QWhizz Math
Program Documentation

Getting Started

Before use of the QWhizz Math program, you must ensure that you have Python installed along with the required Python libraries for the program to function correctly. If Python is not installed, visit the page www.python.org and then download and install Python before proceeding with the instructions.

Once Python is installed, you must also install the Python libraries needed for the program if they are not already installed. To install them, please follow the instructions below for your current operating system:

Windows Computers:

- Open Command Prompt and run the command:
   o pip install customtkinter pillow

macOS Computers:

- Open Terminal and run the command:
    o brew install python-tk && pip install customtkinter pillow

Linux Computers:

- Open Terminal and run the command:
    o sudo apt install python3-tk && pip install customtkinter pillow

Once the command has been run successfully, you may begin use of the program. This can be done by opening the "QWhizz Math - V4.3.1 Final.py" file directly from the file manager app used for your current operating system (Windows, macOS, or Linux). If for any reason there is an issue in doing so, the program can also be run through IDLE or other code editors such as Visual Studio/Visual Studio Code.

Homepage
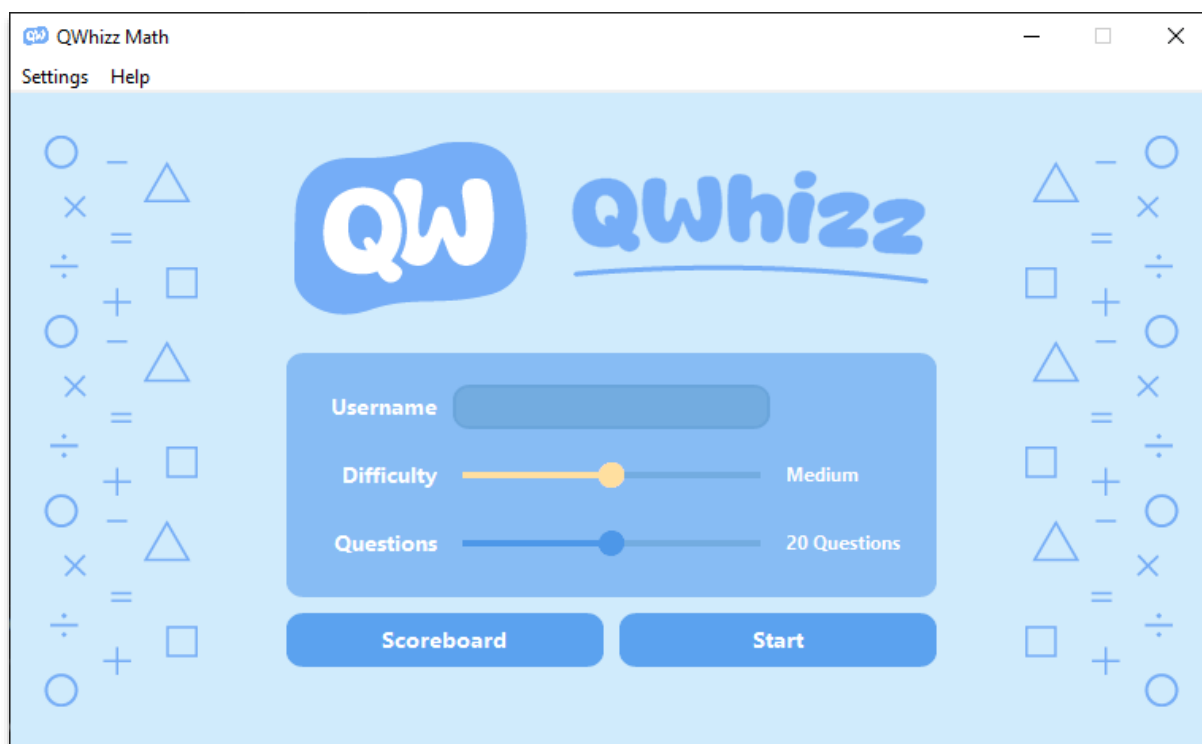
Starting the QWhizz Math program will take you directly to the homepage, where you can choose to view existing scores on the scoreboard by pressing the Scoreboard button, or starting a quiz by pressing the Start button. To start a quiz, you are required to enter your username of choice into the username entry box seen beside the "Username" text. Next, you may choose the difficulty of the questions that you'd like to answer, which can be chosen by dragging the slider left to make it Easy, dragging the slider to the middle if not there already to make it Medium, or dragging the slider right to make it Hard. Finally, you can choose how many questions you'd like to answer in the quiz, ranging from 5 to 35, where dragging the questions slider left will reduce the number of questions, and dragging it right will increase the number of questions.
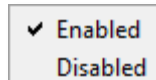
Settings Menu

