE_15A[I];

END;

*Compute subtest standard scores for Form 15B:

IF FORM = '15B' THEN DO;

I = SAR + 1;

STDAR = STAR_15B[I];

I = SMK + 1;

STDMK = STMK_15B[I];

I = SVE + 1;

STDVE = STVE_15B[I];

END;

*Compute subtest standard scores for Form 16A:

IF FORM = '16A' THEN DO;

I = SAR + 1;

STDAR = STAR_16A[I];

I = SMK + 1;

STDMK = STMK_16A[I];

I = SVE + 1;

STDVE = STVE_16A[I];

END;

*Compute subtest standard scores for Form 16B:

IF FORM = '16B' THEN DO;

I = SAR + 1;

STDAR = STAR_16B[I];

I = SMK + 1;

STDMK = STMK_16B[I];

I = SVE + 1;

STDVE = STVE_16B[I];

END;

*Compute subtest standard scores for Form 17A:

IF FORM = '17A' THEN DO;

I = SAR + 1;

STDAR = STAR_17A[I];

I = SMK + 1;

STDMK = STMK_17A[I];

I = SVE + 1;

STDVE = STVE_17A[I];

END;

*Compute subtest standard scores for Form 17B:

IF FORM = '17B' THEN DO;

I = SAR + 1;

STDAR = STAR_17B[I];

I = SMK + 1;

```

STDME - STMK_17B[I];
I = SVE + 1;
STDVE - STVE_17B[I];
END;

```

```

*Compute subtest standard scores for forms 8/9/10/14/13C/15C;
IF FORM = ' 8' THEN DO;
STDAR = ROUND(50 + 10*(AR - 18.009)/7.373);
STDMK = ROUND(50 + 10*(MK - 13.578)/6.393);
STDVE = ROUND(50 + 10*(VE - 37.281)/10.595);
END;

```

```

*Compute form 5 version of current AFQT;
IF FORM = ' 5' THEN DO;
*Compute subtest standard scores (WWII scale, 11 July 1980 tables);
WKSTD = ROUND((50+10*((WK - 19.638)/7.251)));
ARSTD = ROUND((50+10*((AR - 12.739)/4.729)));
MKSTD = ROUND((50+10*((MK - 11.636)/4.932)));

```

```

*Compute sum of subtest standard scores;
AFQT1 = 2*WKSTD + ARSTD + MKSTD;

```

```

*Convert sum of subtest standard scores to equivalent sum on 1980
score scale;

```

```

IF 0 <= AFQT1 <= 95 THEN AFQT2 = 96;
ELSE IF 96 <= AFQT1 <= 101 THEN AFQT2 = AFQT1;
ELSE IF 102 <= AFQT1 <= 105 THEN AFQT2 = AFQT1+1;
ELSE IF 106 <= AFQT1 <= 108 THEN AFQT2 = AFQT1;
ELSE IF 109 <= AFQT1 <= 112 THEN AFQT2 = AFQT1 - 1;
ELSE IF 113 <= AFQT1 <= 117 THEN AFQT2 = AFQT1-2;
ELSE IF 118 <= AFQT1 <= 122 THEN AFQT2 = AFQT1-3;
ELSE IF 123 <= AFQT1 <= 124 THEN AFQT2 = AFQT1-2;
ELSE IF 125 <= AFQT1 <= 144 THEN AFQT2 = AFQT1-3;
ELSE IF 145 <= AFQT1 <= 148 THEN AFQT2 = AFQT1-1;
ELSE IF 149 <= AFQT1 <= 150 THEN AFQT2 = AFQT1-2;
ELSE IF 151 <= AFQT1 <= 156 THEN AFQT2 = AFQT1-3;
ELSE IF 157 <= AFQT1 <= 159 THEN AFQT2 = AFQT1-4;
ELSE IF 160 <= AFQT1 <= 161 THEN AFQT2 = AFQT1-5;
ELSE IF 162 <= AFQT1 <= 167 THEN AFQT2 = AFQT1-4;
ELSE IF 168 <= AFQT1 <= 177 THEN AFQT2 = AFQT1-3;
ELSE IF 178 <= AFQT1 <= 190 THEN AFQT2 = AFQT1-2;
ELSE IF 191 <= AFQT1 <= 193 THEN AFQT2 = AFQT1-1;
ELSE IF 194 <= AFQT1 <= 205 THEN AFQT2 = AFQT1-2;
ELSE IF 206 <= AFQT1 <= 218 THEN AFQT2 = AFQT1-3;
ELSE IF 219 <= AFQT1 <= 223 THEN AFQT2 = AFQT1-4;
ELSE IF 224 <= AFQT1 <= 230 THEN AFQT2 = AFQT1-5;
ELSE IF 231 <= AFQT1 <= 232 THEN AFQT2 = AFQT1-4;
ELSE IF 233 <= AFQT1 <= 243 THEN AFQT2 = AFQT1-5;
ELSE IF 244 <= AFQT1 <= 260 THEN AFQT2 = AFQT1-6;
ELSE IF 261 <= AFQT1 <= 262 THEN AFQT2 = AFQT1-4;
ELSE IF AFQT1 >= 263 THEN AFQT2 = 258;

