SCANTOMARK

User Guide

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Contents

1 Overview **1**
- 1.1 Main System Functions . . . 1
- 1.2 System Versions . . . 3

2 Form Types Supported **4**
- 2.1 Scantomark Custom Forms . . . 4
- 2.2 Scantron Forms . . . 5
- 2.3 Student Exam Forms . . . 6

3 Answer Keys **7**

4 Digitizing Exam Forms as PDFs **9**

5 Marking/Grading **11**
- 5.1 License Key . . . 11
- 5.2 Exam Form Type . . . 11
- 5.3 Answer Key File . . . 11
- 5.4 Exam PDF File . . . 11
- 5.5 Upload and Wait . . . 12

6 Security and Privacy Considerations **14**

Chapter 1

Overview

The objective of Scantomark is to provide an efficient online tool for educators to grade stanadard exams (i.e., those exams that contain multiple-choice questions only and require students to pick their answers by filling "bubbles" on a standard, pre-printed form.) By using Scantomark, educators can save time on marking and returning exams and will therefore be able to provide timely feedback to students.

1.1 Main System Functions

As the name Scantomark signifies, the online system marks scanned exam forms. Its main functions are as follows:

Clearly mark correct/wrong answers on student forms. Correct and wrong answers are marked in different colors for quick reading. On the examples shown below in Figure 1.1, red/blue marks indicate the keys but student answers are wrong; green ones indicate students' correct answers. The purple lines show student IDs, exam versions, and total scores.[1]

Save each graded form as a separate PDF file. Individual PDF files can be emailed to individual students. Alternatively, they may be uploaded to LMS (Learning Management Systems) such as Canvas through API.[2]

Save all scores in a CSV file. All calculated scores are saved as Comma-Separated Values (CSV).[3] The file can be uploaded to LMS and imported into the grade book with minimal edit. As such faculty would not need to perform any manual entry, which is

[1] The second example shows the marking of a Scantron form. Scantron is a registered trademark of Scantron Corporation, to which the website Scantomrk.com is not related.