To further customise your quiz experience, you can utilise the Settings menu, available at any time from the top left of the program window, which gives you access to timer configurations, question
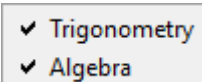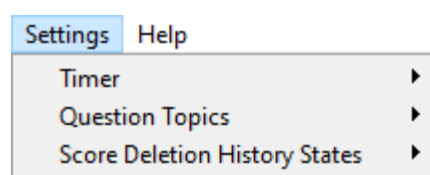
topic choices, and deletion history configurations for the scoreboard (this is explained in the relevant scoreboard section of this document).

- The Timer option allows you to either enable or disable the timer for a quiz, with this option being saved to storage so that your choice is remembered after closing and reopening the program. If the timer is disabled, your final score after completing the quiz will not include a time, however, if you decide you'd like to include your time after starting a quiz, the Timer option can be enabled again during a quiz to show the total time regardless, making it easier to change your mind at any point before completion.
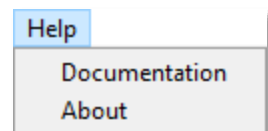
- The Question Topics option allows you to select or unselect the Trigonometry and Algebra topics that can be given in a quiz. You may select both, or unselect either one to suit your preferences, however both options cannot be disabled at once.
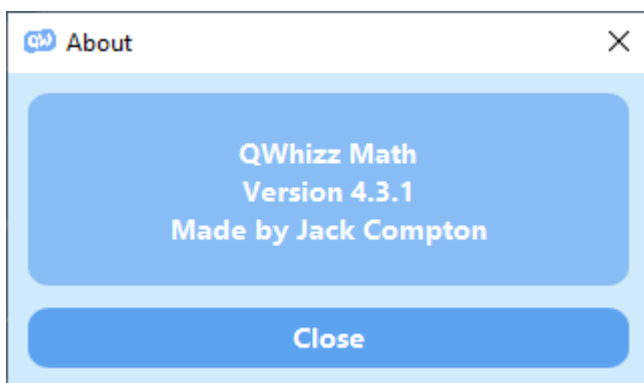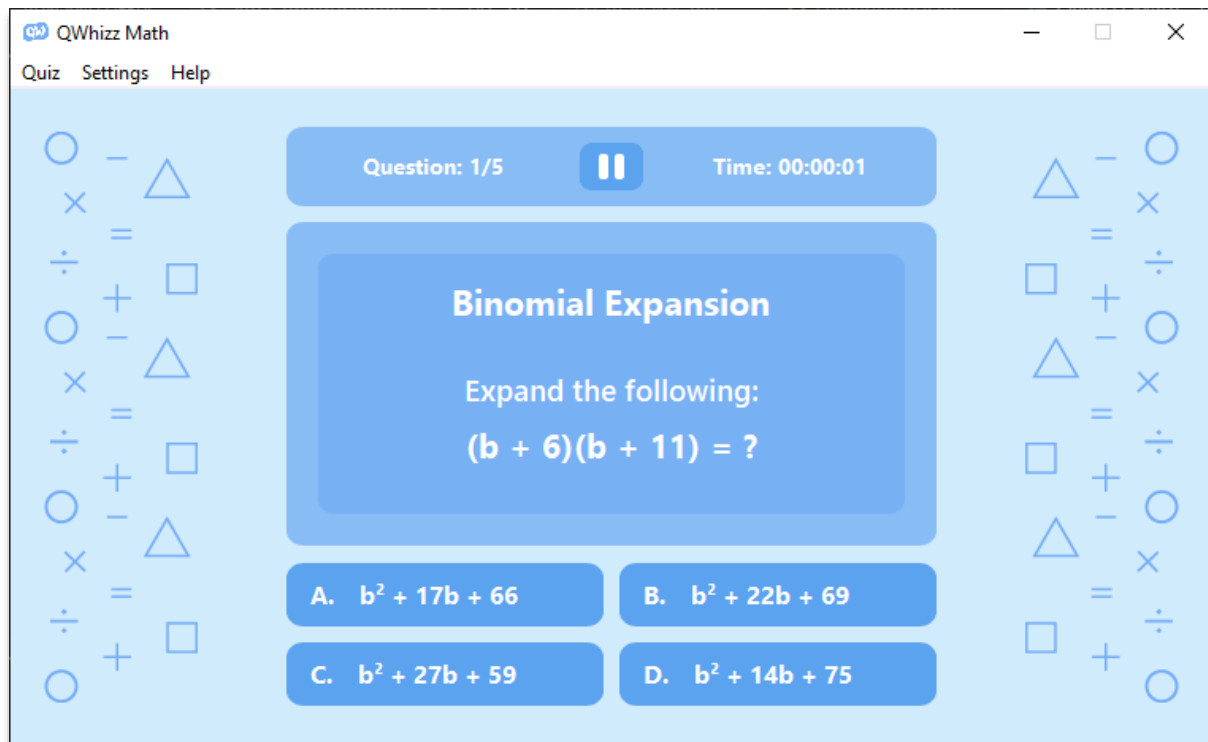
Help Menu

