

Introduction

ITS offers Optical Mark Reader (OMR) services using an NCS OpScan 10 Model 55 scanner. The standard form supported records 240 single-character answers and 45 characters of demographic data.

This handout explains the steps for obtaining OMR services, the format of captured data, requesting auto-matic exam grading, and optional follow-up data analysis.

All OMR forms and sheets are free; however, there is a \$0.10 processing charge per OMR scanner sheet and a \$5.00 minimum charge for use of the OMR. **Please note:** Re-runs are subject to the same charges.

Turnaround time for processing scanned documents or exams is 24 hours; processing is done Monday through Friday only.

Before obtaining OMR services, you need:

1. Blank OMR scanner sheets, which can be picked up at the Dispatch Counter in the lobby of Tyler Hall.
2. Handout No.37, "Optical Mark Reader (OMR) Services Request". If your method of payment is through a departmental account, the account number **must** be entered on this form.

Optional:

A staff/faculty computer account on the UNIX application server, grinder . If you do not have one, fill out and submit handout No.72, "UNIX (AIX): Grinder Computer Account Application".

The handouts are located in numbered bins in the lobby of Tyler Hall, in the URI Library LL4, and on the Web:

<http://www.uri.edu/ois/iits/iits.handouts.files/handout.no.13.html>

Obtaining OMR Services

1. Fill out handout No.37; you will be asked to provide a three-character (alphanumeric only) data set identifier. This identifier is used to create a UNIX file with a name of the form **omrxxx.data** where xxx is the user-supplied data set identifier. This data set is referenced by an analysis program as the source of the data to be processed.
2. Have respondents complete the OMR scanner sheets correctly and neatly; see **Filling out the OMR Scanner Sheets** below.
3. If you are administering an exam, complete one or more separate scanner sheets as the answer keys.
4. Complete an additional scanner sheet if you wish to request automatic exam grading.
5. Complete and return all of the above forms at the Dispatch Counter in the lobby of Tyler Hall. You may call 874-4364 in 24 hours to confirm that your job has been processed.
6. Optionally, you may wish to program your own OMR-captured data analysis. SAS software is recommended for this task, but any package or language may be used.

Filling out the OMR Scanner Sheets

We cannot stress enough the importance of correctly and neatly filling out the scanner sheets. Be sure to instruct your respondents carefully on how to fill out the OMR sheets. The machine is very unforgiving of stray marks or other error conditions. In the name field, all embedded blanks must be blackened (i.e., between first name, middle initial, and last name). In numeric fields, leading zeros should be filled in and all numbers right-justified. In the question response fields, only one circle may be filled in. Be sure to erase completely any stray or duplicate marks.

The Answer Key(s)

If you are administering an exam, an answer key will be required to grade the exam. To use the automatic grading routine, it is required that the answer key be submitted immediately preceding the students' sheets. If you are administering different versions of the exam, fill out an answer key for each version in **ascending** order (i.e., answer key #1 first, answer key #2 next, and so on, up to a maximum of four) and submit them immediately preceding the students' sheets. If you are programming your own exam analysis, it is recommended that the key be part of the OMR-captured data. Fill out the key scanner sheet as if it were one of the student response sheets. In the NAME field enter: **answer key**. In the IDENTIFICATION NUMBER field, enter all zeros. For the actual question responses, be sure that only one circle is filled in for each exam question. Multiple or missing values in the key will terminate the automatic grading routine.

Requesting Automatic Exam Grading

Users who do not wish to process their own exam data may request grade reports, grade distribution histograms, summary statistics, and item analysis. To request automatic exam grading, fill out an additional OMR sheet and place it as the first sheet in the group. The answer key sheet(s) will immediately follow, followed by all of the student forms. The OMR scanner sheet for automatic grading should be filled out according to the format below to supply the appropriate instructions to the program:

Name and letters of course code:

NAME field: Enter your last name first, a blank, first initial, a blank, then the first three characters of your course code (e.g., for ENG402 enter ENG). Be sure to blacken the blanks between the three sets of character strings.

Automatic grading:

SEX field: Fill in both MALE and FEMALE. This is critical for initiating the automatic grading.

Total questions and digits of course code:

SPECIAL CODES field: This field is divided into two sets of three digits each. In the first, enter the total number of exam questions administered (be sure to fill in leading zeros). In the second, enter the three digits of your course code (e.g., for ENG402 enter 402).

Subtests:

IDENTIFICATION NUMBER field: If you require separate scoring for parts of this exam, enter the upper range of each subtest. A maximum of three subtests is permitted, with three digits for each upper range. If only two subtests exist, leave the last three boxes blank. For example, suppose a biology exam has three distinct parts to be scored separately as well as together: ecology, morphology, and physiology. If the ecology section is the first 40 questions, the morphology section the next 40 questions, and the physiology section the last 20 questions (for a total of a 100 item exam), then the data field would appear as follows: 040080100.

Weights for subtests:

Two columns of the **BIRTH YEAR** field and one column of the **BIRTH MONTH** field together constitute the weights for the subtests.

BIRTH YR field (2 columns 0-9): If you are administering subtests, and want them weighted, fill in an integer weight (0-9) in each column, for the first and second subtest.

BIRTH MO field (2 columns 0-9):

If you are administering a third subtest, and want it weighted, fill in an integer weight (0-9) in the first (left) column for the third subtest.

