Technician Class Training System

By Eugene Morgan (WB7RLX)

Revision: 1.18.23

I had been considering for some time trying for my Extra Class ticket. So when I heard the club was sponsoring an Extra Class online training I decided that now might be the time. After going through several different books I can't say one was better than other, no. It would depend on your learning style. And having to pick just one would not be fair to the other two, all three were very good and I'm sure almost anyone using any one of the three books would do fine when it came time for the test.

Of course the next consideration was all of the various online resources. Some are free, some require a subscription. I looked briefly an a couple but decided that I would write my own. Why you might ask when there is some much available online, a good question.

If any of you have been to my QRZ site you will find that I have written a lot of the software I use. The key reason for that is to keep my brain from turning to mush. In my job before retiring I use to write a lot of utilities that made my job easier and that allowed my project and program managers to be more effective at managing their various projects. I found that writing programs as well as building some fairly sophisticated Microsoft Excel tools was in some sort of twisted way, a form of relaxation for me, the way crossword and Sudoku puzzles are for some people. After several months of retirement it was clear I was starting to get soft in the brain. The other reason for writing my own program is I wanted to capture all of the good tips and tricks for studying and passing the Extra Exam. I found that they were not all included in one book or on one web site. I found that there was good information scattered across the web and in many books and not just those specific to passing the Extra Class test.

After finishing the Extra Class program I decided to adapt it for the new hams studying for their Technician class license. What you have is the result of months of work and a fair amount of testing. But at the end of the day what this program is about is helping you to lean the concepts and make passing the Technical class test easy.

A quick note on the manual: Throughout the figures are referencing the Extra Class test. The program works exactly the same way as the extra class test so the differences are not important. The program you are using is specific to the Technical Class Test.

The Feature Set

I knew the programming would be fairly easy and that the real work would be in developing what I call the hints file or better yet the hints database. Following what in the software business we call the *Functional Requirements*, or as I like to say, the feature set. Unlike other programs I have written in the past where I made it up as I went, this time I had a very specific set of goals before writing a single line of code. However I will admit to adding a couple of features toward the end of development cycle based on feedback obtained during several Zoom sessions.

The Technician/Extra Class Training System Feature Set:

- Give the user the ability to select a specific sub element to focus on. Why waste time on modules already mastered?
- Allow the user to go through the sub element questions in sequential order or in random order.
- If the user selected sequential they could also specify which question they want to start with. The thinking behind this was to make the program more useful in a multi student teaching environment such as our weekly zoom sessions.
- The answers were to be presented in a random order. This would require the user to know the correct answer not just that it's just always A,B,C or D.
- Provide immediate feedback if the user missed a question during a drill. Upon missing a questions the question would be put back into the question pool. This would require the user to ultimately answer the missed question correctly before ending the module.
- Provide the user a way to see the answer, I call this the "Peek" feature. It displays the correct answer A,B,C, or D but provides no explanation. I also wanted to be able to toggle this feature on or off at the press of the space bar or a mouse click.
- Allow the user to ask for a hint. The hint would provide an explanation of the concept and provide the correct answer and if available a memory trigger or a simple way of remembering the answer.
- Give the user the ability to edit the hints database so they can add their own hints and memory triggers.
- Provides the user the ability to take a simulated practice test that looks and behaves exactly the way the real test works with one exception.
- The one exception is the way the "*Review*" function works. Like the real test when the user selects "*Review*" the program displays a list of the question numbers and the users answer for each of the questions. It also shows which questions have not been answered. My program takes this one step further, it actually shows you what questions you have missed and your current score based on the questions that have been answered.
- The program must be able to display accompanying graphics given that some of the test questions are specific to certain graphics. This feature is also available in the practice test as well as in the sub element drills.

- In Study mode the user can review specific questions. This is handy if you are studying from and book or in a classroom or group teaching setting. The teacher can enter in a specific question ID and the question is displayed. Tapping any key displays the associated hint and tapping any key again displays the correct answer.

The Program

Now that we have looked at the programs feature set let's take a quick look at the program. Figure 1 shows the main menu. From this menu you can pick which sub element you wish to drill on or you can select to take a practice test. You can use your mouse or the keyboard to select what you want to do. You exit the program by clicking on the '**X**' in the top right corner of the screen, as is customary for all Windows programs.