[2] https://canvas.instructure.com/doc/api/

[3] https://en.wikipedia.org/wiki/Comma-separated_values

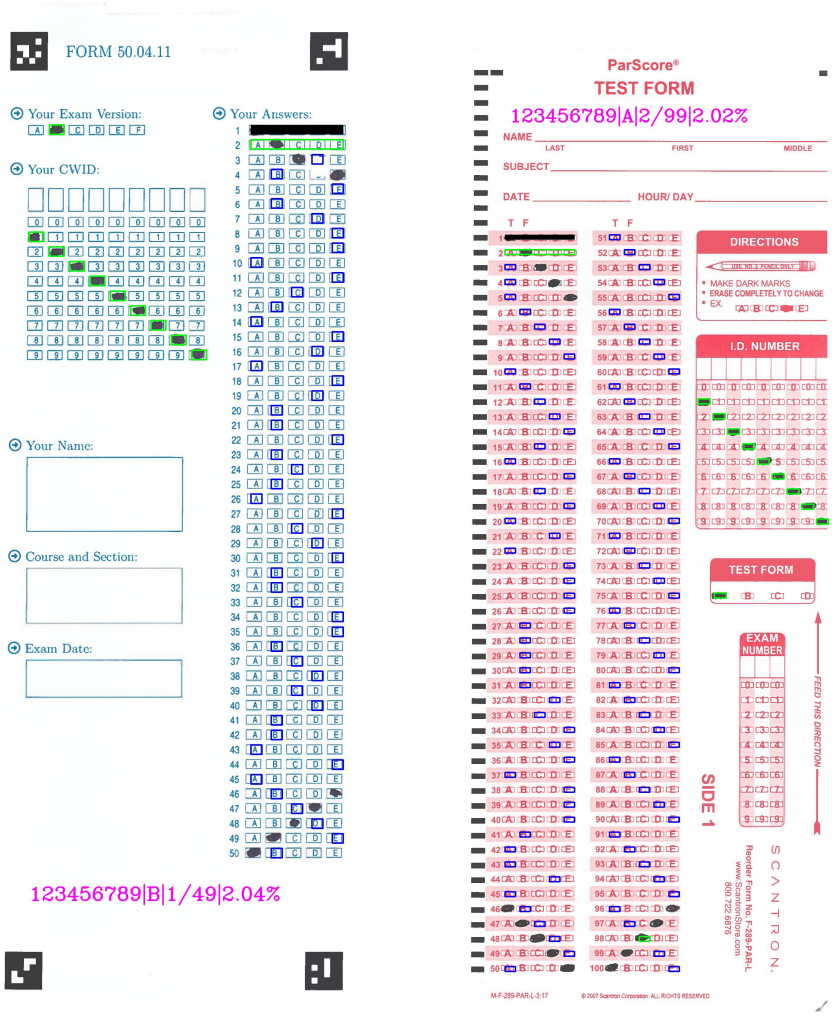

Figure 1.1: Examples of Marked Forms

often error-prone particularly when the class size is large. An example of CSV data (displayed in a spreadsheet app) is shown below in Table 1.1.

Save students' scores on each question in the CSV file. Student scores of all questions can also be exported into CSV (the columns labeled 3–10 in the above example). Such data provide more granulate data for student/item analysis, which is often a critical step in continuous assessment as required by accreditation bodies such as AACSB.[4]

[4] https://www.aacsb.edu/educators/accreditation/business-accreditation/aacsb-business-accreditation-standards

Table 1.1: Example of CSV Export

cwid	exam_version	score_raw	score_pctg	3	4	5	6	7	8	9	10
456789012	D	2	2	0	0	0	0	0	0	0	0
345678901	C	3	3	0	0	1	0	0	0	0	0
234567890	B	3	3	0	1	0	0	0	0	0	0
123456789	A	2	2	0	0	0	0	0	0	0	0

1.2 System Versions

The online tool has two versions: a free one and a paid one meant for institutional use. Any interested educators may use the free version without paying any license fees. A comparison of the two versions in terms of specific functions is shown the the table below (1.2).

Table 1.2: System Functions

Function	Individuals	Institutions
Mark correct/wrong answers	✓	✓
Calculate raw scores and percentage	✓	✓
Detect ID number	✓	✓
Detect exam version	✓	✓
Mark multiple versions in a single run	✓	✓
Export scores to CSV	✓	✓
Save individual forms in separate PDFs	✓	✓
Export item scores to CSV	✓	✓
Maximum number of forms in a single run	30	500
Deskew PDFs		✓
Technical support via email		✓

Chapter 2

Form Types Supported

Scantomark supports two broad catetories of exam forms: our custom forms and those forms sold by Scantron Corporation.

2.1 Scantomark Custom Forms

We provide three forms that you can use for free (see Table 2.1). You can simply download and print out the PDF files for students to use.

Table 2.1: Scantomark Form Types

Form Type	Number of questions	Width (inch)	Height (inch)
Form 50.04.11	50	4	11
Form 100.06.11	100	6	11
Form 150.07.11	150	7	11

As you can tell, the naming of the three form types is based on three attributes: number of questions supported, form width (the shorter edges), and form height (the longer edges). All questions are on the same side of the paper. Figure 2.1 show an example of each form type.

Printing Note that the page size is U.S. Letter (8.5×11), which is assumed to be the physical paper for printing. Make sure to set the printing mode to `Fit to full page` or similar. Do NOT rescale, i.e., do not use setting like `Fit to printable area`.