```

```

END;

```

```

IF FORM NE ' 5' THEN DO;
*Bind subtest values between 20 and 80 (All forms in this data step);
IF (STDAR > 0 AND STDAR < 20) THEN STDAR=20;
IF (STDMK > 0 AND STDMK < 20) THEN STDMK=20;
IF (STDVE > 0 AND STDVE < 20) THEN STDVE=20;
IF (STDAR > 80) THEN STDAR=80;
IF (STDMK > 80) THEN STDMK=80;

```

IF (STDVE , 80) THEN STDVE=80:

* Set standard scores = missing for out-of-range values:

IF AR . 30 OR AR = . THEN STDAR-..;

IF MK . 25 OR MK = . THEN STDMK-..;

IF VE . 50 OR VE = . THEN STDVE-..;

AFQT2 = (2*STDVE - STDAR - STDMK);

END;

IF FORM = ' ' THEN AFQT2 = .;

* Convert sum of subtest standard scores to current AFQT percentile score
(all forms use the same table);

IF AFQT2<0 AND AFQT2<-120 THEN AFQT-1;
ELSE IF AFQT2<-121 AND AFQT2<-124 THEN AFQT-2;
ELSE IF AFQT2<-125 AND AFQT2<-127 THEN AFQT-3;
ELSE IF AFQT2<-128 AND AFQT2<-131 THEN AFQT-4;
ELSE IF AFQT2<-132 AND AFQT2<-134 THEN AFQT-5;
ELSE IF AFQT2<-135 AND AFQT2<-137 THEN AFQT-6;
ELSE IF AFQT2<-138 AND AFQT2<-139 THEN AFQT-7;
ELSE IF AFQT2<-140 AND AFQT2<-142 THEN AFQT-8;
ELSE IF AFQT2<-143 AND AFQT2<-144 THEN AFQT-9;
ELSE IF AFQT2<-145 AND AFQT2<-146 THEN AFQT-10;
ELSE IF AFQT2<-147 AND AFQT2<-148 THEN AFQT-11;
ELSE IF AFQT2<-149 AND AFQT2<-150 THEN AFQT-12;
ELSE IF AFQT2<-151 AND AFQT2<-153 THEN AFQT-13;
ELSE IF AFQT2<-154 THEN AFQT-14;
ELSE IF AFQT2<-155 AND AFQT2<-156 THEN AFQT-15;
ELSE IF AFQT2<-157 AND AFQT2<-158 THEN AFQT-16;
ELSE IF AFQT2<-159 AND AFQT2<-160 THEN AFQT-17;
ELSE IF AFQT2<-161 AND AFQT2<-162 THEN AFQT-18;
ELSE IF AFQT2<-163 AND AFQT2<-164 THEN AFQT-19;
ELSE IF AFQT2<-165 THEN AFQT-20;
ELSE IF AFQT2<-166 AND AFQT2<-167 THEN AFQT-21;
ELSE IF AFQT2<-168 AND AFQT2<-169 THEN AFQT-22;
ELSE IF AFQT2<-170 AND AFQT2<-171 THEN AFQT-23;
ELSE IF AFQT2<-172 THEN AFQT-24;
ELSE IF AFQT2<-173 AND AFQT2<-174 THEN AFQT-25;
ELSE IF AFQT2<-175 THEN AFQT-26;
ELSE IF AFQT2<-176 AND AFQT2<-177 THEN AFQT-27;
ELSE IF AFQT2<-178 THEN AFQT-28;
ELSE IF AFQT2<-179 AND AFQT2<-180 THEN AFQT-29;
ELSE IF AFQT2<-181 THEN AFQT-30;
ELSE IF AFQT2<-182 THEN AFQT-31;
ELSE IF AFQT2<-183 AND AFQT2<-184 THEN AFQT-32;
ELSE IF AFQT2<-185 THEN AFQT-33;
ELSE IF AFQT2<-186 THEN AFQT-34;
ELSE IF AFQT2<-187 AND AFQT2<-188 THEN AFQT-35;
ELSE IF AFQT2<-189 THEN AFQT-36;
ELSE IF AFQT2<-190 AND AFQT2<-194 THEN AFQT-AFQT2-153;
ELSE IF AFQT2<-195 AND AFQT2<-196 THEN AFQT-42;
ELSE IF AFQT2<-197 AND AFQT2<-206 THEN AFQT-AFQT2-154;
ELSE IF AFQT2<-207 AND AFQT2<-208 THEN AFQT-53;
ELSE IF AFQT2<-209 AND AFQT2<-214 THEN AFQT-AFQT2-155;
ELSE IF AFQT2<-215 AND AFQT2<-233 THEN AFQT-AFQT2-154;
ELSE IF AFQT2<-234 AND AFQT2<-235 THEN AFQT-80;
ELSE IF AFQT2<-236 AND AFQT2<-237 THEN AFQT-AFQT2-155;
ELSE IF AFQT2<-238 AND AFQT2<-239 THEN AFQT-84;
ELSE IF AFQT2<-240 AND AFQT2<-253 THEN AFQT-AFQT2-155;
ELSE IF AFQT2<-254 AND AFQT2<-300 THEN AFQT-99;