If you choose to do a sub element module you will be asked if you want the questions presented in a random order or in a sequential order. If you select [R]andom you will go immediately into the drill. Questions will be presented in a random order until you have answered all questions correctly or until you select [S]top Drill]. Note that missed questions will be put back into the rotation and will be presented again randomly during the drill.

If you selected to have the questions presented sequentially you will be asked which question you want to start with, in most cases this will be question one. This feature was added after a couple of Zoom sessions. It was clear that presenting the questions in order was necessary so attendees could follow along more easily if they were running their own copy of the Extra Class Training System during the training class or using one of the many study guides.
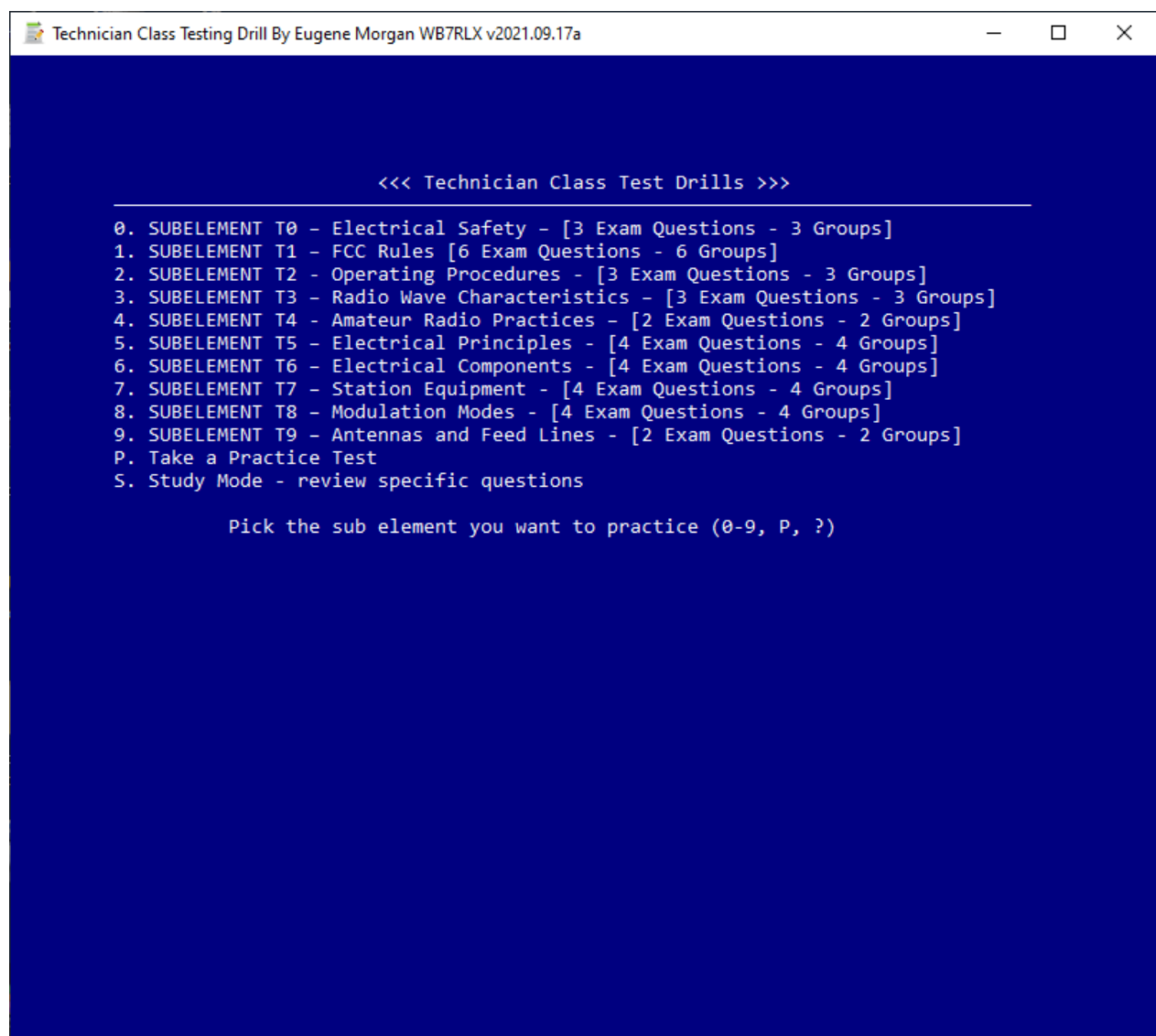