Course sections:

DO NOT WRITE IN THIS SPACE field: This field is divided into two rows (0-9). Treat the row under IN THIS SPACE as a left (tens) column and the upper row under DO NOT WRITE as a right (ones) column and enter the number of the highest course section included in this group of exams. For example, if there are twelve course sections, the 1 is filled in on the row under IN THIS SPACE, and the 2 is filled on the row under DO NOT WRITE.

Test versions:

GRADE or EDUCATION field: The first column (1-4) is for entering the maximum number of answer keys you are using. This allows you to administer up to 4 versions of the exam at once. Be sure to have your students fill in the appropriate circle for the version they are taking.

Other information:

When you have entered all the necessary demographic information, turn the sheet over to enter the information necessary to format your printout. Unless otherwise noted, the answers to the following questions will be A for YES or B for NO. Answer the following questions in columns 1-8 of side one:

Column Number:

1 If there are multiple sections in this course, would you like them scored separately? If you have only one section, please answer NO (B).

- 2 In the output, how would you like the students' grades listed?:
A - by NAME
B - by URI student ID number
C - by NAME then URI student ID number
D - by URI student ID number then NAME
Enter the appropriate letter.
- 3 Would you like a printed grade report? This report is suitable for posting.
- 4 Would you like a histogram showing the grade distribution?
- 5 Would you like an item analysis of each exam question?
- 6 What is the maximum valid response for any of the exam questions? For example, if the entire exam is True/False, enter B. If the exam is multiple choice with some questions having only three choices and some four choices, enter D.
- 7 Do you wish to have parts of the exam scored separately as well as together? If yes, be sure that the **IDENTIFICATION NUMBER** field on side two contains the maximum question number for each subtest. Only three subtests are allowed.
- 8 Do you wish to have an individualized report to return to each student? Note: the student copy is not usually requested on final exams.

Directions for Students

Filling out Response Scanner Sheets

An individual scanner sheet must be filled out by each student taking the exam. The instructions for filling out the four required demographic fields are as follows:

Name:

In the **Name** field, the student must enter the last name first, a blank, and then the first name. Be sure to instruct them to blacken the blanks between the two sets of character strings as well as any trailing blanks.

Identification Number:

In this field, students should fill in their URI Student ID number.

Course section:

DO NOT WRITE IN THIS SPACE field: This field is divided into two rows (0-9). Treat the row under IN THIS SPACE as a left (tens) column and the upper row under DO NOT WRITE as a right (ones) column and enter the number of the highest course section included in this group of exams.

For example, if the students from multiple sections are taking the same exam they must fill in the appropriate section number. A student from section 5 must enter 0 on the row under IN THIS SPACE, and 5 on the row under DO NOT WRITE.

Test Version:

GRADE or EDUCATION field: The first column (1-4) is for entering the number of the answer key that the student is using.

Submitting and Retrieving Paperwork

Upon completion of the scanner sheets, return them with the OMR services request form (handout No.37) to the Dispatch Counter for processing. The scanner sheets must be in the following order:

1. request for automatic grading (optional),
2. answer key (optional), and
3. the respondents' sheets.

Depending on the current workload, the turnaround time will range from a few minutes to a full day, Monday through Friday.

User-written OMR Data Analysis

The information below is for users who wish to do their own programming of the data analysis. The format of the captured data is explained and a few suggestions are given on the use of SAS.

The OMR data is written to disk in fixed, 80-byte records. For each form read by the OMR, four records are written to disk. The first three records contain 80 responses each for the total of 240 questions possible on the standard answer sheet. If the exam or

questionnaire is shorter than 240 questions, blanks will be written in the unused locations.

The fourth record contains demographic information: **NAME** (cols. 1-19), **IDENTIFICATION NUMBER** (URI student ID number, cols. 20-28), **SEX** (29), **SPECIAL CODES** (30-35), **BIRTH YEAR** (36-37), **BIRTH MONTH** (38- 39), **DO NOT WRITE** (41) and **IN THIS SPACE** (40), and **GRADE or EDUCATION** (42-45).

A note on the demographic fields:

In the **NAME** field, intervening blanks must be filled in. In the **SEX** field, 0=female and 1=male. The **GRADE or EDUCATION** field consists of four columns with possible values of blank, 0, 1, 2, or 3. If grade 10 had been recorded on the mark sense form, a 1 would show in column 44 of the OMR-captured data set and blanks in the other three columns. The response of grade 16 would be written to the data set as a 3 in column 45 and blanks in 42-44. If the **GRADE or EDUCATION** field is used in data collection, be prepared to transform the data appropriately in your analysis program.

Although the OMR-captured data is not language or package-dependent, the computer package most recommended for exam grading or questionnaire analysis is SAS. If you are writing your own SAS program to analyze the OMR-captured data, the information below may be helpful.

- Review the syntax necessary to invoke SAS, especially the use of Filename statements to describe the source data.
- Review the SAS INFILE and INPUT (multiple records per observation) statements. An input statement that reads all of the possible variables might look as follows:

```
INPUT #1 (Q1-Q80) (1.)
      #2 (Q81-Q160) (1.)
      #3 (Q161-Q240) (1.)
      #4 NAME $ 1-19 SSN 20-28 SEX 29
      SPECCODE 30-35 YR 36-37 MO 38-          39
      DNW 40-41 GRADE 42-45:
```

- For questionnaire analysis, the **FREQ** procedure is recommended for error checking and general description of the sampled population.
- Other SAS procedures of possible interest include **MEANS** or **UNIVARIATE** for simple descriptive statistics and **PLOT** or **CHART** for simple printer graphics.