* Check subtest raw scores. if any are missing assign missing value
to AFQT;

MISS1=0;

DO I = 1 TO 3;

IF TEST[I] = . THEN MISS1+1; END;

IF MISS1 > 0 THEN AFQT = .;

PUT ADBD \$ 1-4
 AFORM \$ 5-6
 AVER \$ 7
 AFQT 8-9;

PROC FREQ DATA=ARMS;
TABLES FORM AFQT;

CHANGE_FORM5.COB

- * These changes are to be used when raw data originates in
- * the ARMS/RAMS database. This database has all test scores
- * in answer sheet order, since the order changed between forms
- * 5-6/7 and 8-17 likenamed subtests are NOT in the same field.
- * For example the GS subtest was the 10th test in the
- * form 5-6/7 battery, therefore the GS score will be in the field
- * corresponding to the 10th test or the EI field. Most HMF datasets
- * have been updated to put likenamed subtests in the same field.
- * Some DMDC datasets still have the subtests in answer sheet order
- * and will also require this code.
- * Select out records with out-of-range scores--DO NOT PROCESS'.
 - IF EI < 0 OR EI > 20 PERFORM OUT-OF-RANGE.
 - IF NOS < 0 OR NOS > 20 PERFORM OUT-OF-RANGE.
 - IF PC < 0 OR PC > 30 PERFORM OUT-OF-RANGE.
 - IF AR < 0 OR AR > 50 PERFORM OUT-OF-RANGE.
 - IF AS < 0 OR AS > 30 PERFORM OUT-OF-RANGE.
 - IF MC < 0 OR MC > 20 PERFORM OUT-OF-RANGE.
 - IF MK < 0 OR MK > 30 PERFORM OUT-OF-RANGE.
 - IF AI < 0 OR AI > 20 PERFORM OUT-OF-RANGE.
 - IF (EI + NOS + PC + AR + AS + MC + MK + AI) = 0 PERFORM
 - OUT-OF-RANGE.
- * Assign subscripts from raw scores.
 - COMPUTE GSN = EI + 1.
 - COMPUTE ARN = NOS + 22.
 - COMPUTE WKN = PC + 43.
 - COMPUTE NON = AR + 74.
 - COMPUTE AIN = AI + 123.
 - COMPUTE MKN = AS + 146.
 - COMPUTE EIN = MK + 167.
 - COMPUTE MCN = MC + 198.