Figure 1: The Main Menu

Peek Feature: During a sub element session you can toggle the peek feature on or off by either tapping the **Space Bar** or clicking "Peek On" to turn the peek feature on, or click on "Peek Off" to turn the peek feature off. With the peek feature enabled an '*' will appear above the correct answer. In Figure 2 note the "*" above the letter "D".
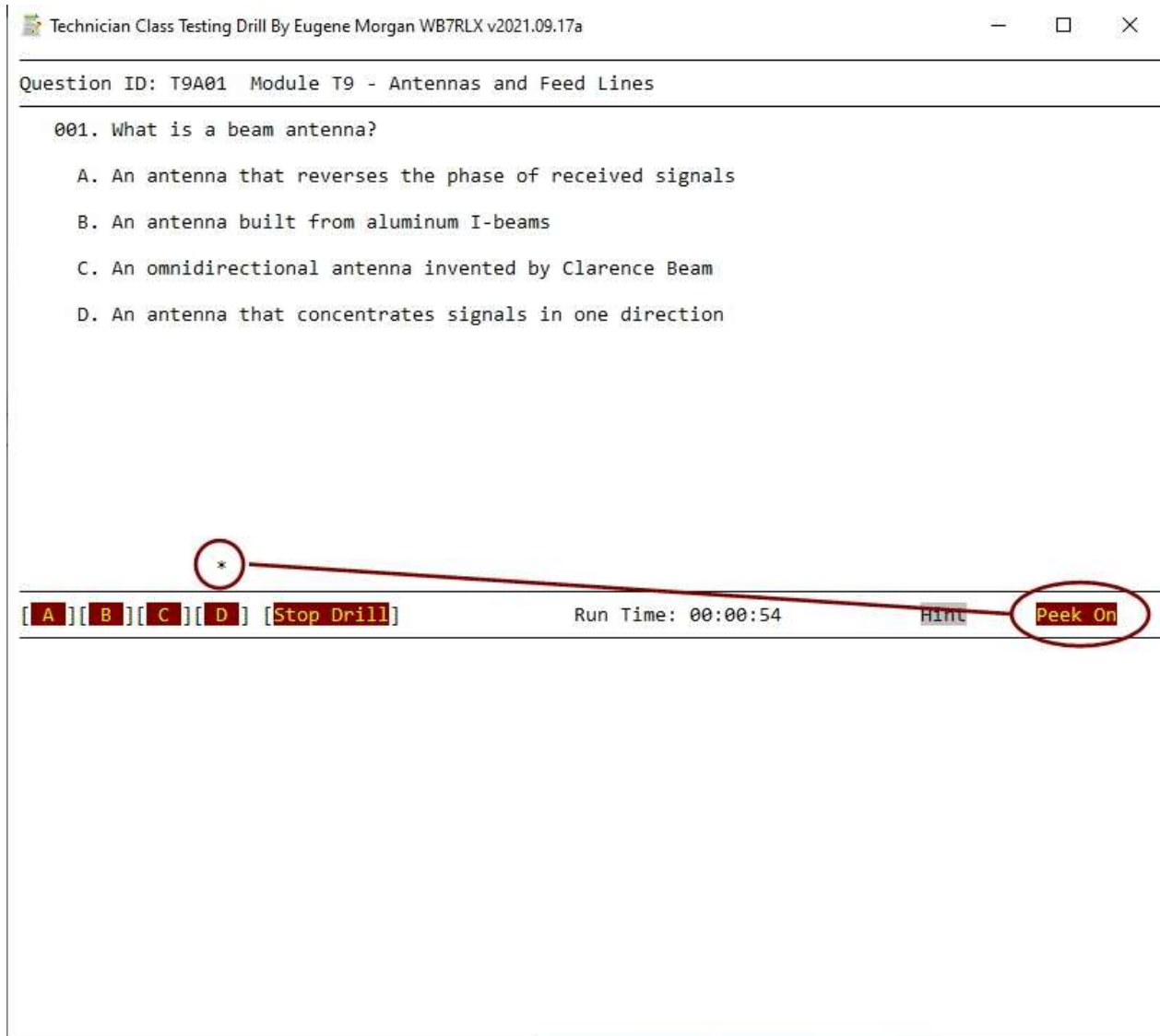