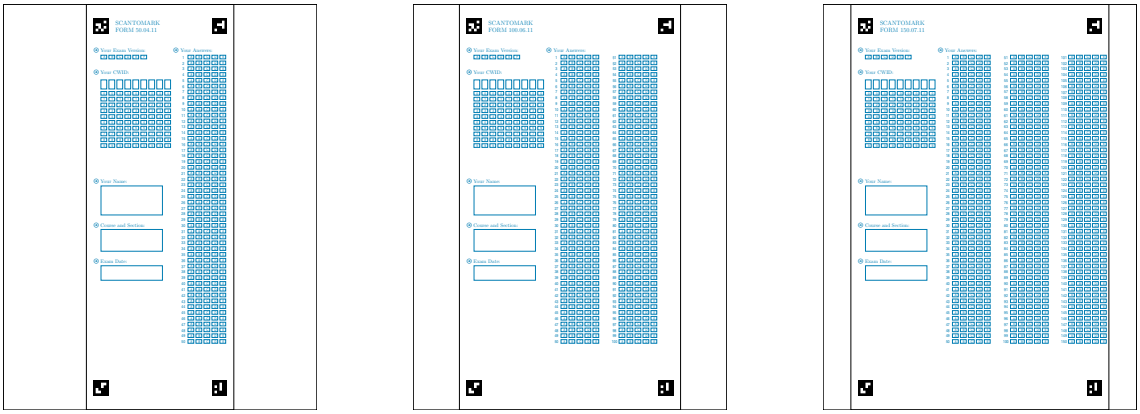

Figure 2.1: Examples of Scantomark Custom Forms

Scanning When you scan actual student forms, you should scan the areas bounded by the four black squares, which correspond to the sizes specified in Table 2.1. Scanning the whole Letter papers will make it very slow for your forms to be processed by the system.

2.2 Scantron Forms

We also support three forms designed and sold by Scantron Corporation. Because these forms may be copyrighted by the company, we do not provide any PDF files and you would have to buy physical forms from the company or other retailers.

Table 2.2: Scantron Form Types

Form Type	Number of questions	Width (inch)	Height (inch)
882-E	50	4.25	11
X-101864	50	4.25	11
F-289	100	4.25	11

Note that:

882-E Scantron's 882-E form does not support ID numbers and exam versions while the other two do.

X-101864 The X-101864 form has a field for "Exam Number", which is ignored on our system. The ID number field has ten (10) spaces but use the first nine only. For exam version, use the "Test Form" field.

F-289 This form also has a field for "Exam Number", which is ingored as well. Similarly, use the "Test Form" field for exam versions.

You can find more information about Scantron forms at https://store.scantron.com/shop-forms/.

2.3 Student Exam Forms

An import factor affecting grading accuracy is the quality of the forms students submit. While how to fill up a standard form properly seems trivial enough, it is often not the case. Past experience tells us that many unexpected things can cause problems for grading. Thus it may be worthwhile to emphasize a number of seemingly taken-for-granted guidelines for using the forms:

1. Fill up the bubbles or anwser areas completely.
2. In stead of using #2 pencils (as one would normally do), it is better to use black ink pens, which can give more blackish images when the forms are scanned into PDFs. Pencils often result in gray images that are not black enough for scanners.
3. For all forms that have a filed for ID number, use the first nine (9) digits only. If an ID number has less than nine digits, pad it with zeros in the front. For example, if it is `12345`, then enter `000012345`.
4. The field for "Exam Number" on Scantron forms will be ignored. For exam version, use the "Test Form" field.

Chapter 3

Answer Keys

To use our online tool to mark your exams, you need to save your answer keys in a CSV file first. This is obviously different from the way you would use a Scantron machine to do the grading whereby you would need to use a pencil to manually fill up the form like students do.

An example of the answer key file (displayed in a spreadsheet app) is shown in Table 3.1:

Table 3.1: Example of Answer Key CSV File

VERSION	1	2	3	4	5	6	7	8	9	10
A	DROP	ANY	A	A	A	B	C	D	E	A
B	DROP	ANY	D	B	E	B	D	E	E	A
C	DROP	ANY	B	E	C	B	A	E	C	B
D	DROP	ANY	E	B	B	D	C	A	D	E
E	DROP	ANY	E	E	B	A	B	C	B	B
F	DROP	ANY	E	E	D	D	E	E	E	D

Your answer key CSV file must meet the following requirements:

All CAP Everything (other than numbers of course) must be in the UPPER case.

Rows are versions Organize your data to show rows as exam versions. The first column is versions and the heading must be `VERSION`. The version letters must match what are displayed on the forms.