CHANGE_FORM5.SAS

```
WKSTD = ROUND((50+10*(PC - 19.638)/7.251));
ARSTD = ROUND((50+10*(NO - 12.739)/4.729));
MKSTD = ROUND((50+10*(AS - 11.636)/4.932));
```

APPENDIX C

**DOCUMENTATION OF CNA-GENERATED CONVERSION TABLES TO COMPUTE
CURRENT AFQT FROM HISTORICAL SUBTEST RAW SCORES**

APPENDIX C

DOCUMENTATION OF CNA-GENERATED CONVERSION TABLES TO COMPUTE CURRENT AFQT FROM HISTORICAL SUBTEST RAW SCORES

In January 1989, all the services adopted a new definition of the AFQT. The definition changed from the sum of subtest raw scores for VE + AR + NO/2 to the sum of subtest standard scores for 2VE + AR + MK. These sums are then converted to the AFQT percentile score. All conversions from raw to standard scores are currently based on the 1980 Youth Population.

In order to maintain consistency across time this current version of the AFQT should be computed for all accessions. This presents two problems for accessions tested with ASVAB forms 5/6/7. First, all raw-score-to-standard-score conversions for those forms are on the WWII score scale, not the 1980 scale. Second, the paragraph comprehension subtest (a subtest used in the VE composite) was not a part of the battery. The following method was used to estimate the value of the current AFQT for people with ASVAB forms 5/6/7.

Three score distributions were generated from the 1980 Youth Population database. The first two distributions were used to address the lack of the PC subtest for ASVABs 5/6/7. VE is the sum of the PC and WK subtests. Since WK was part of the 5/6/7 battery it was substituted for VE. To address the definition difference, both distributions were converted to standard scores using the WWII score scale. The sums of subtest standard scores of 2WK + AR + MK and 2VE + AR + MK were equated using an analytical equipercentile method. Results are shown in table C-1.

The next step addresses the different score scales used across time. In this step the sum of subtest standard scores for 2VE + AR + MK was computed on the 1980 score scale. This sum was then equated to the 2VE + AR + MK distribution on the WWII score scale used in step 1. These results are shown in table C-2.

The final step is to combine these two equatings and convert each value from the 2WK + AR + MK on the WWII scale to an equivalent score in the 2VE + AR + MK on the 1980 scale. These results are shown in table C-3. For example, if the initial computation of 2WK + AR + MK on the WWII scale is equal to 208, it would be equivalent to a score of 209 in the distribution of 2VE + AR + MK (see table C-1). A score of 209 on the WWII score scale equates to a score of 205 on the 1980 score scale (see table C-2). Therefore, the initial score of 208 would be equated to a score of 205 (see table C-3). Only table C-3 is necessary for the conversion of subtests from forms 5/6/7 to the current AFQT definition. Table C-3 is reproduced in appendix A as table A-2.

This equating for the AFQT definition and score scale is at the sum of subtest score level; the percentile score equivalent must be found from table A-3.

Table C-1. Equating the sum of subtest standard scores (2WK+AR+MK) to sum of subtest standard scores (2VE+AR+MK) on the WWII score

2WK+AR +MK	2VE+AR +MK	2WK+AR +MK	2VE+AR +MK	2WK+AR +MK	2VE+AR +MK	2WK+AR +MK	2VE+AR +MK
95	95	141	141	187	188	233	233
96	96	142	142	188	189	234	234
97	97	143	143	189	190	235	235
98	98	144	144	190	191	236	236
99	99	145	146	191	192	237	237
100	100	146	147	192	193	238	238
101	101	147	148	193	194	239	239
102	103	148	149	194	195	240	240
103	105	149	150	195	196	241	241
104	106	150	151	196	197	242	242
105	107	151	152	197	198	243	243
106	108	152	153	198	199	244	244
107	109	153	154	199	200	245	245
108	110	154	155	200	201	246	246
109	111	155	156	201	202	247	247
110	112	156	157	202	203	248	248
111	113	157	158	203	204	249	249
112	114	158	159	204	205	250	250
113	115	159	160	205	206	251	251
114	116	160	161	206	207	252	252
115	117	161	162	207	208	253	253
116	118	162	163	208	209	254	254
117	119	163	164	209	210	255	255
118	120	164	165	210	211	256	256
119	121	165	166	211	212	257	257
120	122	166	167	212	213	258	258
121	123	167	168	213	214	259	259
122	124	168	169	214	215	260	260
123	125	169	170	215	216	261	261
124	126	170	171	216	217	262	262
125	127	171	172	217	218	263	263
126	128	172	173	218	219	264	264
127	129	173	174	219	220		
128	130	174	175	220	221		
129	131	175	176	221	222		
130	132	176	177	222	223		
131	133	177	178	223	224		
132	134	178	179	224	225		
133	135	179	180	225	226		
134	136	180	181	226	227		
135	137	181	182	227	228		
136	138	182	183	228	229		
137	139	183	184	229	230		
138	140	184	185	230	231		
139	141	185	186	231	232		
140	142	186	187	232	233		

