

Optical Reading of Multiple Choice Exams Using Remark OMR

This short guide is intended to provide you with a brief overview of the steps involved in using the Remark OMR software for scanning exams. Full details of the software's functionality can be found in the [User Manual](#). It is recommended that you consult the User Manual. Using the optical mark reader for exams involves seven steps.

Before the exam

- A. Create the exam answer sheet to be scanned
- B. Create a 'mask' file that tells the scanner where on the answer sheet to look for answers
- C. Test the scanning of answer sheets to pdf format

After the exam

- D. Scan the completed answer sheets to pdf format
- E. Create a 'data' file and 'read' the scanned answer sheets to populate the data file
- F. Check and confirm any data that appears inconclusive to the software
- G. Create an 'answer key' to tell the software which answers are correct and to sets the marking bands (i.e. how marks are translated into grades). Export the results.

BEFORE THE EXAM

A. Create your exam answer sheet

- Using any software you like, create a document to present your exam. Useful fonts, including barcodes and answer 'bubbles' can be downloaded from the [Remark OMR site](#). Using sans serif fonts will aid character recognition.
- The answer 'bubbles' can either be on the same page as the question text or on a separate answer page (It is easier to manage if the answer sheet can be on a single page recto verso¹). It is essential to have sufficient clearance around the areas to be read to avoid capturing other marks; this is best done by using a simple layout and avoiding tables with borders.
- EPFL regulations require multiple versions for multiple choice exams (same questions in different order). Use a 'form identifier' to enable the software to automatically distinguish between the versions of the exam², printed in barcode font to enable accurate reading. The recommended barcode font [called '3of9 barcode'] requires the information printed in it to begin and end with asterisks and should be in 24 pt font for optimum readability.
- If a student's answers will exceed a single recto-verso), then you will need to include tracking elements (sciper, page numbers) to ensure that the software recognises which sheet goes with which student)².
- Create a pdf of the answer sheet and print the exam copies from this pdf (this will help to ensure that the exam answer sheets are identical to the 'mask' and that the OMR will be able to read them).

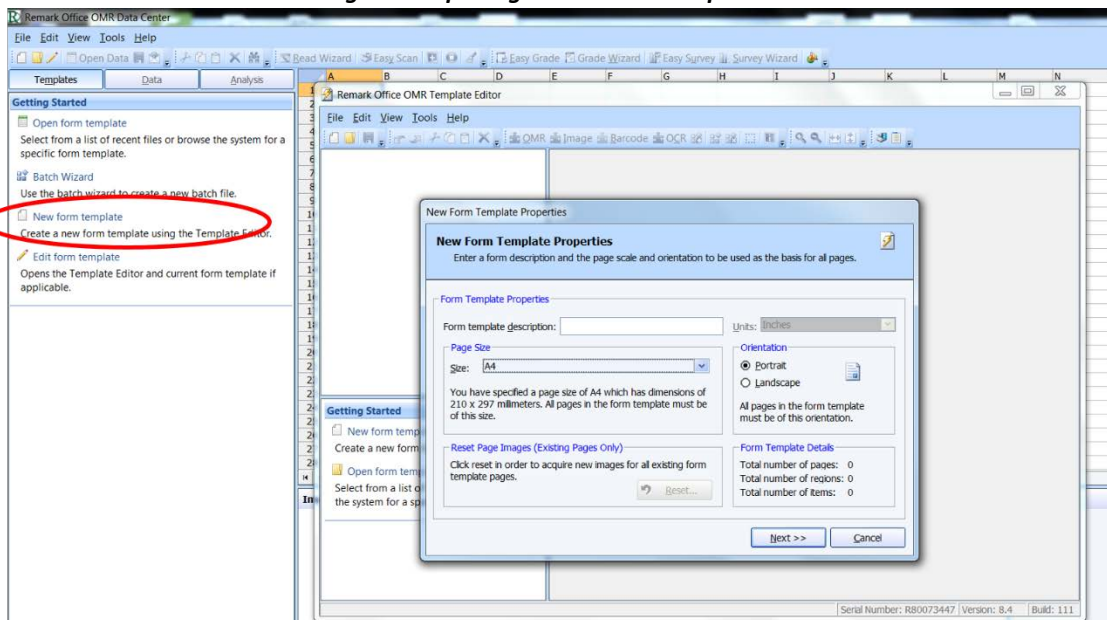
¹ For multiple page exams, use student, page and form tracking identifiers. Please note that identifiers must be on every page of the document and should be legible by both people and machine (2 formats if necessary). Use a mail merge function (e.g., [MS Word](#)) to place student ID information on each exam. EPFL Reprographie can print a stapled booklet form (A3 paper folded to A4) and cut it pages post-administration to facilitate scanning. Keep all identifiers well back from the margins and use 100g paper to facilitate the cutting procedure. When scanning, do not load the cut edge into the scanner to reduce paper jams.

