## UT logo

**Test Scoring Using the NCS Scanner**

**Explanation of Output Report**

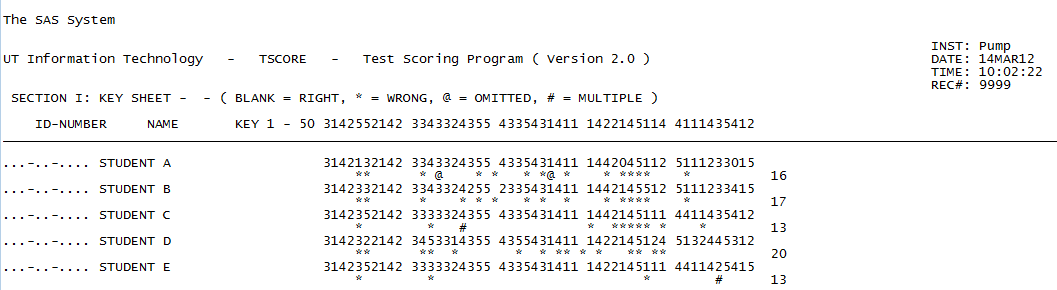
The output report discussed below was generated using SAS (Statistical Analysis System) procedures. Information about the statistical procedures used may be obtained from SAS USER’S GUIDE: BASICS and/or SAS USER’S GUIDE: STATISTICS, available at most libraries.

**SECTION I – KEY SHEET**

This section presents a listing of all sheets submitted, sorted by NAME (unless ID number sorting is requested). The header line contains the correct answers, as defined by the key sheet. The output lines identify the student, the answer chosen by the student, and (on the second output line) one of four codes defining the student’s answer. The four codes and their meanings are:

* Blank = the student’s answer is correct
* \* = the student’s answer is wrong
* @ = the student did not answer this question
* # = the student marked more than one answer

The following abbreviated output listing will illustrate the format of this section of the report. A description follows the sample output.



The numbers following KEY 1-50 on the heading line are the correct answers for the 50 questions on this test (printed in groups of 10). If there are more than 80 questions on a test, multiple output lines will be generated for each student.

Output for each student is printed on two lines. The first line identifies the student and prints the answer the student marked for each item on the test. The second line contains one of the four codes (see Page 1) marked under the student’s answer for each item on the test. The number of incorrect answers for each student is printed on the right side of the second output line.

In the example on Page 1, Student A marked 34 correct answers out of 50. He had 14 incorrect answers (coded with \*’s), and two questions that he did not answer (marked with @’s). Similarly, Student C had 10 incorrect answers (marked with \*’s) and one question which was marked more than once (coded with #).

**SECTION II – CLASS ROSTER**

This section presents a listing of all sheets submitted, sorted by name (unless ID number sorting is requested), along with scores and descriptive statistics.

SCORE  
The score is the sum of all correctly marked questions. The Score will be weighted if that option was chosen.

T-SCORE  
The T-Score is a standardized score – the distribution of which has a mean of 50 and a standard deviation of 10. Therefore, a T-Score of 65 would indicate that the test score of that individual is 1 and ½ standard deviations above the mean of that group’s scores. T-Scores are useful for comparing an individual’s score from one test with his scores from other tests, and should be used when scores are to be combined.

PERCENT CORRECT  
The Percent Correct is the score divided by the total possible score. For example, if a person obtained a score of 10 on a 20 question exam, the Percent Correct would be 50. If, on the same 20 question exam, 10 of the questions are given a weight of 2, a person obtaining a score of 10 would have a Percent Correct of 33 (Score 10 divided by total possible score 30 equals Percent Correct 33).

PERCENTILE  
The Percentile rank is computed for each individual’s score based on the group as a whole. If a score of 22 has a Percentile rank of 41, then 41 percent of the students have scores less than 22.

NUMBER CORRECT  
The Number Correct is the actual number of questions that agreed with the submitted answer key.

