

examBox Users' Manual

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Description of the program

examBox is a computer program capable of generating different versions of a multiple-choice exam in a Microsoft (MS) Word document format. It can also analyze the responses of the students and present the analysis in an Excel workbook. It is designed such that these tasks are accomplished with a few mouse clicks. The program has been written as a customized word document using C# and Visual Studio Tools for Office.

Requirements to run the program

examBox is written for windows XPS and Office 2003. You need to be online to run it. To start running the program, you need two files: examBox.doc and courses.xls. However, the first time you use the program, you need to follow the instructions in the Appendix A: Using examBox for the first time.

examBox is designed for A4 paper size. Please, leave adequate margins of about one inch when you want to use figures, tables, and formula sheet.

examBox Files

Table 1 shows the files used and generated by examBox and Fig. 1 shows the relationships between these files.

Table 1. Files used and generated by examBox.

	Description	Example of the default name
examBox.doc	This is the start point for generating a new exam. Do not save anything to this file.	
courses.xls	This file contains descriptions about courses available to examBox. Each worksheet contains information about one course.	
Exam document	This is the exam file. It is a Word document containing the exam zero version and different exam codes. A copy of this file is saved to a server after the exam is analyzed.	Phys102-061-Final.doc
Analysis workbook	This is an Excel workbook containing, the keys of the exam, the students' responses, and the analyses of the exam. A copy of this file is saved to a server after the exam is analyzed.	Phys102-061-Final.xls
Draft document	This is a Word document containing the zero version of the exam in a certain format. Make sure that the page size is A4 and the left and right margins are 1 inch.	draft-Phys102-061-Fnal.doc
Key text file	This is a text file containing the keys of the exam and needed by ITC to grade the exam.	toITC-Phys102-061-Final.txt
Student responses text file	This is a text file generated by ITC and needed by examBox to get the responses of the students.	fromITC-Phys102-061-Final.txt
Figures document	This is a Word document containing the figures of the exam. This file is needed only if the figures are inserted at the end of the exam. Make sure that the page size is A4 and the all margins are at least 1 inch wide.	figures-Phys102-061-Final.doc
Formula sheet document	This is a Word document containing the formula sheet of the exam. This file is needed only if a formula sheet is used in the exam. Make sure that the page size is A4 and the all margins are at least 1 inch wide.	formula-sheet-Phys102-061-Final.doc

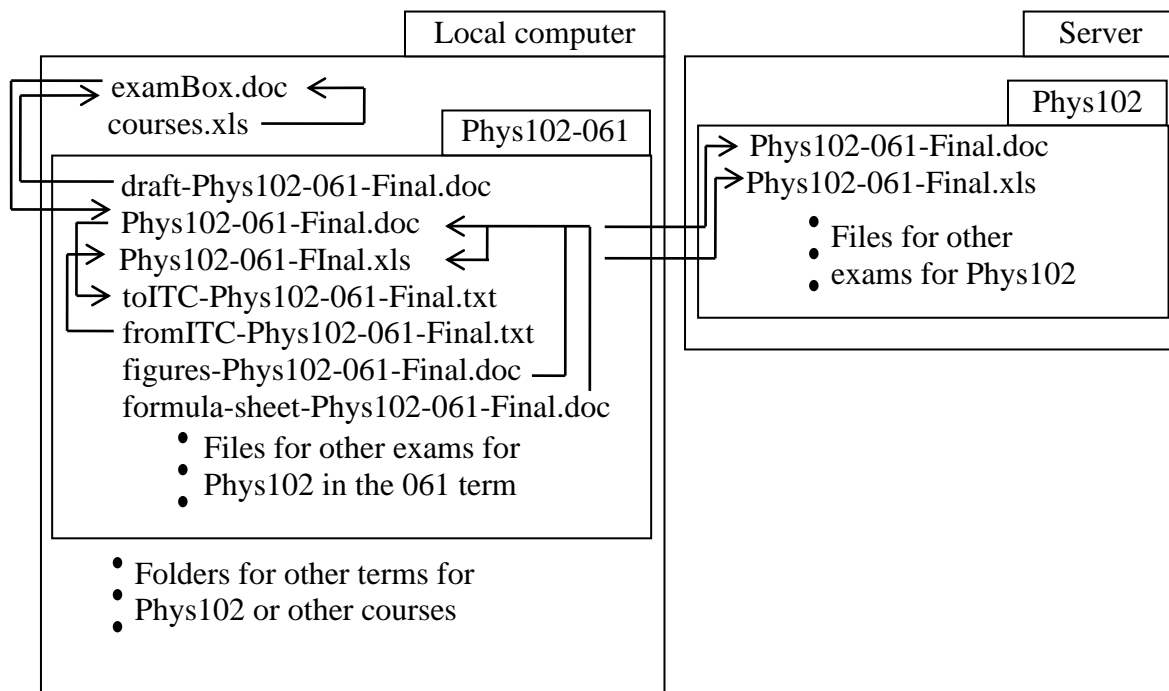


Fig. 1 The relationships between examBox.doc and other files used or generated by it

courses.xls file format

You can add any course to examBox by creating a worksheet in the courses.xls file. The name of the worksheet will be used by examBox as the course name. The information in this work sheet will be used by examBox to generate the exam. The format of the worksheet should be like the example shown in Fig. 2 which is a portion of the physics 102 course worksheet in the courses.xls file.

In the server folder, in this example, `\\phys-server\physExams\phys102`, a copy of the exam file and analysis file are saved. Make sure that your local computer has permission to write to this folder. If the name of this folder is wrong or you do not have permission to write to it, no copies will be written to the server. It is strongly recommended that you let the program save a copy on the same location for a particular course. This will help locating all exams generating by examBox for the course in future.

	A	B	C
1	University	King Fahd University of Petroleum and Minerals	
2	Department	Physics Department	
3	Server	\\phys-server\physExams\phys102	
4	Exams	Number of Questions	
5	First Major	20	
6	Second Major	20	
7	Final	30	
8			
9	Chapters	Sections	ch-sec
10	Wave Motion	Transverse and Longitudinal Waves	1-1
11		Superposition and Interference of Waves	1-2
12		The Speed of Waves on Strings	1-3
13		Reflection and Transmission of Waves	1-4
14		Energy and Power Transmitted by Sinusoidal Waves on Strings	1-5
15		Standing Waves and Resonance	1-6
16	Sound Waves	Speed of Sound Waves	2-1
17		Intensity of Periodic Sound waves	2-2
18			2-3
19			2-4
20			2-5
21	Temperature	Law of Thermodynamics	2-6
22		Thermometers and Temperature Scale	3-1
23		Thermal Expansion of Solids and Liquids	3-2

Fig. 2. An example of a Phys102 course worksheet. In this example, courses.xls contains three courses.

The name of exams will be used in the exams and in tagging different files. For example, if you want to use the name “First Exam” instead “First Major”, you need to change the name in worksheet of the course. You can have as many exams or quizzes as you want, but you need to leave an empty row between the row containing the last exam and the row starting with “Chapters”. The number of questions is the default number and you can change it later in the program.

In the list of the chapters and sections, there must not be any empty row and the chapter name must not be repeated. This list is used to classify questions. The number to right of the chapter-section name is not used by the program, but they are useful for the user. examBox read chapters and sections sequentially; the first chapter appear will be number one, the second chapter will be number two, and so on. Even if you write 3-4 instead of 1-3 for the section “The Speed of Waves on Strings”, examBox will treat it as 1-3.

Draft file format

examBox uses a draft file to read questions and check the zero version of the exam. The draft file can have any name, but if you want to program not to prompt you to choose this file, you need to use the default name of the draft file. The default name is in this format draft-course name-term-exam name.doc, as an example, draft-Phys102-061-Final.doc.

The first part of the draft file might contain any information related to the exam. The examBox.doc reads only the questions and ignores any text at the beginning of the file. The examBox.doc also ignores any empty spaces between questions or choices. Fig. 3 shows a portion of a draft file along with comments explaining the required format for this file.