Table C-2. Equating the sum of subtest standard scores (2VE+AR+MK) on the WWII score scale to the sum of subtest standard scores (2VE+AR+MK) on the 1980 score scale

WWII	1980	WWII	1980	WWII	1980	WWII	1980
95	96	141	138	187	184	233	228
96	96	142	139	188	185	234	229
97	97	143	140	189	186	235	230
98	98	144	141	190	187	236	231
99	99	145	142	191	188	237	232
100	100	146	143	192	190	238	233
101	101	147	144	193	191	239	234
102	102	148	145	194	192	240	235
103	103	149	146	195	192	241	236
104	104	150	147	196	193	242	237
105	105	151	148	197	194	243	238
106	105	152	149	198	195	244	238
107	106	153	150	199	196	245	239
108	106	154	151	200	197	246	240
109	107	155	152	201	198	247	241
110	108	156	153	202	199	248	242
111	109	157	154	203	200	249	243
112	110	158	155	204	201	250	244
113	111	159	156	205	202	251	245
114	112	160	157	206	203	252	246
115	113	161	158	207	203	253	247
116	114	162	159	208	204	254	248
117	115	163	160	209	205	255	249
118	115	164	161	210	206	256	250
119	116	165	162	211	207	257	251
120	117	166	163	212	208	258	252
121	118	167	164	213	209	259	253
122	119	168	165	214	210	260	254
123	121	169	166	215	211	261	256
124	122	170	167	216	212	262	257
125	122	171	168	217	213	263	258
126	123	172	169	218	214	264	258
127	124	173	170	219	215		
128	125	174	171	220	216		
129	126	175	172	221	217		
130	127	176	173	222	218		
131	128	177	174	223	219		
132	129	178	175	224	219		
133	130	179	176	225	229		
134	131	180	177	226	221		
135	132	181	178	227	222		
136	133	182	179	228	223		
137	134	183	180	229	224		
138	135	184	181	230	225		
139	136	185	182	231	226		
140	137	186	183	231	227		

Table C-3. Converting the sum of subtest standard scores (2WK+AR+MK) on the WWII score scale to the sum of subtest standard scores (2VE+AR+MK) on the 1980 score scale

WWII	1980	WWII	1980	WWII	1980	WWII	1980
95	96	146	145	196	194	246	240
96	96	147	146	197	195	247	241
97	97	148	147	198	196	248	242
98	98	149	147	199	197	249	243
99	99	150	148	200	198	250	244
100	100	151	148	201	199	251	245
101	101	152	149	202	200	252	246
102	103	153	150	203	201	253	247
103	104	154	151	204	202	254	248
104	105	155	152	205	203	255	249
105	106	156	153	206	203	256	250
106	106	157	153	207	204	257	251
107	107	158	154	208	205	258	252
108	108	159	155	209	206	259	253
109	108	160	155	210	207	260	254
110	109	161	156	211	208	261	255
111	110	162	158	212	209	262	256
112	111	163	159	213	210	263	257
113	111	164	160	214	211	264	258
114	112	165	161	215	212		
115	113	166	162	216	213		
116	114	167	163	217	214		
117	115	168	165	218	215		
118	115	169	166	219	215		
119	116	170	167	220	216		
120	117	171	168	221	217		
121	118	172	169	222	218		
122	119	173	170	223	219		
123	121	174	171	224	219		
124	122	175	172	225	220		
125	122	176	173	226	221		
126	123	177	174	227	222		
127	124	178	176	228	223		
128	125	179	177	229	224		
128	126	180	178	230	225		
130	127	181	179	231	227		
131	128	182	180	232	228		
132	129	183	181	233	228		
133	130	184	182	234	229		
134	131	185	183	235	230		
135	132	186	184	236	231		
136	133	187	185	237	232		
137	134	188	186	238	233		
138	135	189	187	239	234		
139	136	190	188	240	235		
140	137	191	190	241	236		
141	138	192	191	242	237		
142	139	193	192	243	238		
143	140	194	192	244	238		
144	141	195	193	245	239		
145	144	196					