NUMBER WRONG  
The Number Wrong is the actual number of questions that did not agree with the submitted answer key.

NUMBER OMITTED  
The Number Omitted is the total number of questions left blank.

NUMBER MULTIPLE  
The Number Multiple is the total number of questions with multiple answers.

**SECTION III – SUMMARY OF TEST STATISTICS**

This section presents descriptive statistics for the test and score groups.

NUMBER OF QUESTIONS (ITEMS)  
The total number of questions on the test.

NUMBER OF OBSERVATIONS  
The number of answer sheets scored on the scanner.

MEAN SCORES  
The Mean is the arithmetic average of a group of scores – the sum of all scores divided by the number of sheets scored.

VARIANCE  
The Variance is one way of measuring how closely the individual scores cluster around the mean. It is the average squared deviation from the Mean. The Variance will be very small when there is a great deal of homogeneity in the scores, for then most scores will have very small deviations from the mean (i.e., will be close to the mean).

STANDARD DEVIATION  
The Standard Deviation is an indicator of the dispersion of scores. If one has a large number of examinees and assumes a normal distribution of scores, approximately 2/3rd of the scores will fall within the interval found by adding and subtracting one Standard Deviation from the Mean. For example, if the Mean is 25 and the Standard Deviation is 7, then 68.26% of the scores are within the interval 18-32.

RELIABILITY (KR-20)  
The Kuder-Richardson value gives us an estimate of how well the test would provide stable scores. The KR-20 assumes that all questions measure the same general ability, or the content of the questions is similar. The values of KR-20 range between 0 and +1.00. A value close to +1.00 indicates a high degree of internal consistency reliability; that is, all questions would assess the skill area in approximately the same way.

RELIABILITY (KR-21)  
The distinction between Kuder-Richardson 20 and 21 is that the KR-21 assumes all items to be of equal difficulty; that is, that the proportion of people who answered correctly is constant for all items. If this assumption is not met, KR-21 will give a slightly lower estimate of reliability.

STANDARD ERROR OF MEASUREMENT (KR-20 and KR-21)  
The Standard Error of Measurement is useful in the interpretation of individual scores and should be viewed in a manner similar to Standard Deviation. For an individual’s obtained test score, we can find the interval plus or minus one Standard Error spanning either side of this obtained score. We are 68% confident that the interval contained his true score.

OBTAINED LOW SCORE  
The Obtained Low Score is the lowest score that any student obtained on the test.

OBTAINED HIGH SCORE  
The Obtained High Score is the highest score that any student obtained on the test.

TOTAL POSSIBLE SCORE  
The Total Possible Score is the total number of points given for the test. This includes weighting factors if that option was specified.

TOTAL NUMBER OF ANSWERS  
The Total Number of Answers is the number of questions on the test multiplied by the number of students taking the test.

NUMBER OF MISSING  
The Number of Missing is the total number of questions which a student or students did not mark.

NUMBER MULTIPLE  
The Number Multiple is the total number of questions for which a student or students marked multiple answers.

**SECTION IV – TEST FREQUENCY DISTRIBUTION**

This section presents distribution statistics (including a frequency histogram) for all scores obtained. The scores are in a high to low sequential order.

RAW SCORE  
The Raw Score is the actual score that a student received on the test.

STANDARD SCORE  
The Standard Scores it the ration of the student’s deviation from the Standard Deviation of the class. Standardizing is a technique for removing location and scale attributes from a set of scores. The standard scores reported will have a Mean of 500 and a Standard Deviation of 100.

PERCENTILE  
The Percentile rank is computed for each of the scores based on the group as a whole. If a score of 40 has a Percentile rank of 82, then 82% of the persons taking the exam had a score less than 40.

PERCENT  
The Percent is the ratio of the number of students who obtained a particular score to the toral number of sheets scored.

CUMULATIVE PERCENTAGE  
The Cumulative Percentage is the summing of the percentages starting with the lowest percentage. The Cumulative Percentage for the highest score for the test will be 100.