Figure 2: Sub element Drill - Peek On

Hint Feature: During the drill if you find you need some help with a question you can ask for a hint by clicking on "Hint" or pressing the "**H**" key. Refer to Figure 3. For this particular question not only is an explanation given but also a clever hint, "*Very high Fry-ability.*"
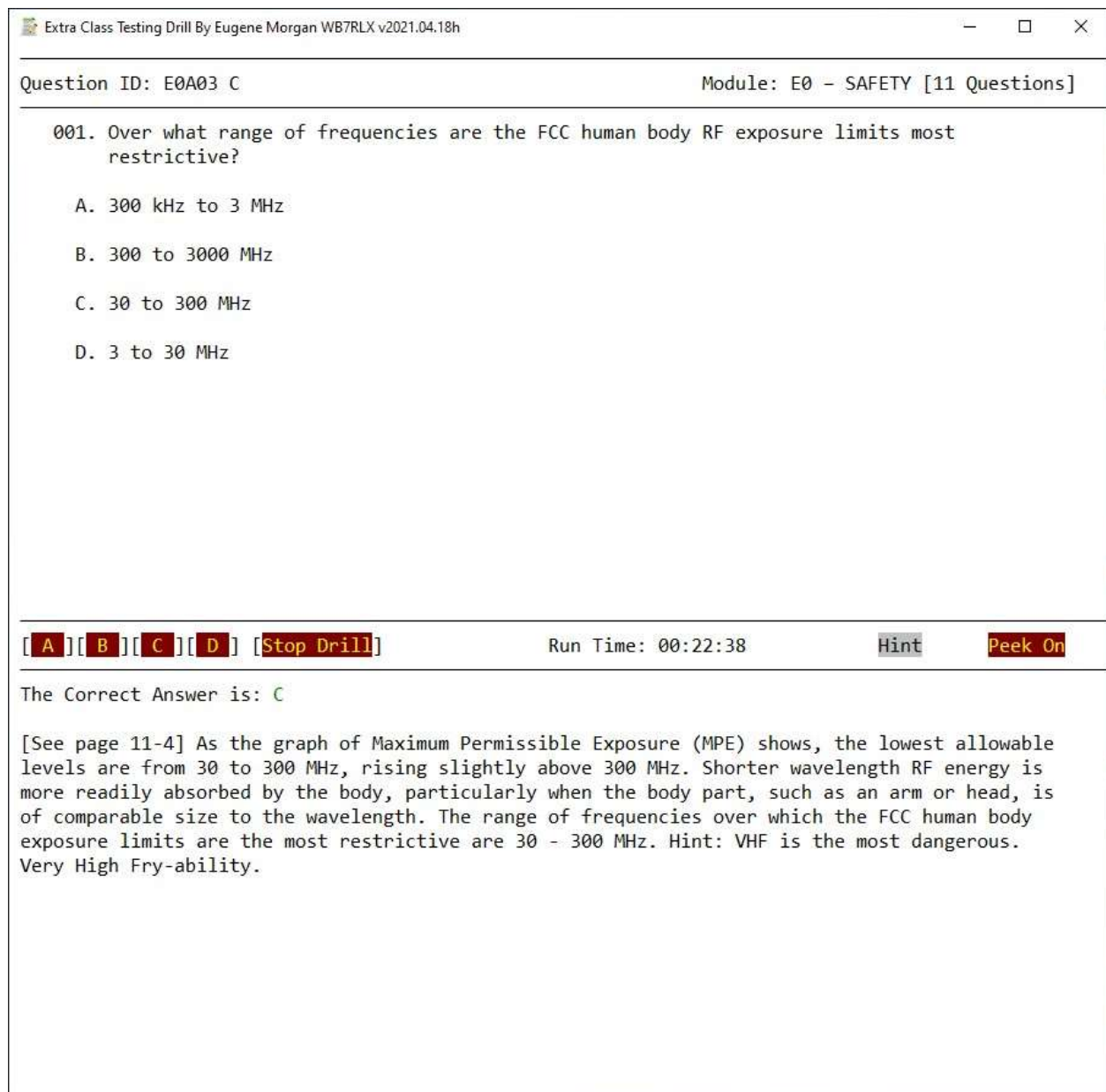
Figure 3: Sub Element Drill showing the hint.

Practice Test: The other feature of the program is the practice test. Refer to Figure 4. The practice test has been designed to act and feel the same as the real test. Questions are selected at random from each sub element, with one question coming from each sub group. The questions are presented in random order and the answers are also presented in a random order. In short no two tests should ever be alike. Refer to Figure 4.