Columns are questions Store question numbers in columns. All questions must be included and numbered consecutively from 1. The number of questions does not need to match the maximum number allowed on a form. For example, if you use our custom form 50.04.11 and only have 30 questions on your exam, you only need to include 1–30 in the answer key file. Do not omit any numbers.

Special key–DROP In some cases you may need to drop one or more questions. For these questions you must enter `DROP` as the answer key. Dropped questions are ignored in the grading process.

Special key–ANY In some cases you may want to give students free points (e.g., when a question is confusing and it is deemed your fault). For such questions you must enter `ANY` as the answer key, meaning all choices are correct.

A special note about Scantron form 882-E, which does not support exam versions. If you use this form, you can include all versions in your answer key file but manually enter the actual version of the student forms that you upload for grading.

Chapter 4

Digitizing Exam Forms as PDFs

The marking or grading of exam forms involves two generally steps as signified by the name "Scantomark": making a PDF file and then submitting a job order by uploading the PDF for marking.

The first step—making PDFs—sounds straightforward enough: you simply use a multi-function printer or dedicated scanner to scan the forms and save them in a PDF file. The quality of the PDF, howeve, will have a big imapct on the accuracy of grading.

The PDF file must be good enough for accurate grading. Here are the requirements:

Portrait mode The exam forms must be in the `portrait` mode, i.e, reading questions from top down and the shorter edge on the top.

DPI The setting for DPI (dot per inch) should be `300`. It is not necessary to set higher values.

Color The forms must be in `color` mode. Even if your physical form is all black/white, set the scanning mode to `color`.

There are a few things you can do to imporove the quality (and processing speed as well):

1. Usually you would use a document feeder to scan multiple copies of the form. If this is the case, feed with the top short edge of the form, i.e., the top short edge facing the document feeder.

2. Make sure it is in the portrait mode when you first open the PDF file. If it is in the landscape mode, then you have to use editing tools such as Adobe Acrobat to change it. Note that simply rotate the view will not work.

3. Scan the area of the actual form, not the print paper. For example, if you print/use our form Scantomark 50.04.11, set the scan area as 4×11 inchs, not the letter paper size 8.5×11.

If you use our custom forms, please also check the Scantomark Custom Forms section for more information.

Chapter 5

Marking/Grading

Once you have collected all required files, the final step is to mark/grade your exam forms by submitting a job order on Scantomark.com.

5.1 License Key

Optional. Enter your school admin's email address and license key if your school has a site license. Note that the email address is the one that your school used to register for a license, not your individual one.

5.2 Exam Form Type

Required. Select one from the list.

5.3 Answer Key File

Required. Make sure you check the relevant chapter for detailed requirements.

5.4 Exam PDF File

Required. This is the scanned student exam forms. Make sure the number of pages does not exceed the maximum allowed (free version: 30; site license version: 500).