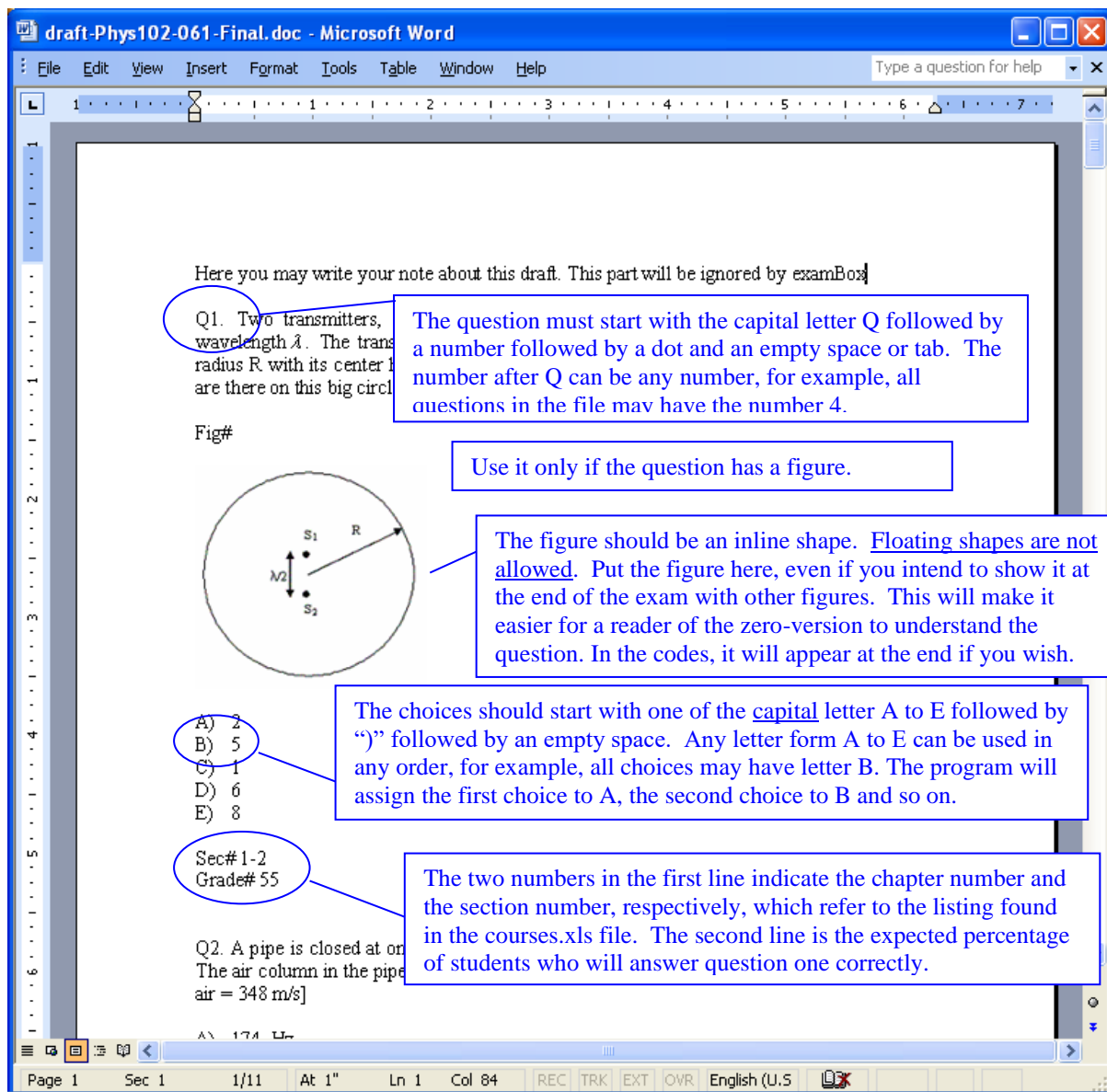


Fig. 3. A draft document and its required formatting.

Using examBox: a walk through

To generate a new exam, click examBox.doc. The examBox.doc reads information about different courses available from the courses.xls file. Each worksheet of the courses.xls file contains important information about a specific course. The list of courses names which is read from the courses.xls file will be shown in a list box in the examBox.doc action pane. The courses names are the name of the worksheet in the courses.xls. When you choose a course, another list box will show the exams available for this course. When you choose an exam, you will be prompted with three text boxes and four check boxes to choose the following parameters:

- Number of questions in the exam. The default value is read from courses.xls file. You can choose any number between 1 and 999.
- Number of codes to generate. The default value is read from courses.xls file. You can choose any number between 1 and 999.
- Equal Correct Answers. If this is selected, then there will be the same number of the correct answers = (number of questions in the exam)/5 for each choice letter. For example, if there are 20 questions in the exam, a student chooses the same letter for all questions scores 4 (= 20/5, where 5 is the number of choices per question). If equal correct number is selected, then the number of questions in the exam must be divisible by 5. If this check box is not selected, which is the default value, then there will be no constraint on the number of correct answer associated with any choice letter. In this case, there will be on average (number of questions in the exam)/5 correct answers for each choice letter. The probability that a student who knows nothing scores n correct answers in an exam of N questions is

$$p(n) = \frac{N!}{n!(N-n)!} \left(\frac{1}{5}\right)^n \left(\frac{4}{5}\right)^{N-n}.$$

Fig. 4 shows scores of 100 students who are answering randomly in an exam of 20 questions. This indicates that in a 20-code exam, a student who chooses only one choice letter for all questions will score on average 4 with a chance of 22%, but he has a chance of about 2.2% to score 8 and a chance of 1.2% to score 0. Fig. 5 is similar to Fig. 4 but for an exam of 30 questions.

- Figures at End. The default value of this choice is to embed the figures within the questions. But if it is selected, then the figure will be shown at the end of the exam. In this case, you need to have a Word file containing these figures. The file can have any name, but if you want to program not to prompt you to choose this file, you need to use the default name of the figures file. The default name is figures-course name-term-exam name.doc, for example, figures-Phys102-061-First Major.doc.

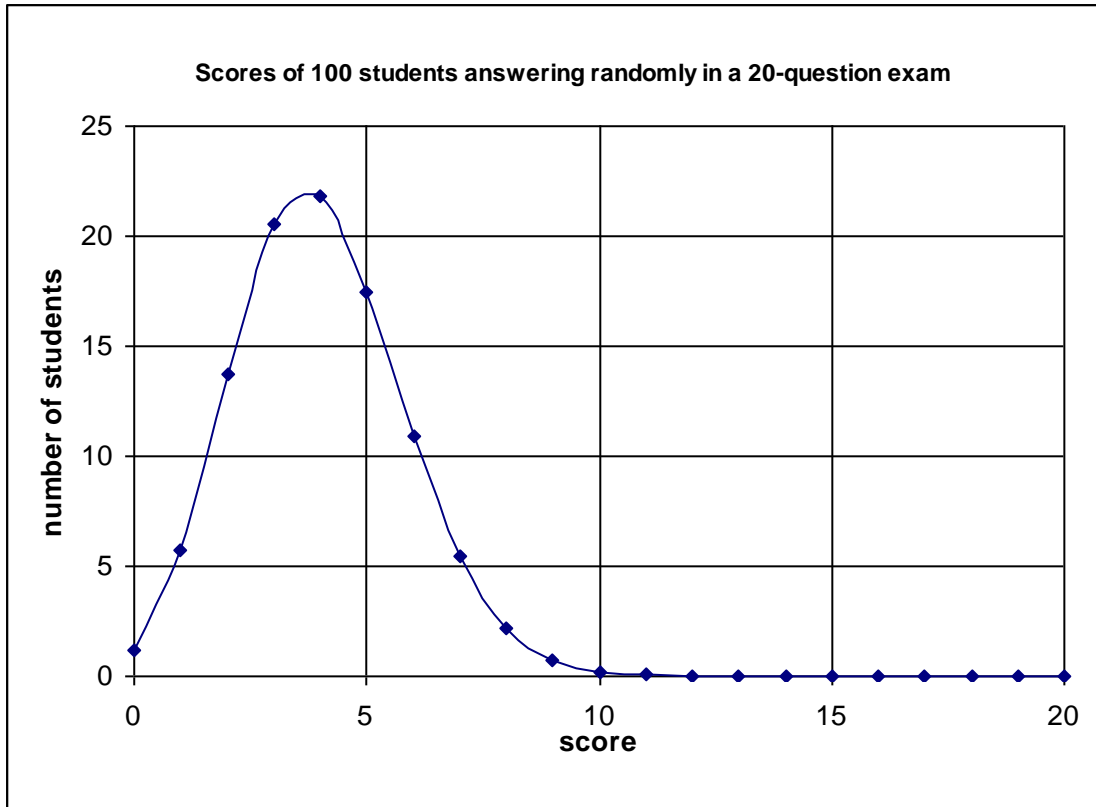


Fig. 4. Scores of 100 students answering randomly in a 20-question exam.