And like the real test you can skip a question and go back to a question at any time. However the review feature behaves a little differently than the real test.
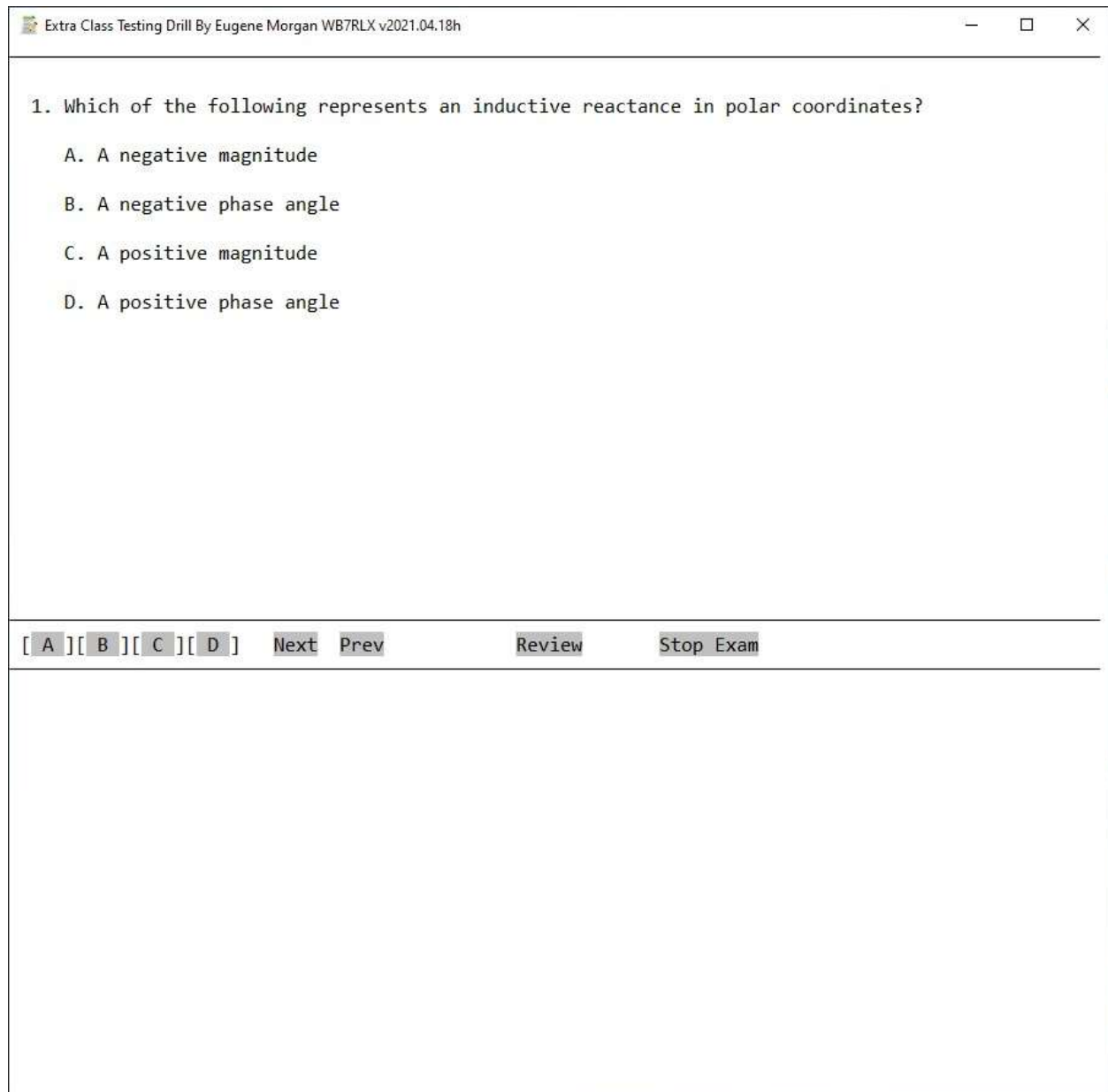
Figure 4: The Practice Test

The Practice Test, the Review Feature: Please refer now to Figure 5. Given this system was intended to be a training tool it was necessary that it provide some level of feedback. To that end the review feature works a little differently than the real test. To begin you can toggle the review feature on or off. You can leave it on during the test so as to show you every time you miss or correctly answer a question. Or you can toggle it off and only review your status when you feel it beneficial to do so. Simply toggle it on or off by clicking on the review button or pressing "**R**".