² Further information on using form identifiers ('Auto Form ID') and tracking elements can be found in the [Remark OMR manual](#), page 89 and following. Please see also footnote 1.

B. Create an OMR template ('mask') (.omr file) or 'mask' file that tells the scanner where on the answer sheet to look for answers.

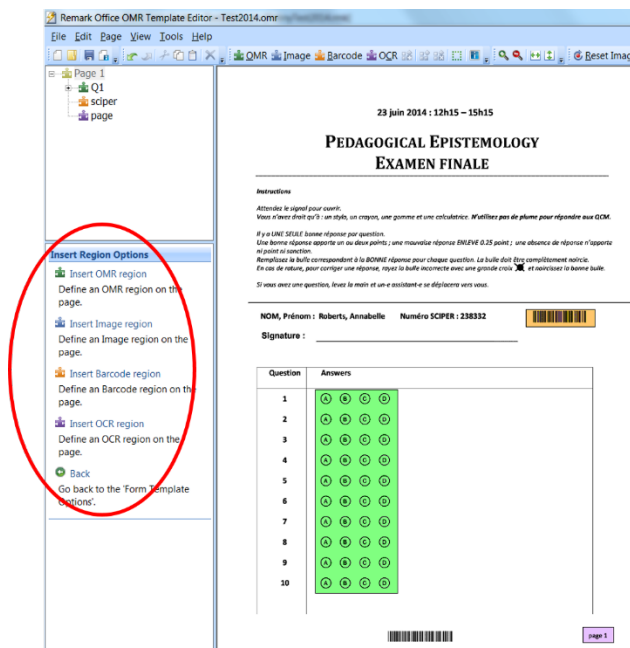
1. Download a test version of the [Remark Office 8 software](#).
2. Launch the software and select 'new form template' from the menu on the left.

Figure 1: Opening "New Form Template"



3. Define page size then select 'Next' button.
4. Select 'read from image files' and click "Acquire images from file" button. Then select the PDF of your blank exam.
5. Define the regions of the page where the software should look for answers. The software can read completed bubbles (select OMR), barcodes or text (select OCR). It can also capture images. Drag the cursor over the area of the page to be read in order to select it.
6. Depending on the type of region chosen you will need to define the region properties in the pop up window³. For example, for OMR, you can chose a region which includes answers to multiple questions (as in figure 2 below) and will then have to define the number of rows and columns to be read, and the label scales (e.g. 1 – 4, A to D, etc.).
7. Save the template when you are finished.

Figure 2: Defining template regions

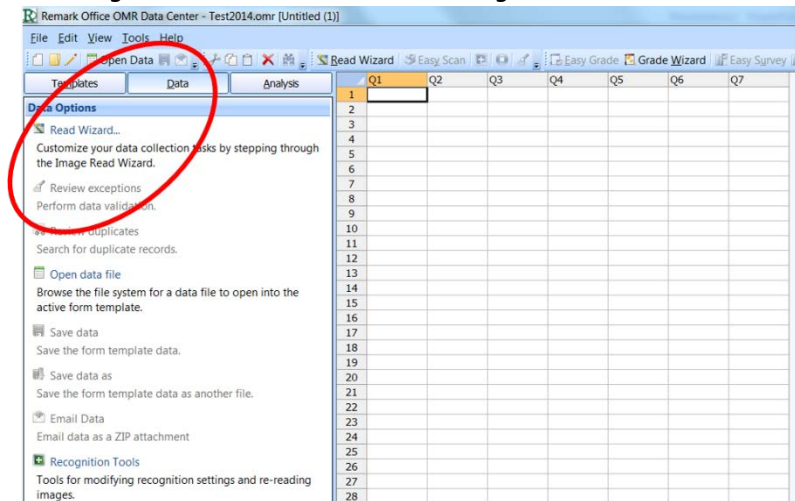


³ See the [OMR User Manual](#), pg. 51 and following for further details.

C. Testing the readability of your exam is highly advisable to test the optical readability of your document before students take the exam. ‘Answer’ the exam several times by filling in the bubbles with a pen or pencil and then create a scanned PDF of these filled exams. Run this through the scanner to ensure that the scanner and the software is reading your answer sheet correctly.