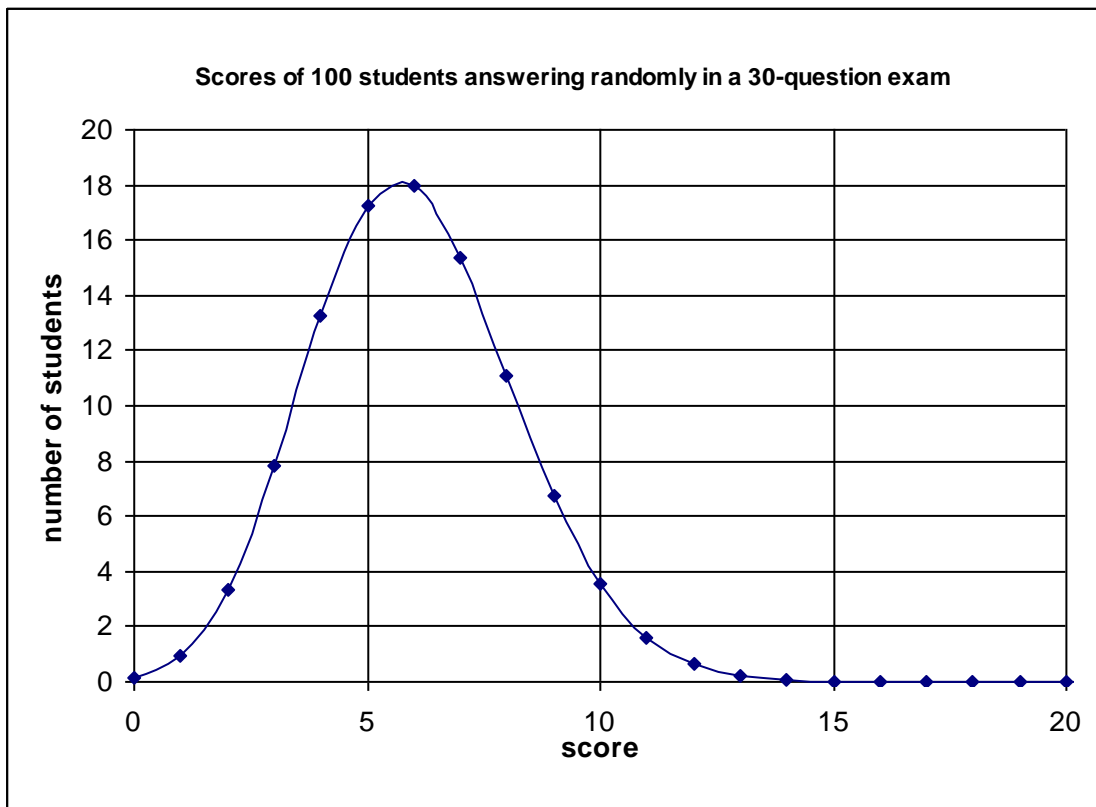


Fig. 5. Scores of 100 students answering randomly in a 30-question exam.

- Don Not Check Repeated Choices. examBox will not check if one of the choices is repeated. Since examBox can only compare texts, it cannot tell the difference between two different equations or pictures and it generates false warnings about repeated choices. If you have a lot of choices which are equations or pictures, you might avoid getting these false warnings by asking examBox not to check repeated choices. Checking repeated choices is the default value for this option
- No formula sheet. The default value of this option is to include a formula sheet at the end of each code. But if it is selected, then the program assumes that there are no formula sheets. The formula sheet should be in a Word file and it can have any name. If you want to avoid selecting the formula sheet manually, you need to use the default name of the formula sheet which is formula-sheet-course name-term-exam name.doc, for example, formula-sheet-Phys102-061-First Major.doc.
- Term. The default value is 053. You need to change this value to the current term to move to the next step.

If you press enter while you are in the term text box, the examBox.doc will give you a chance to select the date of the exam and then the name of the coordinator of the course. If you press enter while you are in the coordinator text box, you will be asked to accept the exam parameters, as shown in Fig. 6.

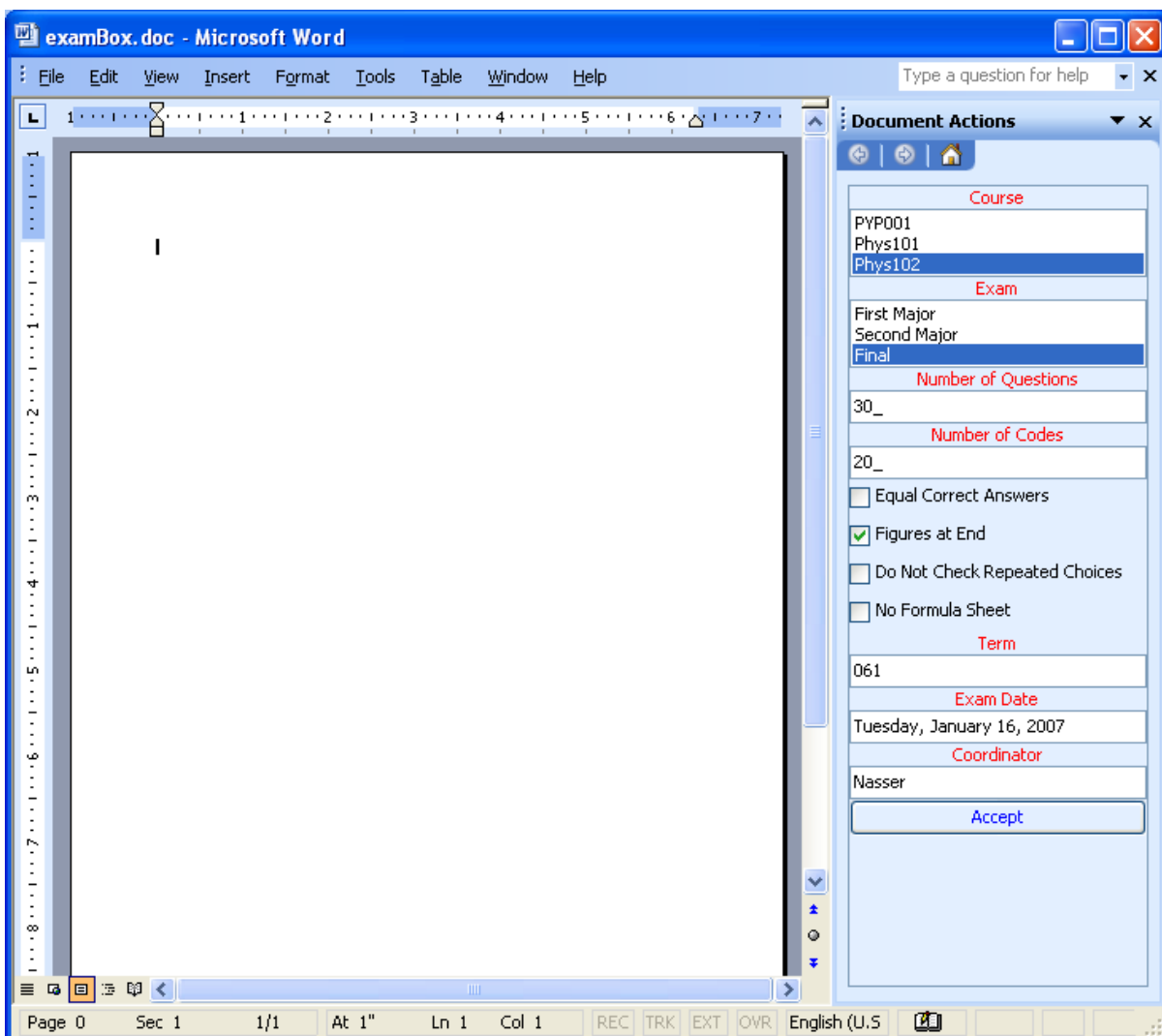


Fig. 6. Entering exam parameter in examBox.doc.

If you click on accept, the following actions will occur

- 1- The exam parameters will be written to the header and footer of the examBox.doc
- 2- The examBox.doc will be saved in the course-term folder as another Word document, the exam document, whose name is in the following format “course name-term-exam name.doc”, for example, Phys102-061-Final.doc. If the course-term folder does not exist, the examBox.doc will create it automatically. From this point on you will deal with the exam document rather than the examBox.doc. The examBox.doc will be used in future to generate new exams. Please do not save anything to the examBox.doc file.
- 3- A button with the name “Load Draft Document” will appear in the action pane of the exam document.