The Review feature will show you the questions you have missed in red and show you your score based on the questions that you have answered, see Figure 5. In referring to Figure 5 I have clearly not done

very well on this practice test, I answered 40 questions and only got 10 correct for a failing score of 25% on the questions that I actually answered.   Questions that were not answered are blank so before ending the test one should go back to the unanswered questions and complete them. In the real test, missed questions are not deducted from the total of 50 questions. Your actual score in the real test is based in the number of correct answers out of a possible 50 questions. A skipped question is the same as an incorrect answer in the real test.

Finally you can of course end the test at any time by selecting Stop Exam. Note also that when you have answered all 50 questions the program will inform you and then let you decided if you want to review and possibly change some of you answers or revisit any questions you might have skipped over or simply stop the test and get your final score.
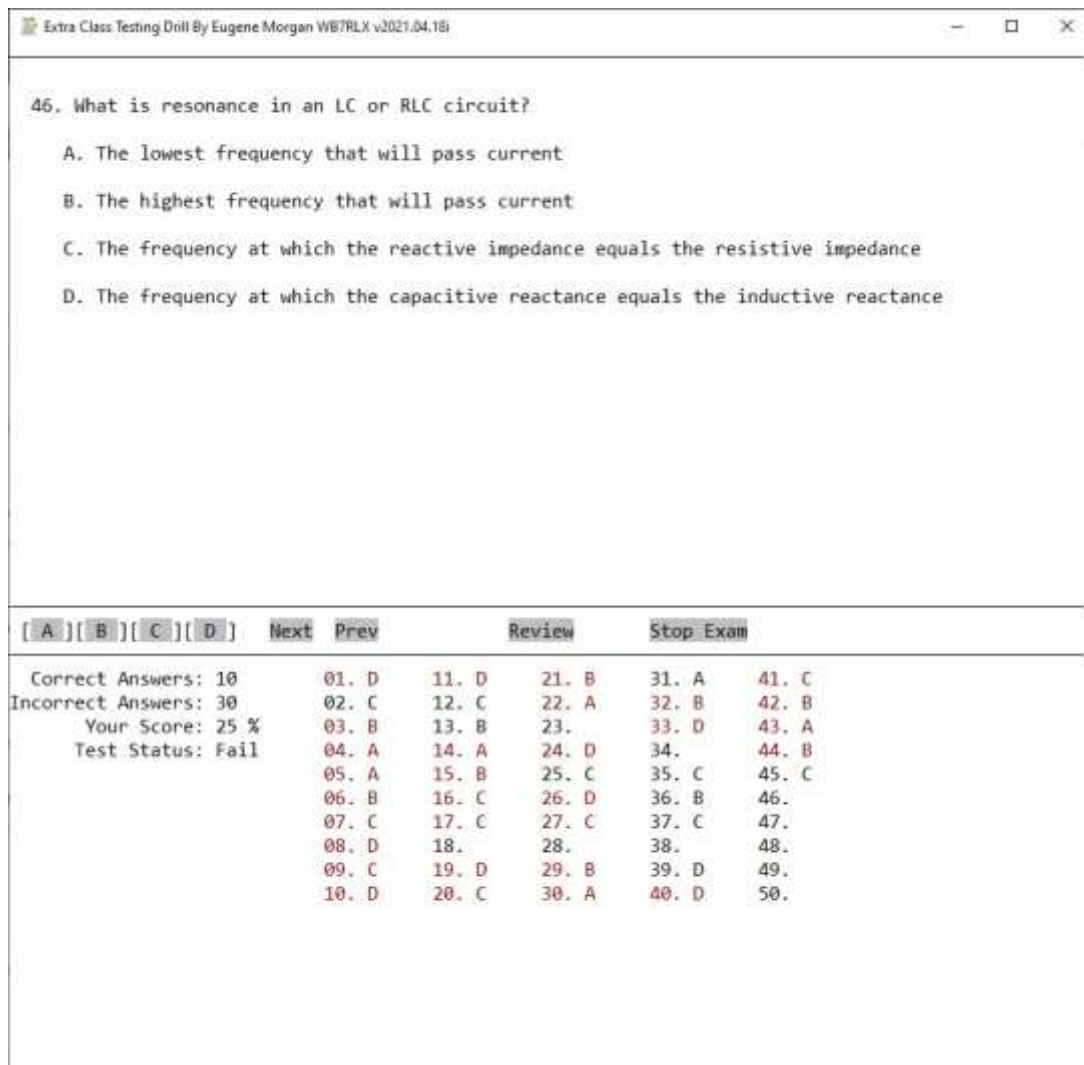

Figure 5: The Practice Test - The Review Feature

Overall the program is pretty simple to operate, the goal after all, was to study and get ready for your exam and not waste a minute figuring out how to use the program.