There is also the Help menu, which is accessible on all pages and provides an option to view this documentation by clicking "Documentation", or the details of the program by clicking "About".

Quiz Page

After pressing start from the Homepage, you will be taken to the Quiz page. The quiz features multi-choice answer buttons, so that answering questions is simplified compared to typing in answers, preventing the risk of accidental mistypes causing incorrect answers. There is also a pause button so that you may pause your quiz at any time, which pauses the timer and hides the quiz and answer details. This prevents both cheating scores and accidental clicks on answer buttons.

Quiz Menu

Alongside these features, there is also another menu in the menu bar titled "Quiz", which provides options to either restart the quiz, start a new quiz, or exit the current quiz. The key binds for these actions are listed beside their relevant actions, for example, pressing the "Esc" key will exit the quiz.

- The Restart Quiz option will restart the current quiz with the same set of questions, just with reshuffled answer buttons and a reset time. Changing the question topic settings will have no effect on this functionality, and the same question topics will be used for the quiz that is being restarted.

- The New Quiz option will start a completely fresh quiz, with a new set of questions and a reset timer. The username, difficulty, and number of questions will be the same as the quiz in progress prior to starting a new quiz. However, you may adjust the question topic settings before starting a new quiz, so that you can include or exclude a topic for the new quiz.

- The Exit Quiz option will simply return to the Homepage, cancelling the quiz and not saving any permanent information. The username, difficulty, and number of questions are temporarily stored in memory, however, so that when you exit a quiz and return to the homepage, the entry box and sliders are already preconfigured with the previously chosen username, difficulty, and question amount respectively.
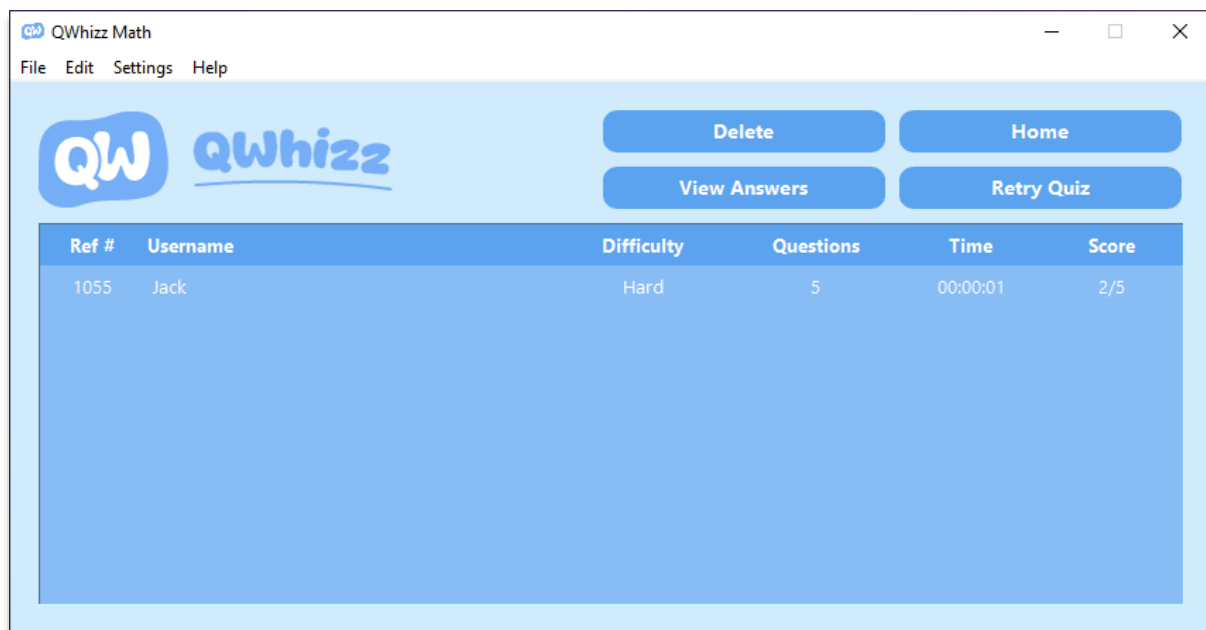
Completion Page