Upon clicking the “Load Draft Document” button, the program will try to find a document of the default name of the draft document in the course-term folder. If it fails, it will prompt you with a file dialog box to select the draft document. The content of the draft document will be loaded into the exam document as the zero version. The following action will be taken while loading the draft document.

- 1- Check that there are 5 choices.
- 2- Convert chapter-section numbers to text. The program uses the list of chapters and sections courses.xls to do this. It assigns numbers to them sequentially; the first chapter appears as chapter one and the next chapter as chapter two and so on. The same is true for sections. Note the program does not read the third column which is adjacent to the section text and contains chapter-section number. The purpose of column is to help the users assign chapters and sections numbers.

If there is an error and the program cannot convert chapter-section number to text or the Sect# part of the question is missing, the program will insert “sec#” and ask you to select the chapter and section, which the question belong to, from two lists in the action pane of the exam document; one containing the names of chapters and the other the name of the sections in the selected chapter.

You can change the chapter-section text by clicking on it. The list of chapters and sections available from the courses.xls will be displayed in the action pane so that you can select the appropriate section and section. After closing the exam document, you will not be allowed to change the chapter-section text.

- 3- Check that the grade is between 0 and 100. If there is an error or the Grade# part of the question is missing, the program will insert Grade# and ask you to insert the grade in a text box in the action pane of the exam document. You can change the grade by clicking on it text by clicking on, but after closing the exam document, you will not be allowed to change the grade.
- 4- Calculate the expected average of the exam from the expected grade of each question. The expected average will be displayed at the end of the zero version and it will be updated if the grade of any question is changed.
- 5- Display Generate Exams button in the action pane of the exam document.

After inspecting the zero version, you may generate the codes by clicking Generate Exams button. This will bring about the following actions

- 1- Create a new exam workbook and delete all its worksheets except one which will be renamed as keys. The keys worksheet will contain the keys for the exam codes. This exam workbook will be created in the exam-term folder with a name in following format: course name-term-

exam name.xls, for example, Phys102-061-Final.xls. If a file with same name exists, an error message will be displayed which will ask you either to delete or rename the old file.

- 2- Create a new text file that will also contain the key of the exam. This text book will be given to ITC, so that ITC can grade the exam. and delete all its worksheets except one which will be renamed as keys. This text file will be created in the exam-term folder with a name in following format: toITC-course name-term-exam name.txt, for example, toITC-Phys102-061-Final.xls. If a file with same name exists, an error message will be displayed which will ask you either to delete or rename the old file.
- 3- Generate the exam codes below the zero version in the exam document, with the keys to the keys work sheet and toITC text file. Fig. 7 and Fig. 8 show an example of a worksheet and toITC text file, respectively.
- 4- Save the exam document, exam workbook, and toITC text file and close toITC text file.
- 5- Display analysis button in the action pane of the exam document.

At this point, you are done with generating the exam. After inspecting the codes, you may print or close the exam document and workbook.

Before analyzing the exam, you need to get from ITC the text file containing the students' responses. A typical file is shown in Fig. 9. This file may have any name, but if you want the program not to prompt you to choice the file, put the file in course-term folder with the following name format fromITC-Coure Name-Term-Exam Name.txt, for example, fromITC-Phys102-061-Final.txt.

The analysis of the exam is done in three steps

- 1- reading the students answers fromITC txt file to the exam workbook
- 2- finding the zero-version choices that correspond to the students answers.
- 3- finding statistics.

To start analyzing the exam, open the exam document, you should get analyze button in the document action pane. When you click the button, the program will open the exam excel workbook and check its status. If only "keys" worksheet is in the workbook, the action pane of the document will show the "get raw answers" button. When you click "get raw answers", the following actions will be taken

- 1- Reading the students' responses formITC txt file.
- 2- Creating a new worksheet "answers-raw" then inserting the students' responses in it as well as the number of students in each section.
- 3- Marking students who have missing answers or double answers so that the might be corrected easily. An empty cell means a missing answer and an X in a cell means a double answer. A sample of "answers-raw" worksheet is shown in Fig. 1.
- 4- Sorting the students according to sections and then to id.
- 5- Changing the "get raw answers" button into "redo get raw answers" and creating a new button "covert to zero version".

Microsoft Excel - Phys102-061-Final.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

100%

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
		code 1	code 2	code 3	code 4	code 5	code 6	code 7	code 8	code 9	code 10	code 11	code 12	code 13	code 14	code 15	code 16	code 17	code 18	code 19	code 20	ex grade
155	c	a	d	e	a	a	b	a	d	e	a	d	e	a	a	b	b	e	a	b	c	
156	d	c	c	d	b	b	d	d	e	c	b	a	d	e	e	d	a	d	e	a	a	
157	e	b	e	b	e	c	a	b	c	a	e	b	c	c	d	e	e	a	b	c	b	
158	27	27	9	6	5	15	24	19	1	25	19	7	25	29	12	30	23	6	22	5	4	55
159	a	d	d	a	c	d	e	e	e	d	d	a	b	b	a	c	c	a	b	d	c	
160	b	e	e	b	d	a	d	b	d	b	e	e	d	d	b	b	d	c	d	c	a	
161	c	a	b	e	b	e	b	c	b	e	c	b	a	e	c	a	e	e	a	b	e	
162	d	c	c	d	a	c	a	d	a	a	b	c	c	a	d	e	a	d	e	e	b	
163	e	b	a	c	e	b	c	a	c	a	c	a	d	e	c	e	d	b	c	a	d	
164	28	10	27	24	22	9	14	2	13	14	28	20	20	8	26	12	2	23	13	30	13	60
165	a	a	a															b	e	d	a	e
166	b	d	c															e	a	e	b	c
167	c	e	d															d	c	a	c	a
168	d	c	e															a	b	c	d	b
169	e	b	b	d	a	b	e	b	c	e	a	d	b	c	a	b	c	d	b	e	d	
170	29	26	8	3	15	16	17	15	27	3	18	15	23	20	3	4	3	30	12	13	27	45
171	a	e	d	d	c	c	b	e	a	d	a	d	d	d	a	c	d	b	a	b	d	
172	b	d	c	e	d	a	c	d	b	c	e	b	b	d	e	a	e	b	e	e	e	
173	c	c	e	a	a	d	e	b	e	c	d	b										
174	d	a	a	b	e	b	d	a	b	a	b	c										
175	e	b	b	c	b	e	a	c	c	e	e	a										
176	30	7	4	2	12	4	23	7	18	20	6	19	27	25	14	10	10	1	25	19	9	60
177	a	d	d	b	a	d	b	a	d	d	a	b	b	a	a	b	c	d	e	b	a	
178	b	a	a	e	b	a	c	e	c	e	e	c	d	d	d	c	e	b	a	a	e	
179	c	b	c	a	e	b	a	b	a	b	b											
180	d	c	e	c	e	e	e	d	b	c	c											
181	e	e	b	d	d	c	d	c	e	a	d											
182																						
183	allA	4	6	5	4	3	4	4	5	5	8	4	5	10	4	9	7	6	4	5	4	
184	allB	7	6	11	10	9	4	3	9	5	3	3	7	3	4	3	8	8	6	5	9	
185	allC	9	5	6	5	5	8	8	4	7	5	6	9	4	9	9	4	3	10	7	5	
186	allD	7	7	7	8	7	6	6	6	8	7	11	5	5	6	4	6	5	7	5	3	
187	allE	3	6	1	3	6	8	9	6	5	7	6	4	8	7	5	5	8	3	8	9	
188																						

keys/

Ready NUM

This means that choice c of question 27 in code 8 is choice b of question 1 in the zero-version.

This is the expected grade of question 29 in the zero-version

If a student selects all B in this code, he will get 5 correct answers.

Fig. 7 An example of the keys worksheet.