Customizing the Hint's Database

One of what I think is one of the most important features of the program is the ability to add your own hints and graphics to the hints database. Although the program comes with a fairly robust set of hints and graphics you can also add your own or add your own embellishment to the existing hints. This section will explain how to include your own hints and graphics.

To begin the hints database is nothing more than a text file which means it can be edited using a common text editor such as Windows Notepad or a more feature rich text editor such as Notepad++. You should not use a program like Microsoft Word, however if you do, make sure you save the file as a

DOS text file.

You will find the *hints.txt* file in the directory where you installed the program. Let's begin by opening the file and examining a typical line. The each line has a fairly specific format:

Hint ID: [Page Reference] followed by that hint text, refer to Figure 6. The hint ID is the question reference number used in the Big Green Book. The Hint ID format is 'E' for Extra, the Sub element number, followed by the sub element group ID, and finally the question number in the group, example the Question ID for E1A01 would be specific to a question from the Extra Class question pool, from sub element 1 on Commission Rules, and from group A which is about Operating Standards in regard to frequency privileges and specifically question 1 about legal carrier frequencies. See page 13-4 in the Big Green Book. Note that the page reference included in the provided hints database is specific to the Big Green Book. You can however include not only the page reference between the brackets but a book reference as well, example: [ARRL Antenna Handbook, 24th Edition, page 21-4]

A hint cannot be on more than one line and cannot be more than 1425 characters in total length. You do not need to put a blank line between hints. In the example below the blank lines were added only to make the file more readable. If there is a graphic associated with the hint the reference will be placed at the very end of the line and will be in the form of: ***~Figure E1A01.bmp*** In this example the actual graphic is named E1A01.bmp and is located in the "*Figures*" sub folder under the main installation folder. All graphic files must be in a bit map format, aka: a .bmp file.

As long as you follow the prescribe format you can add as many hints as you like. However, only one hint per question. You are also welcome to edit the hints file and add whatever hints you have found useful. I also encourage you to send any hints you might want added to me for inclusion in future updates to the hints database.
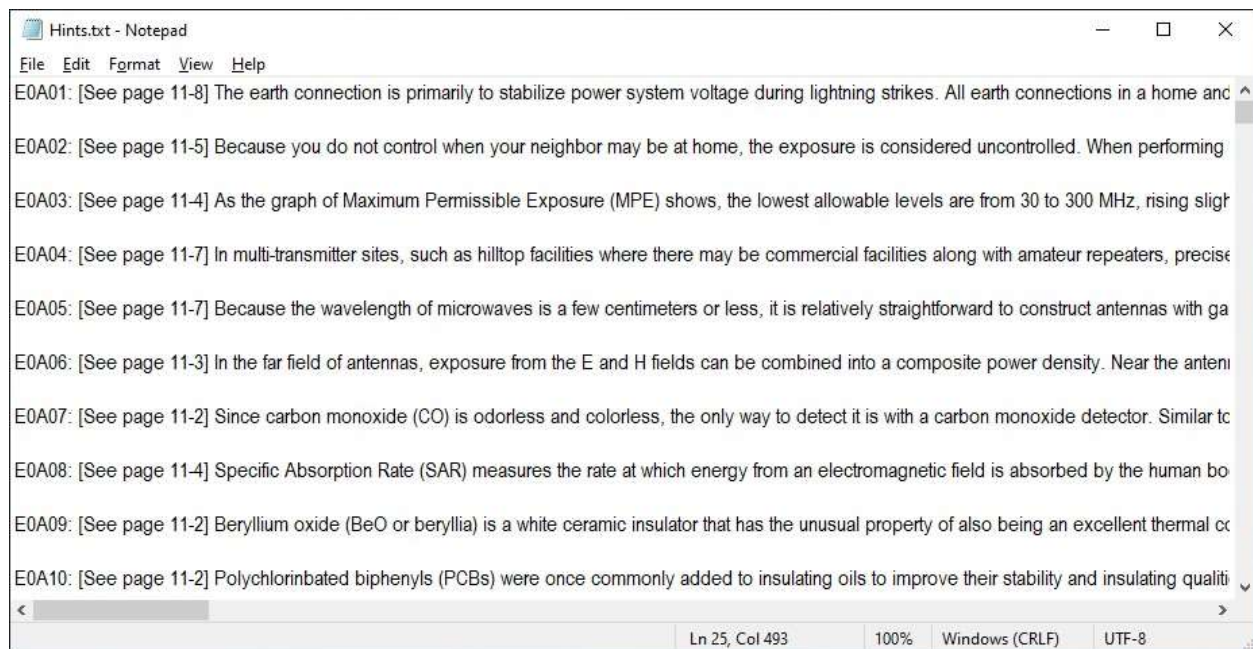
Figure 6: The Hints.txt file