FREQUENCY  
The Frequency is the number of persons obtaining each score.

CUMULATIVE FREQUENCY   
The Cumulative Frequency is a summing of the frequencies starting at the frequency with the lowest score.

FREQUENCY HISTOGRAM  
The Frequency Histogram is a pictorial representation of the number of students who received each score. Each X printed in the histogram may represent one or more students depending on the number of students taking the test.

**SECTION V – ITEM ANALYSIS**

This section presents a listing of questions along with the number (first row) and percentage of persons (second row) who selected each choice. The correct answer is marked with an asterisk (\*).

NUMBER OMITTED  
The Number Omitted column indicates how many times a particular question was left blank.

NUMBER MULTIPLE  
The Number Multiple column indicates how many times a particular question had multiple answers marked.

POINT BISERIAL COEFFICENT  
The Point Biserial Coefficient is a correlation coefficient which will range from -1.00 to +1.00. This coefficient can be used to determine whether a question should be retained or discarded. A higher positive coefficient (+1.00) indicates (for this group of examinees) similarity between performance on the question and on the total test or subtest. Only relatively high positive coefficient questions should be retained.

POINTS RIGHT  
Points Right indicates the number of points awarded for each correct answer.

POINTS WRONG  
Points Wrong indicates the number of points awarded for each wrong answer. This value is usually zero.

**Procedures for Submitting Exams for Scanning**

* Obtain Scantron test sheets through your department’s administrative office, the UT Print Shop, or contact the IT Scanning Office for outside vendors and information.
* Administer your test.
* Bring your answer sheets AND completed answer key (with all zeroes bubbled in in the Identification Number field) to the Information Commons IT Helpdesk in Carlson Library. If you have questions about our location, you can contact us at (419) 530-3863 or email us at [ITScan@utoledo.edu](mailto:ITScan@utoledo.edu) .
* Make sure that all answer sheets are facing the same direction and have the same side up. Tests must be in an envelope or cannot be checked in. This is for our safety and for yours. Put all tests for each class in a separate envelope.

Fill out the Scanning Request Form completely and submit it along with your tests. If you do not have a form, you can obtain one from the Info Commons Helpdesk or Information Technology’s website. If you want printed and/or digital results, please specify on the form.   
(Scanning Forms can be found here: <http://www.utoledo.edu/it/forms.html> )

* You will be given a receipt with your job number printed on it. When your tests are finished, you must bring the receipt back and present it when you are picking up your packet. No jobs will be released without the correct receipt. If you do not have your receipt, IT has the right to ask for a photo ID.

**Limtations**

* Results should be available within 24 hours, except over weekends and during breaks when the University is closed. If you need your results sooner, you can contact IT Scanning to make arrangements. If we are able to accommodate you, we will.
* The maximum number of questions per test is 240.
* There may be no more than five choices for each question.
* For standard test scoring each question receives a weight of one if correct and zero if it is wrong or omitted, or if the student bubbled in more than one value for a question.
* If weighted test scoring is requested, a weight may be given for each correct and/or wrong answer. In weighted test scoring, all omitted questions receive a weight of zero. Indicate the weights on the Scanning Request Form.
  + If weighted test scoring is requested, then the following statistics have no meaning and will not be generated: Reliability (KR-20 and KR-21) and Standard Error of Measurement (KR-20 and KR-21).
* If there is more than one correct answer for a question, fill in ONLY ONE of the correct answers on the key sheet, and then on your Scanning Request form write the number of the question(s) and all possible correct answers.
* At this time, our analysis software does not allow us to grade questions as “extra credit” (i.e., points for a correct answer but no penalization for an incorrect answer).
* IT Scanning is only able to scan certain answer forms. Please do not administer an exam on anything other than the approved green General Purpose Answer Sheet (or the red CAPS forms used for Faculty Evaluations). If you are unsure about whether your form is approved, please contact IT Scanning at (419) 530-3863 or email us at [ITScan@utoledo.edu](mailto:ITScan@utoledo.edu) .