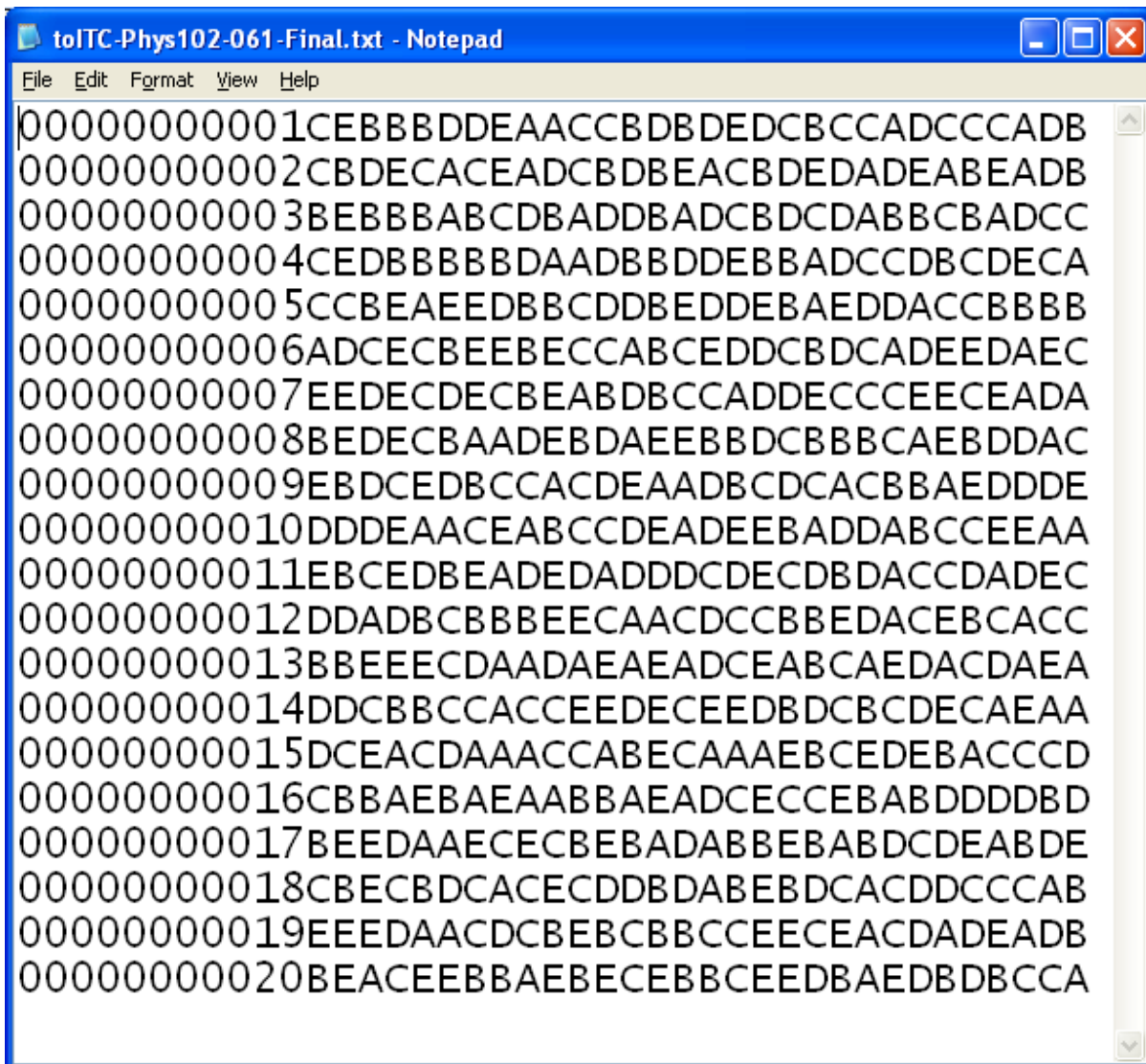


Fig. 8. An example of the toITC text file which contains the keys for each code of the 20 codes. In this file, only the correct choices are listed sequentially after the code number and no information is given about other choices. This text file will not be used by the program in future it is generated only for ITC to assign grades.

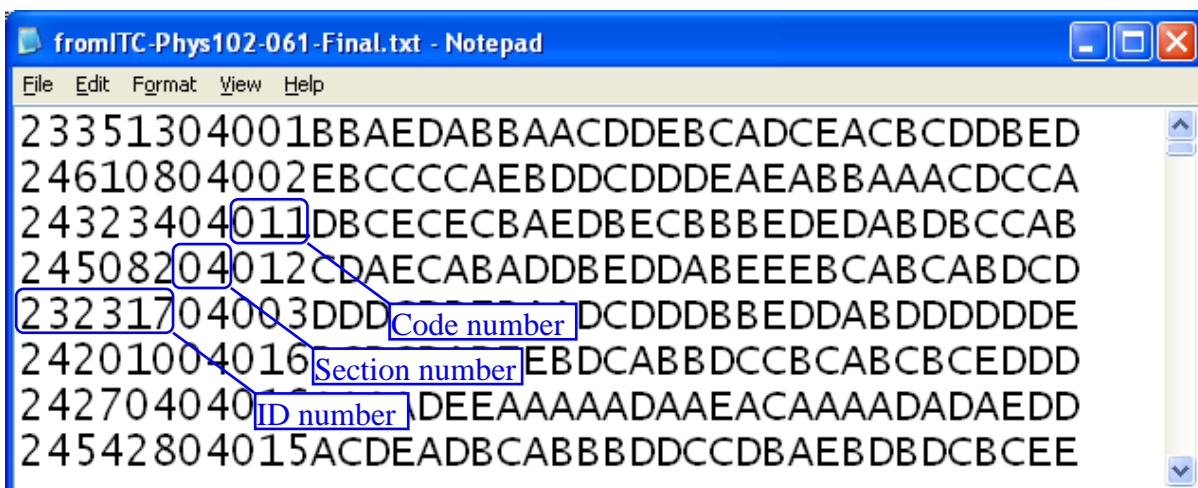


Fig. 9. A typical file containing the responses of the students.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	ID	Sec	Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Sec	students #	
2	214091	1	7	D	B	C	D	A	C	E	C	A	B	B	B	A	E	A	C	D	D	A	D	1	8	
3	244376	1	14	B	B	B	D	A	D	B	C	E	D	E	C	D	C	A	E	A	A	C	A	2	12	
4	244712	1	4	D	B	D	D	D	A	D	C	A	B	E	E	D	B	A	D	C	C	D	B	3	4	
5	244794	1	13	D	A	C	D	A	B	C	B	E	D	B	E	C	A	C	D	E	A	B	E	4	30	
6	245350	1	5	C	D	C	D	D	D	A	D	D	C	C	C	D	D	D	C	D	B	A	B	5	30	
7	245372	1																								
8	246494	1																								
9	246740	1	16	B	C	E	B	A	D	D	B	E	A	D	A	A										
10	216301	2	2	E	B	A	D	D	A	C	A	C	D	E	C	D	C	B	C	B	D	A	C	9	23	
11	224308	2	1	A	C	D	E	B	D	A	D	A	A	E	B	E	B	C	C	E	D	D	E	10	3	
12	232923	2	10	D	B	D	B	D	A	B	B	B	B	D	A	B	E	B	C	B	C	B	E	11	7	
13	234293	2	15	C	D	E	A	B	B	E	B	C	E	B	D	D	C	E	A	B	E	A	A	12	3	
14	236527	2	12	B	B	C	B	B	E	E	E	C	D	B	B	C	B	E								
15	242768	2	16	C	E	E	B	A	D	B	B	E	A	E	A	A	A	C	E	D	C	E	A			
16	243296	2	3	D	E	A	E	A	A	E	C	C	D	B	A	D	D	B	C	E	A	D	A			
17	243974	2	13	D	E	B	D	B	A	C	B	C	C	B	E	B	A	C	B	E	A	C	C			
18	244202	2	12	D	B	C	A	D	A	C	A	C														
19	244568	2	11	B	E	C	D	B	C	A	B	D														
20	245290	2	6	E	A	E	D	E	C	C	C	B														
21	245382	2	18	C	B	D	E	A	B	A	E	B														
22	234617	3	8	C	A	E	D	A	C	E	D	B	D	D	E	E	C	D	B	A	A	E	C			
23	243836	3	14	B	B	B	D	D	C	B	E	A	D	E	C	D	C	A	B	A	A	C	A			

Fig. 10. A typical “answers-raw” worksheet.

If click “redo get raw answers” button, the previous steps will be redone. If you click “convert to zero version” button, the following actions will take place

- 1- Two worksheets will be created: “answers-code-to-zero” and “answers-zero”. The first worksheet contains the raw responses of students along with their corresponding zero-version answers and the second worksheet contains only the students’ responses with respect to the zero-version exam. The grades of the students appear in both of these worksheets. The “answers-zero” worksheet will be used to do the statistical analysis of the exam. If a question has a mistake, you can cancel it easily in the “answers-zero” worksheet. This can be done by assigning it “a” for all students if you want to give all students credit for solving this question, or assigning it any other letter if you do not want to give them credit. Typical “answers-code-to-zero” and “answers-zero” are shown in Fig. 10 and Fig. 11, respectively.
- 2- The text of “convert to zero version” button will be changed to “redo convert to zero version” and new button “find statistics” will appear in the action pane of the document. At this point if you click “redo get raw answers” button, you will be prompted to allow deletion of all worksheets except “keys” and if you click “redo convert to zero version”, you will be prompted to allow deletion of “answers-code-to-zero” and “answers-zero” worksheets.