Once a quiz is completed, the user-entered details (username, difficulty, & question amount), alongside the quiz results, are saved to a JSON datafile so that user scores aren't lost when the program is closed and reopened. You will also have a summary of your results displayed on the completion page, along with buttons below, providing options to either view the answers of your quiz, retry your quiz, go to the Scoreboard Page, or go to the Homepage. Exiting the completion page by going to the Homepage or Scoreboard Page will clear the temporarily stored user-entered details (username, difficulty, & question amount), so that new details can be used for the next time a quiz is started.

Also, the next time the Homepage is visited after the first quiz completion is recorded, the username entry box will have changed into a combo box with a dropdown menu (occurs after one or more scores are recorded), meaning selecting a previous username is hassle-free if the user wishes to use the same username as what they had for their previous quiz. The combo box also utilises autocomplete, so that the user can simply type a few letters of an already recorded username, and that specific username, along with other similar matches, will be shown in the dropdown menu without all other saved usernames showing. This makes it easier to find and select a specific username in scenarios where there might be many already recorded usernames saved in the datafile.

Scoreboard Page

Accessible from either the Homepage or the Completion Page, the Scoreboard Page offers a variety of features to help you manage saved quiz results, view the answers of a saved quiz, replay a saved quiz, or even print results into a PDF file which can then be sent directly to the default printer.

Interacting with Scores

The Scoreboard Page provides a table for you to interact with saved scores, where a specific score can be selected by left clicking on it. You may choose to select a score to delete it, print it individually, view the answers, or retry the quiz associated with that selected score.

- If you wish to select more than one score at a time, you must hold the "Ctrl" key and then click on the scores you'd like to select; in doing so, you won't be able to use the View Answers or Retry Quiz options, as multiple selections are only needed for deleting or printing only those selected scores.

- If you wish to select a group of scores starting from one score and ending at another, hold the "Shift" key and select one score, then while still holding the key, select another score. Now, all scores in between those two selections will be selected as well. This makes it more efficient to

select many scores together, rather than holding "Ctrl" and selecting them one-by-one.

- If you wish to unselect a score, you must hold the "Ctrl" key and then click on the selected score(s) that you'd like to unselect. Unselecting can only be done individually, so the "Shift" key has no purpose for this functionality.

- If you wish to select just one score when multiple scores are selected, you can simply click on just that one score without holding any of these keys.

File Menu

The File Menu contains all the management functionality for scores, providing options to either print the selected score, print all scores, delete the selected score, or delete all scores. The key binds for these actions are listed beside their relevant actions, for example, simultaneously pressing "Ctrl", "Shift", and "P" will print all recorded scores.

File	Edit	Settings	Help
Print Selected		Ctrl+P	
Print All		Ctrl+Shift+P	
Delete Selected		Del	
Delete All		Shift+Del	

- The Print Selected option will print only the scores you have selected on the scoreboard into a PDF file, then make a request to send the file to the default printer. This means you can print just one score, or a specific selection of scores at once.