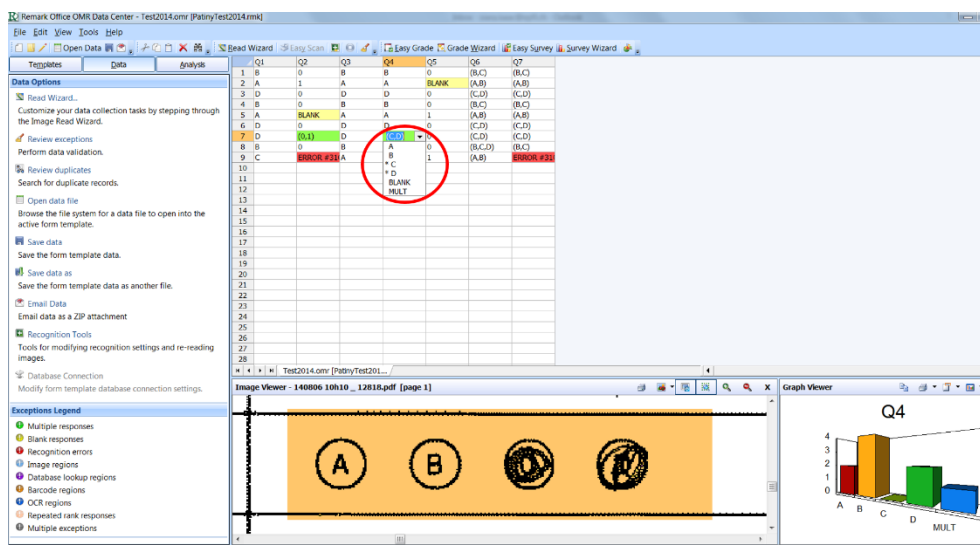
1. Once you have the scanned, completed sample exams, open the form template (‘mask’) you have created in Remark OMR.
2. The “data menu” should appear automatically as in figure 3 below (if not, select the “Data” button at the top of the left-hand portion of the screen). Then use the “Read Wizard” to select the PDF of your scanned, answered exams.

Figure 3: The “Data menu” – selecting the “Read Wizard”



3. Once the read operation is complete, you can review and correct the scanned data by clicking directly on a highlighted data cell. Adjust recognition settings on the first window of the Read Wizard (e.g. if completed answers appear too light). You cannot save your data in the demo version of the software – but it can be used for creating the mask and for testing the scanning.

Figure 4: Reviewing and correcting scanned data



Creating a good exam document often requires several iterations of the steps A through C to acquaint oneself with the requirement of the software.

AFTER THE EXAM

D. Scan the answered copies into a PDF. The multifunction printers/scanners located across EPFL are well suited for this and can save directly onto a USB key.

E. Optical reading of the exams (.rmk file)

In Remark OMR, open the template (or 'mask') file ('.omr') for your exam as in step C above. Use the Read Wizard to import the scanned answer sheets, which will populate the data file (.rmk) as they are 'read'. As the demonstration version does not permit you to save data, you will need to use the licenced version of the software. Please contact the Teaching Support Centre to book the laptop with the licenced software.

F. Check and confirm any data that appears inconclusive to the software

The software will indicate any data that appears blank or duplicate (e.g. where a student has answered a question multiple times) (see figure 4 above). You can check each inconclusive answer by clicking on that cell in the data file: an image of that part of the scanned document will appear on screen and you can identify how the answer should be read.

G. Create an 'answer key' and export results

The software will need an answer key to identify which answers are correct. Where there are multiple versions of the exam, there will need to be multiple answer keys. The software can also be used to set the marking bands (i.e. how marks are translated into grades). Alternatively you can save your data in a spreadsheet format (e.g. excel, .csv etc.) and do this part autonomously.

1. Select the "Analysis" button at the top of the left-hand portion of the screen. This will bring you to the "analysis menu" (see figure 5, below).
2. Select the Grade Wizard and follow the steps outlined.
 - a. You can construct multiple answer keys for a single test (if there are multiple versions).
 - b. Identify the correct answers for each question. First select the source for the answer key. To enter answers manually select "grid row". To import an answer key from a scanned correct answer sheet, select "Read Wizard".
 - c. Define for each question how many marks awarded for a correct answer etc.
 - d. Set grade scales.
3. After you click "Finish" on the Grade Wizard, a "report options" menu and screen will appear. You can use the "Export Gradebook" function to extract student grades.
4. The "Display Reports" function will propose a series of standard reports which you can use to analyse your exam questions (difficulty, discrimination etc.).

Figure 5: Analysis button and Grade Wizard