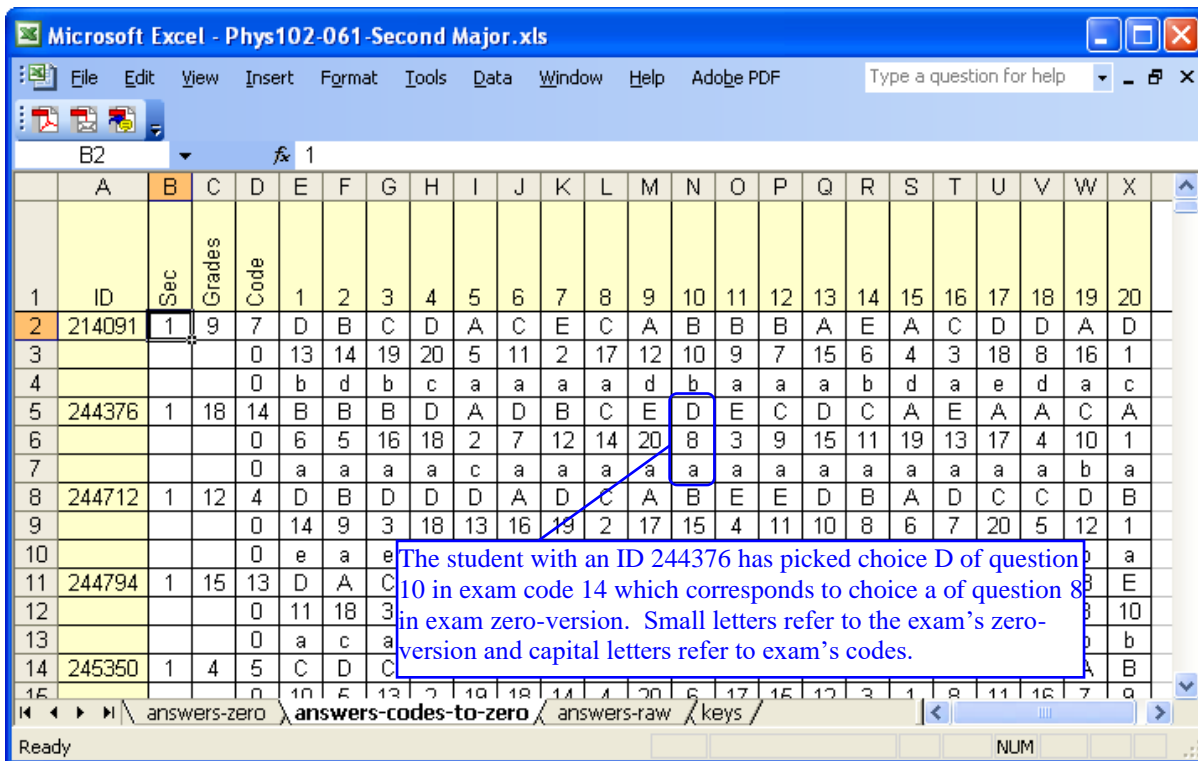


Fig. 11. A typical “answers-codes-to-zero” worksheet.

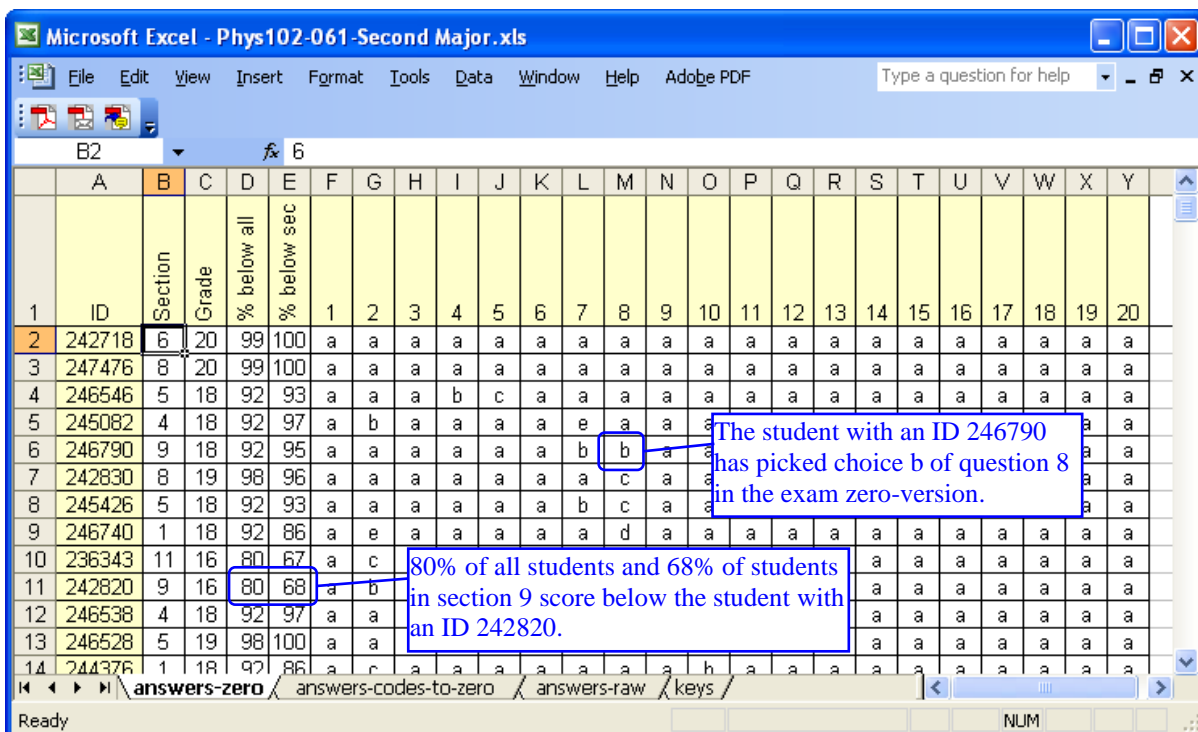


Fig. 12. A typical “answers-zero” worksheet.

When you click “find statistics” button, the following action will take place

- 1- Three worksheets will be created: “sections-statistics”, “item-analysis” and “grade-distributions” worksheets. Typical examples of these worksheets are shown in Fig. 13, Fig. 14, Fig. 15, and Fig. 16.
- 2- Some statistical information is inserted at the bottom of each question in the zero version. An example is shown in Fig. 17.

- 3- The text of “find statistics” button will be changed to “redo find statistics”.
- 4- The exam document and analysis workbook are saved on a local directory.
- 5- The exam document and analysis workbook are saved on a server directory.

In the “section-statistics” worksheet, percentages of students in each section selecting each choice are shown along with the percentage of all students selecting that choice. This worksheet also shows the discrimination for each question for each section and for all students. The discrimination of a question is defined as the difference between the percent of the top 25% and bottom 25% of students who answered the question correctly. Discrimination can have a value between -1 and 1. A question with discrimination less than 0.2 does not discriminate well between high-scoring and low-scoring students.

“item-analysis” worksheet presents the percentage of students selecting each choice, the percentage of the top and the bottom 25% of students for each choice, the expected and the actual averages of every question, the discrimination, and point-biserial correlation. These numbers, except point-biserial correlation, are also presented graphically.

The point-biserial correlation is another way of assessing the ability of the question to discriminate between high-scoring and low-scoring students. It is proportional to the difference between the averages of those who answered the question correctly and incorrectly. It is scaled such that its range is between -1 and 1. A positive point-biserial indicates that those scoring higher on the exam are more likely to answer the question correctly. A question with point-biserial correlation less than 0.2 does not discriminate well between high-scoring and low-scoring students. The point-biserial correlation is defined as

$$\text{Point-biserial} = (M_p - M_q) \frac{\sqrt{pq}}{stdev} .$$

Here,

- M_p = mean score of those who answered the question correctly.
- M_q = mean score of those who answered the question incorrectly.
- p = proportion of those who answered the question correctly.
- q = proportion of those who answered the question incorrectly.
- $stdev$ = standard deviation of the test scores.