Installation

The program is pretty easy to install. To give you a thumbnail of the process, after downloading it from the OARC web site, unzip the file and run the setup utility and then modify the shortcut. The steps below will walk you through the process in a bit more detail. If you have any issues please drop me a note and I will be happy to help you. Before beginning the installation the program let's make sure you have the right hardware and operating system.

Program Requirements:

Required: A computer running Windows. This program was developed using Windows 10 but there's no reason it shouldn't run under Windows 7 or even Windows XP.

Required: Disc space and memory requirements are minimal, just under 85 Mb of disk space. In terms of memory the program is fairly small, the memory foot print is around 4Mb and CPU utilization is under .5%. So in terms of computer resources the requirements are minimal.

Required: A desire to learn and the time necessary to practice.

Installation Instructions:

✓   Download the program from the OARC web site. It should be located in the down load area on the

OARC web site see: http://ogdenarc.org/downloads.html. If a class is being offered a link will be provided on the OARC home page just under the link to the Zoom meeting invite. It can also be found under *Member downloads by Eugene Morgan*. After you have downloaded the file unzip it and run the TechSetup.exe. If you are reading this article make sure you also do the next two steps.

✓ The next step requires that we configure the *Extra Class Training System* window size. On your desktop you will find the "Tech *Test*" icon. *Right Click* on it and select **Properties**.   In the properties window you will see a number of tabs, click on the **Layout** tab. In the middle of the Layout Tab window you will see a box labeled **Windows Size**. Set the *Width:* to **100** and the *Height:* to **43**.

✓ While you have the shortcut open next select the [**Options**] tab. Uncheck the [**Quick Edit Mode**] option. Then click on the [**Ok**] button. At this point you can run the Extra Class Practice program.

Just In Case You See A Warning From Windows Defender or other Anti-Virus program: When executing or installing the program for the first time you may experience a warning from Microsoft Defender or your anti-virus software warning you about this program. Don't worry. In the case of Microsoft Defender just click on the "***More info***" link then click on the "***Run anyway***" link. This only occurs the very first time the program is launched and only on some computers. I take extreme precautions to make sure that none of my programs are infected and scan each before sending on to the clubs Web Master.

Acknowledgements: I would call out two of our peers that helped me during the development and beta testing. Justin Hall (KP7LAK) for feedback, the loan of the Craig Buck book complete with highlights and notations as well as beta testing the various versions. I would also like to thank Rick Morrison (W7RIK) for some help explaining what the real test looks like, beta testing and providing feedback. I also need to send a thank you to Pete Heisig (AI7GV) for loaning me his copy of the little green book, which was well mark and truly broke in as well. Pete also shared with me his memory of the test screens. I can't express my thanks and appreciation to these three enough. Their testing, their input, and their recall of the test itself was a big help in getting the program to its final state. A heartfelt thanks Guys!

Future Plans and Possible Updates: I will continue to refine and update the hints database over time and have arrange with the clubs Web master to post these updates in the future. I will also send out updates to the hints file for those who I know are using the program. Once I complete the Extra Class Training System I will also provide a version for the Tech class and the general class courses. I hope to have them ready for the next round of testing in the fall if not sooner.

In Closing: I know there are a lot of good resources out there in the form several books, many not mentioned here, as well as a host of web sites. Regardless, I hope you will find my program just as helpful if not more so. If you decided to use my program then please accept my sincere thanks.

If you have any questions or if you have some ideas about additional features or improvements give me a call. If you find any bugs please do contact me with the specifics. If you are interested in seeing the source code or doing a deep dive into the code drop by, I love talking about this stuff. Above all and most importantly to me, I hope you enjoy using my program.

73,

Gene

(WB7RLX)