- The Print All option will print all recorded scores on the scoreboard into a PDF file, then make a request to send the file to the default printer.

- The Delete Selected option will delete only the scores you have selected on the scoreboard, asking for confirmation before deleting a score so that scores are less likely to be accidentally deleted. This means you can delete just one score, or a specific selection of scores at once.

- The Delete All option will delete all recorded scores on the scoreboard, asking for confirmation before deleting all recorded scores so that scores are less likely to be accidentally deleted.
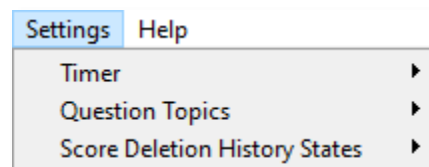
Edit Menu

The Edit Menu provides options to either undo a deleted score or redo the deletion of a score. This undo/redo functionality utilises system memory to store history states after each deletion, or undone deletion.
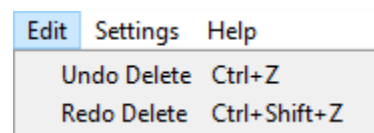
- The Undo Delete option will undo the most recent deletion, whether that be for a single score or a group of selected scores done in one deletion. Either of these will account for one deletion history state, so in summary, every time the delete functionality is used, a deletion history state is created.

- The Redo Delete option will redo the most recent undone deletion action (deleting the most recently undone deletion, essentially reapplying the deletion) in order of the most recent to the oldest undone deletion, one history state at a time for every time the Redo Delete action is used. A redone deletion can still be undone again if needed.

Settings Menu

Finishing off with covering the Settings Menu (primarily covered in the Homepage section of this document), the final option provided is Score Deletion History States. This option relates to how many states/saves the program can store for each deletion event, or rather, the total number of deletion events that can be undone. Every time you press delete or use the delete functionality, that deletion accounts for one "history state", so even if you select 5 different scores and delete them altogether, that deletion is one history state because you pressed the delete button/used the delete action one time for those 5 scores to be deleted at the same time.

When expanding the Score Deletion History States option, you will have 4 choices – Disabled, 10, 25, 50. Choosing "Disabled" will mean that when you delete a score/group of scores, the action cannot be undone. If you choose "10", "25", or "50", you will be able to undo previous deletions from most recent to oldest for the

relevant number of times (e.g. 10 will mean you can undo a total of 10 deletion actions, one after the other). This option has no effect on the ability to repeatedly undo, redo, then undo again, etc.

Viewing Answers

Accessible from either the Scoreboard Page or the Completion Page, a button labelled "View Answers" will allow you to view the answers of a completed quiz. This requires you to either select the score you'd like to view the answers of and press the "View Answers" button on the scoreboard page or complete a new quiz and view the answers of it by pressing the "View Answers" button on the Completion Page.

The answer-viewing page is relatively similar to the Quiz Page, however, in place of a pause button and timer at the top, you will instead have a Previous and Next button which are used to navigate through all the questions of the quiz you're viewing the answers of. Also, the "New Quiz" option in the File menu won't allow you to start a new quiz while currently viewing the answers of a quiz, however you can still use the restart functionality to go back to the start of the quiz you're viewing the answers of and use the exit quiz functionality, which will take you back to the Scoreboard Page instead of the Homepage when viewing answers. Furthermore, instead of clickable answer buttons, the answer buttons will instead be disabled and configured with colours to represent either a correct answer for the question, or an incorrect answer along with what the correct answer button would be for the question.