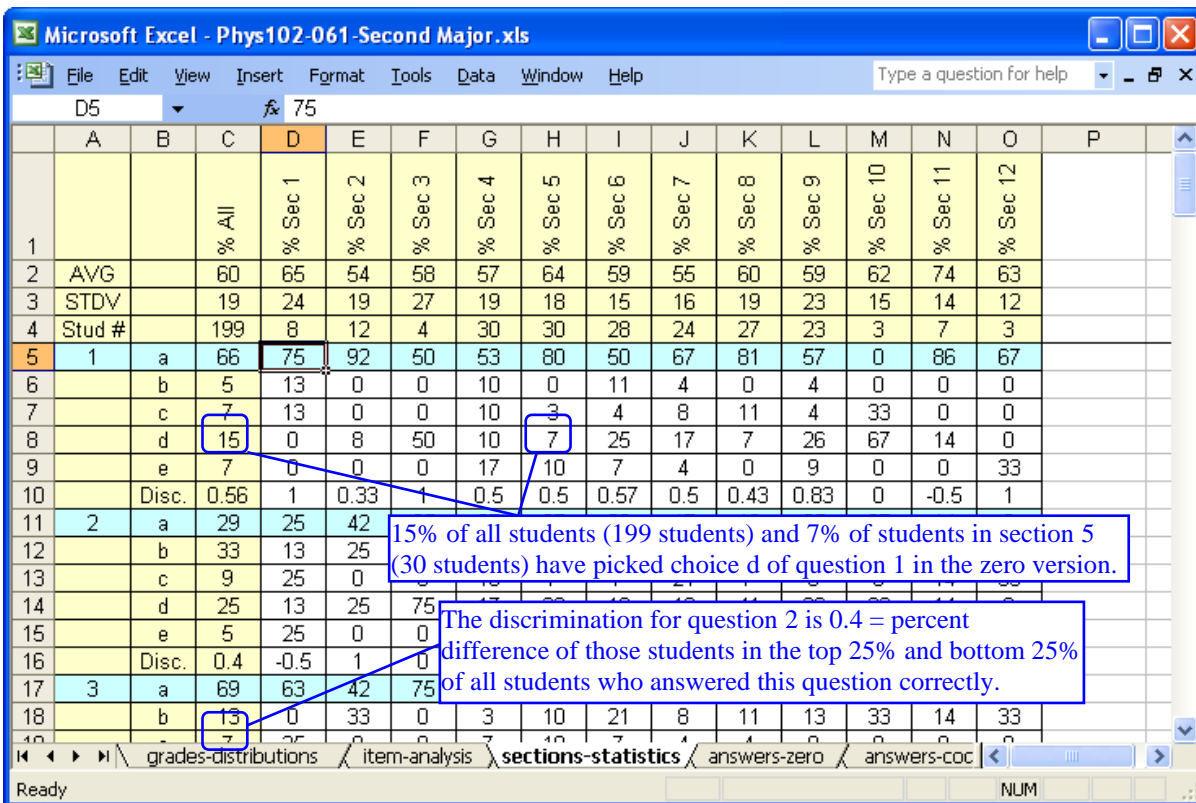


Fig. 13. A typical “sections-statistics” worksheet.

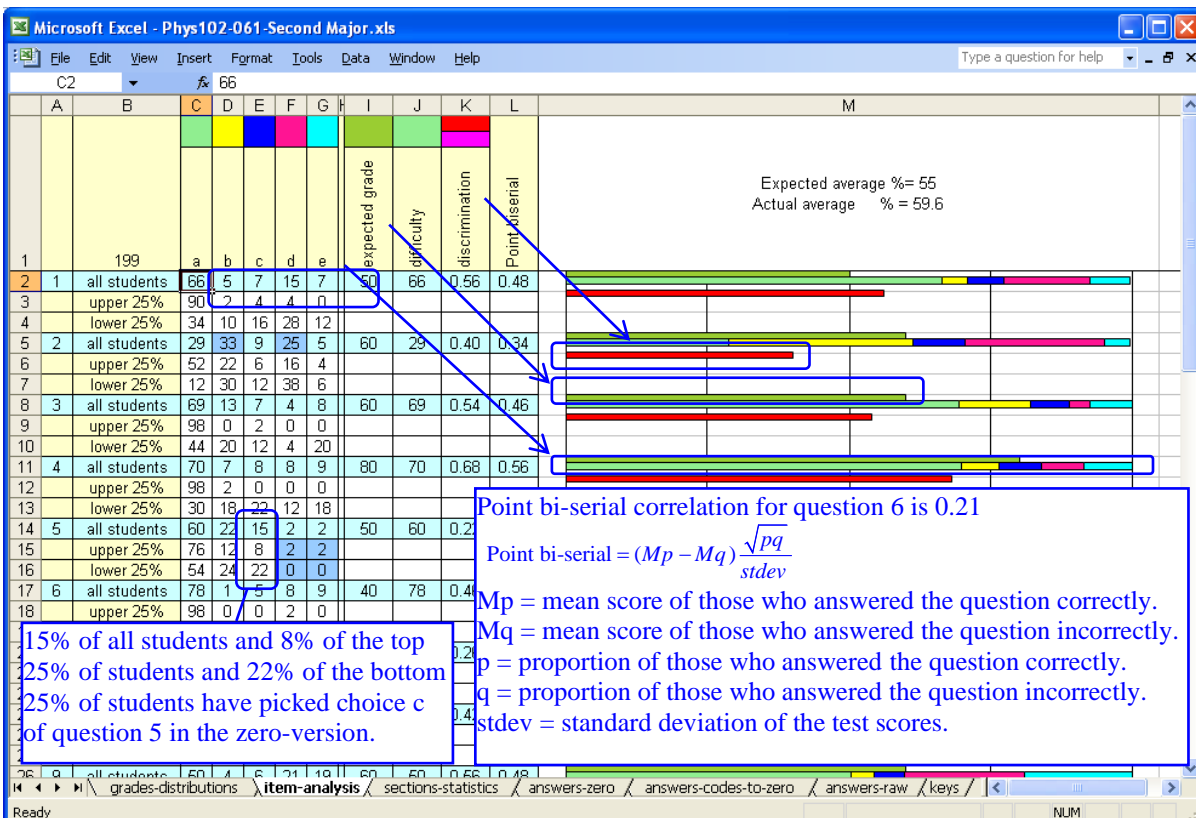


Fig. 14. A typical “item-analysis” worksheet. The b to e cells for percentage of all students will be painted blue if it is higher than 25%. The b to e cells for the top upper and lower 25% of students will be painted blue if the number of the upper 25% is higher or equal to the lower 25%. The

difficulty cells will be painted blue if it is higher than 0.9 or lower than 0.1. The discrimination and point bi-serial correlation will be painted blue if the are less than 0.2.