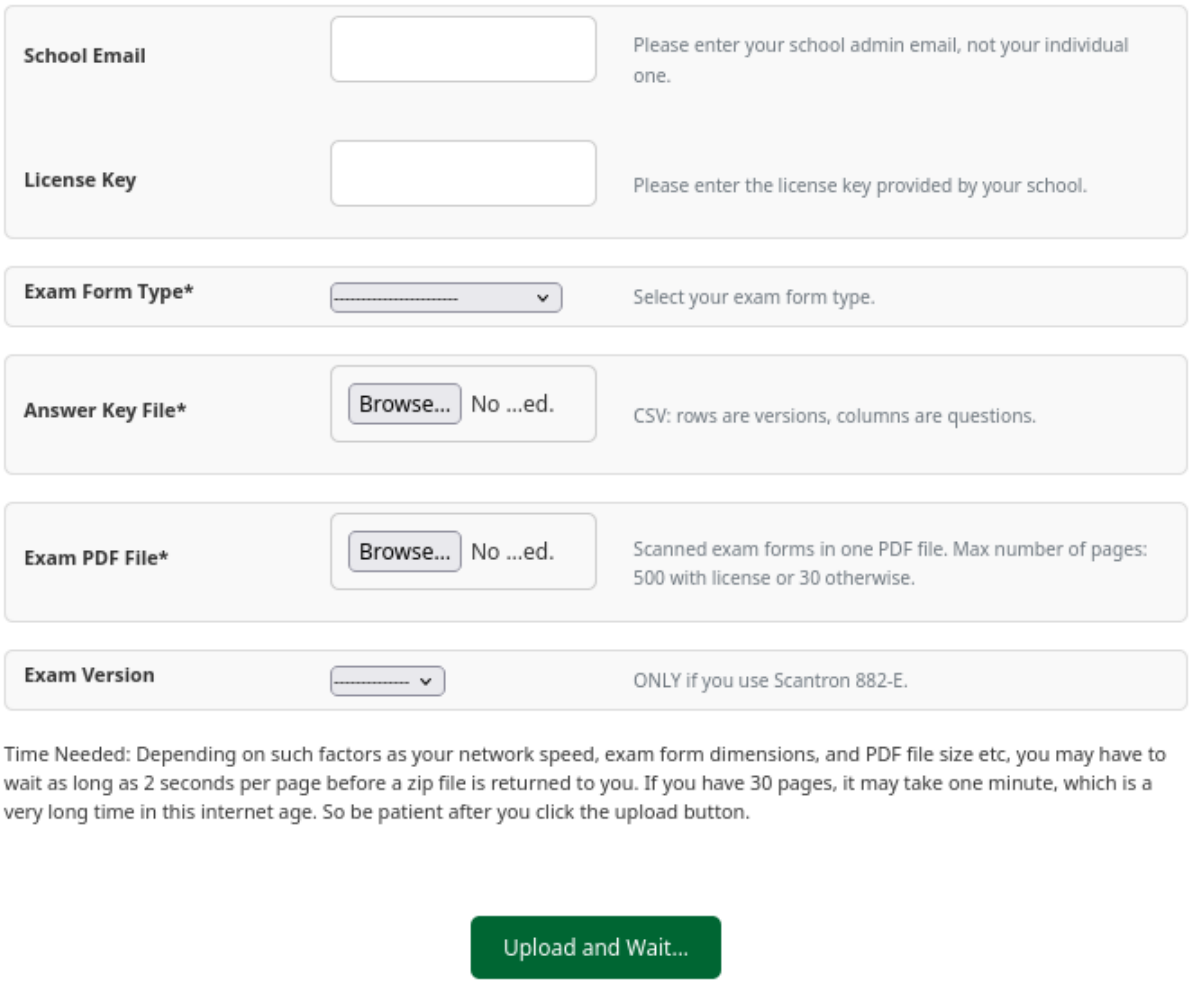

Figure 5.1: Job Order Submission

5.5 Upload and Wait

Please wait for a couple of minutes after you submit the job order. Depending on the PDF file size, the grading may take 2 or 3 seconds per page. Do not refresh the page unless you see any error messages.

If you see any error messages, it is a good idea to refresh the page and resubmit. This may be necessary because the error messages may not disappear automatically.

If everything works as expected, your web browser will pop up a window asking to save a .zip file, which will include all files you uploaded, a CSV file for scores, individual PDF files,

and another PDF file with all graded forms.

Chapter 6

Security and Privacy Considerations

6.1 System Design

Security and privacy issues are important for us and we take several steps to address such issues in our system design.

1. We do not require any input of personal data from users.
2. All files users submit and temporary files generated during the grading process will be deleted immediately once the result (a zip file) is returned. Any files associated with a failed grading will also be removed immediately if any error occurs.

6.2 User Considerations

There are a number things users can do to reduce perceived security/privacy risk.

1. Do not use any sensitive ID numbers. For example, if your school uses SSN (social security number) for student identification, then it might a good idea to use a different, off-line grading tool.
2. Ask your students to write their initials only on exam forms. Usually full names are not needed for grading purposes. (The only exception is perhaps Scantron 882-E, which does not support ID numbers.)

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