- If the question shows only a green button with a tick icon along with three dimmed blue buttons, then the answer to the question was correct. The green button represents the correct answer to the question, chosen by the user, with a tick icon to make this clear. An example is shown below:
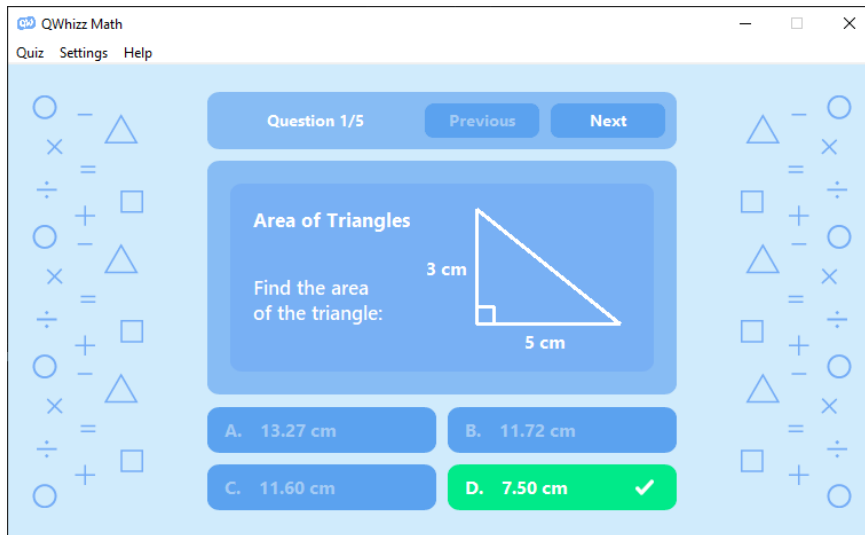
- If the question shows a red button with a cross icon, a blue button with a green outline, and two dimmed blue buttons, then the answer to the question was incorrect. The red button represents the incorrect answer to the question, chosen by the user, with a cross icon to make this clear. The blue button with a green outline represents the correct answer to the question, outlined to indicate it wasn't chosen by the user. An example is shown below:
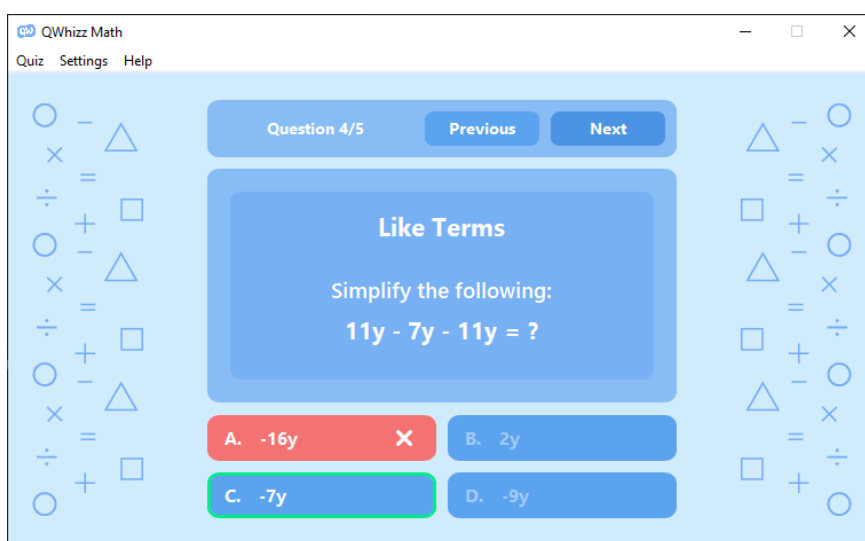
Retrying a Quiz

Accessible from the Scoreboard Page or the Completion Page just like the "View Answers" button, a button labelled "Retry Quiz" will allow you to retry a quiz with the same questions to practice it and potentially improve the score of that quiz. This requires you to either select the score you'd like to retry and press the "Retry Quiz" button on the scoreboard page or complete a new quiz and retry it by pressing the "Retry Quiz" button on the Completion Page.

The quiz retry page is identical to the standard Quiz Page, providing the exact same set of questions that were received during the quiz selected to retry. The "Quiz Topics" option in the Settings menu will not have any effect on the topics shown in a retried quiz, since the questions are required to be the same regardless. Also, the "New Quiz" option in the File menu won't allow you to start a new quiz while currently viewing retrying a quiz, as the purpose of this action is to generate a new set of questions for the active quiz, but new questions can't be generated while retrying a quiz since that would use different questions from the original quiz. However, you can still use the "Restart Quiz" option to go back to the start of the quiz you're retrying and use the "Exit Quiz" option, which will take you back to the Scoreboard Page instead of the Homepage when retrying a quiz.