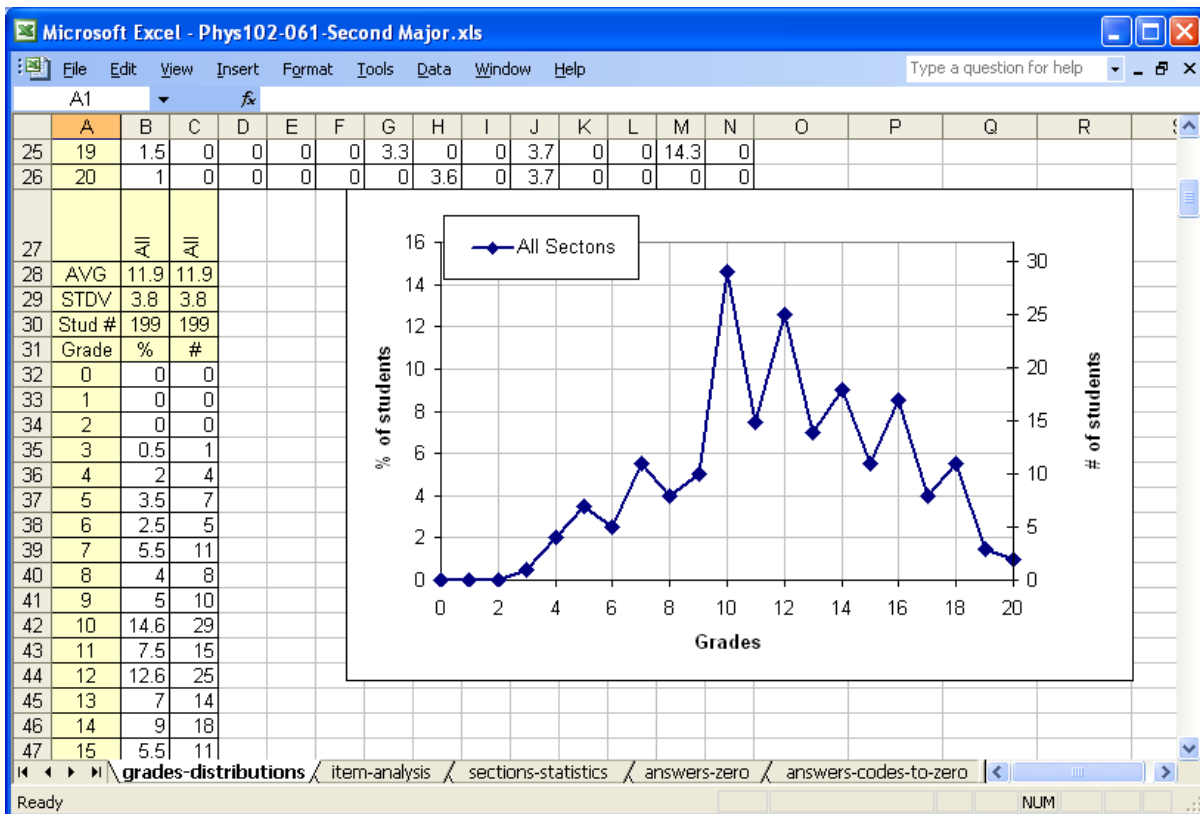


Fig. 15. A typical “grades-distributions” worksheet. Here, all-students grade distribution is shown. The left y-axis is the percentage number of students and the right y-axis is the actual number of students.

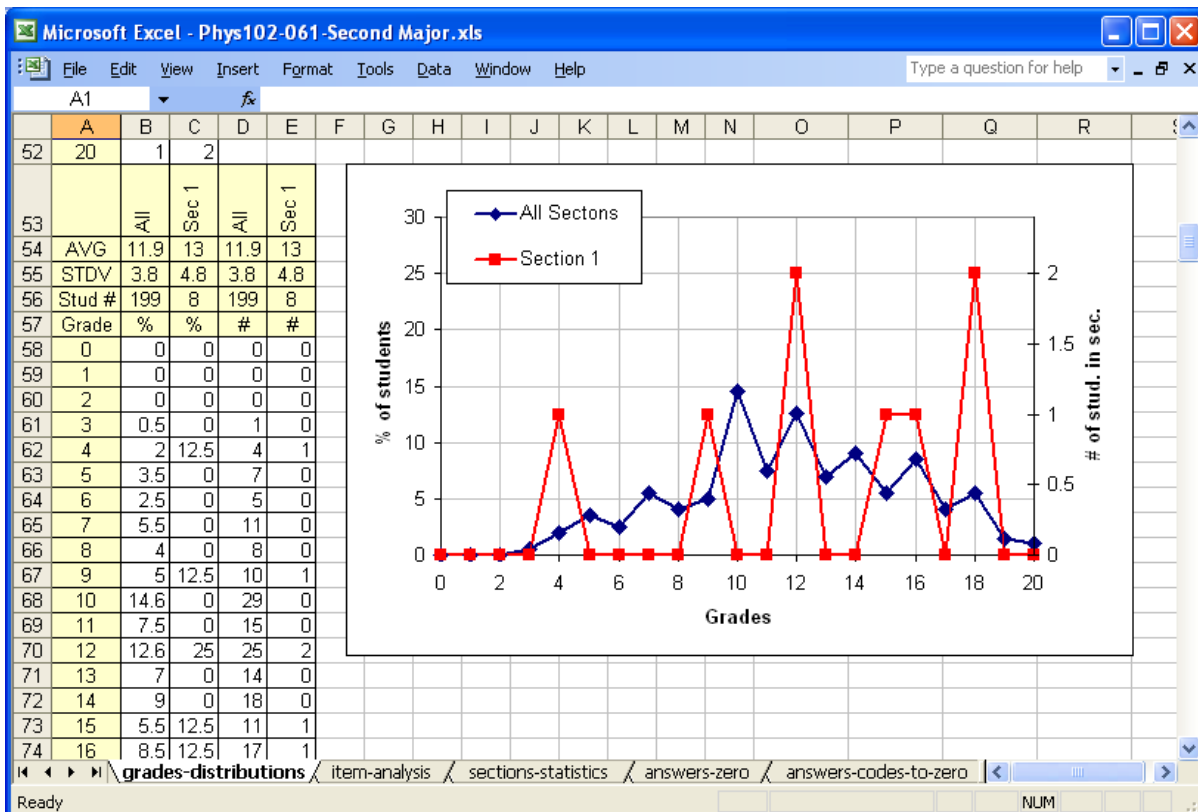


Fig. 16. A typical “grades-distributions” worksheet. Here all-students and section 1 grade distributions are shown. The left y-axis is the percentage number of students and the right y-axis is the actual number of students in section 1.

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 Coordinator: Ibrahim Nasser Sunday, December 10, 2006 Page: 1

Q1.
 Two identical positively charged ions are separated from each other by a distance of 6.8×10^{-9} m. If the electrostatic force between them is 4.5×10^{-9} N, how many electrons are missing from each ion?

A) 30
 B) 45
 C) 48
 D) 37
 E) 25

[Sec# Electric fields - Coulomb's Law]
 [Grade# 50]
 Stat# A_66_DIS_0.56_PBS_0.48_B_5_C_7_D_15_E_7_EXP_50_NUM_199

Percentage of student selected A = 66%
 Discrimination = 0.56
 Point-biserial = 0.48
 Percentage of student selected B = 5%
 Percentage of student selected C = 7%
 Percentage of student selected D = 15%
 Percentage of student selected E = 7%
 Expected grade = 50
 Number of student took the exam = 199

Fig. 17. Statistical information is inserted at the end of each question in the zero version of the exam.

Appendix A: Using examBox for the first time.

Before using examBox, you need to make sure that four items are installed on your computer and you need to set the security to allow examBox to run on your computer.

You need to install the following four items if they are not already on your computer:

- 1- Office 2003 Service Pack 1 or 2. It can be downloaded from <http://www.microsoft.com/downloads/details.aspx?FamilyID=57e27a97-2db6-4654-9db6-ec7d5b4dd867&DisplayLang=en>
- 2- The primary interop assemblies. Check “Add or remove Programs” for Microsoft office 2003 Primary Interop Assemblies and if you do not have it, you may download it from <http://www.microsoft.com/downloads/details.aspx?familyid=3c9a983a-ac14-4125-8ba0-d36d67e0f4ad&displaylang=en>
- 3- The .NET Framework 2.0. Check “Add or remove Programs” for Microsoft .NET Framework 2.0 and if you do not have it, you may download it from <http://www.microsoft.com/downloads/details.aspx?FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5&displaylang=en>
- 4- The VSTO runtime. Check “Add or remove Programs” for Microsoft Visual Studio 2005 Tools for Office Runtime and if you do not have it, you may download it from <http://www.microsoft.com/downloads/details.aspx?FamilyId=8315654B-A5AE-4108-B7FC-186402563F2B&displaylang=en>

You need to set the security policy as follows:

Double click on “permitExamBox.exe” program. In upper box docPath write the path to the folder in which examBox.doc is in and “*”, for example, if the examBox.doc is in C:\Documents and Settings\, write C:\Documents and Settings*, then click permit button. Note every time you change the examBox.doc location, you may need to permit it to run from that location. The lower text box shows the policies written to your computer by “permitExamBox.exe”.

Appendix B: Known error sources.

- During the process of exam generation or analysis, you should not select or type inside the exam document or workbook. You can, however, select a worksheet tab and scroll windows without any problem.
- examBox does not work well with GetRight 6.1. Please, quit GetRight when you want to use examBox.
- The file from ITC may have empty lines at the end. This will prevent examBox from reading the file. Erase these empty lines.
- The answers in the first line of the file from ITC are not equal to the number of the questions in the exam. This is only applied to the first line and the ExamBox is not affected if the number of answers is not equal to the number of questions in the other lines. To fix the problem, erase the extra letters or empty space in positions beyond the number of question in the exam and add x if the answers in the first line is less than the number of questions.
- The draft file, figure file, and formula file should be all in A4 size.