## Global/Generally Used Variables

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| --- | --- | --- | --- | --- |
| Variable | Data type | Scope | Created by | Comments |
| windowSetup() | Class | Global | Fixed | Class responsible for all GUI elements |
| processes() | Class | Global | Fixed | Class responsible for all processes; validating ans etc, running the game etc. Inherits from windowSetup() |
| start | Instance | Global | Fixed | An instance of windowSetup() class |
| x | integer | Local to for loop | for loop | Used as a variable to determine an object’s location in the grid in terms of the column when going through a list of objects via for loop |
| y | integer | Local to for loop | for loop | Used as a variable to determine an object’s location in the grid in terms of the row when going through a list of objects via for loop |
| n | integer | Local to for loop | for loop | Used as a variable when going through a range using a for loop |

## windowSetup() Variables

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| Variable | Data type | Scope | Created by | Comments |
| self.\_\_init\_\_() | Method | Local | Fixed | Runs when the class is called. Everything below this row until the next method is defined within this method. |
| self.window | Instance  (Widget) | Local | Fixed | Instance of Tk(). Refers to the actual window |
| self.canvas | Instance  (Widget) | Local | Fixed | Instance of Canvas(). Refers to the canvas. |
| self.bImage | Instance  (Widget) | Local | Fixed | Instance of PhotoImage().  Is used to import background image “welcome\_screen.gif” |
| self.quitButton | Instance  (Widget) | Local | Fixed | Instance of Button()  Is used to run close the window |
| self.rFrame | Instance  (Widget) | Local | Fixed | Instance of Frame()  Is used to house the radio buttons, round entry and associated labels. |
| self.cFrame | Instance  (Widget) | Local | Fixed | Instance of Frame()  Is used to house the check buttons, entry and associated labels. |
| self.modeVar | Instance  (Integer) | Local | Fixed | Instance of IntVar()  Is used to store the user’s choice for the radio buttons (round options) |
| self.addVar | Instance  (Integer) | Local | Fixed | Instance of IntVar()  Is used to store the user’s choice in enabling the addition game type |
| self.subVar | Instance  (Integer) | Local | Fixed | Instance of IntVar()  Is used to store the user’s choice in enabling the subtraction game type |
| self.multVar | Instance  (Integer) | Local | Fixed | Instance of IntVar()  Is used to store the user’s choice in enabling the multiplication game type |
| self.rLabel | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display the text asking user to select a mode |
| self.roundButton | Instance  (Widget) | Local | Fixed | Instance of Radiobutton()  Is used as an option that the user can choose |
| self.unlimitedButton | Instance  (Widget) | Local | Fixed | Instance of Radiobutton()  Is used as an option that the user can choose |
| self.roundEntry | Instance  (Widget) | Local | Fixed | Instance of Entry()  Is used for user to input the desired number of rounds |
| self.rEntryLabel | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display a text to denote the purpose of the roundEntry box |
| self.cLabel | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display a text prompting the user to choose the desired question types |
| self.addButton | Instance  (Widget) | Local | Fixed | Instance of Checkbutton()  Is used as an option that the user can choose |
| self.subButton | Instance  (Widget) | Local | Fixed | Instance of Checkbutton()  Is used as an option that the user can choose |
| self.multButton | Instance  (Widget) | Local | Fixed | Instance of Checkbutton()  Is used as an option that the user can choose |
| self.startButton | Instance  (Widget) | Local | Fixed | Instance of Button()  Calls the gameStart() method in Processes() class when clicked |
| self.tip | Instance  (Widget) | Local | Fixed | Instance of Label()  Used to display a message informing the user of the right click function |
| self.inputVar | Instance  (string) | Local | Lookup  (.get from inputBox)  (User input) | Instance of StringVar()  Used to store the user’s input in the inputBox, and also to stop the program until it is updated (wait\_variable) |
| self.inputBox | Instance  (Widget) | Local | Fixed | Instance of Entry()  Used for the user to input the answer in |
| self.inputButton | Instance  (Widget) | Local | Fixed | Instance of Button()  Used for the user to submit the answer after they inputted. Updates self.inputVar |
| self.correctImage | Instance  (Widget) | Local | Fixed | Instance of PhotoImage()  Is used to import background image “correct\_screen.gif”  to be displayed if the user is correct |
| self.falseImage | Instance  (Widget) | Local | Fixed | Instance of PhotoImage()  Is used to import background image “false\_screen.gif”  to be displayed if the user is false |
| self.nextVar | Instance | Local | Fixed | Instance of IntVar()  Is used to stop the program until it is updated (wait\_variable) |
| self.nextButton | Instance  (Widget) | Local | Fixed | Instance of Button()  Is used by user to move on to the next question from answer screen. Updates self.nextVar |
| self.restartButton | Instance  (Widget) | Local | Fixed | Instance of Button()  Is used to call welcomeScreen() method in windowSetup() on click, thus enabling the program to loop from the beginning. |
| self.overlayFrame | Instance  (Widget) | Local | Fixed | Instance of Frame()  Is used to house everything in the overlay menu |
| self.gameTypeError | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display an error message |
| self.roundEntryError | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display an error message |
| self.inputError | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display an error message |
| self.tooLongError | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display an error message |
| self.noneError | Instance  (Widget) | Local | Fixed | Instance of Label()  Is used to display an error message |
| self.welcomeScreen() | Method | Local | Fixed | Is used to display the first menu, referred to as the welcome screen.  Everything below this row until the next method is defined within this method. |
| self.questionScreen() | Method | Local | Fixed | Is used to display the question screen, where the user is asked questions  Everything below this row until the next method is defined within this method. |
| question | String | Local | Parameter | Parameter of self.questionScreen(), stores the question in the form of a string |
| qusetionNo | Integer | Local | Parameter | Parameter of self.questionScreen(), stores the question number |
| self.answerScreen() | Method | Local | Fixed | Is used to display the answer screen, where the user is told if they have answered correctly  Everything below this row until the next method is defined within this method. |
| question | String | Local | Parameter | Parameter of self.answerScreen(), stores the question in the form of a string |
| uInput | String | Local | Parameter | Parameter of self.answerScreen(), stores the user answer for the question |
| correct | Boolean | Local | Parameter | Parameter of self.answerScreen(), Boolean for whether the user is correct or incorrect |
| colour | string | Local | If statement | Is used to denote the colour of the buttons to match the background depending on if the user is correct or incorrect |
| self.finalScreen() | Method | Local | Fixed | Is used to display the final screen, where the final score is shown  Everything below this row until the next method is defined within this method. |
| score | Integer | Local | Parameter | Parameter of self.finalScreen(), stores the user’s score |
| totalQuestions | Integer | Local | Parameter | Parameter of self.finalScreen(), stores the total num of questions |
| self.overlayCreate() | Method | Local | Fixed | Is used to display the overlay when right mouse button is clicked. Contains information on previous questions  Everything below this row until the next method is defined within this method. |
| event | string? | Local | bind | string? Parameter of overlayCreate, contains information about a given event |
| qaDict | Dictionary | Local | Parameter | Parameter of qaDict, contains information about the previously asked questions and the user’s answers |
| colour | string | Local | If statement | Is used to denote the colour of the labels depending on if the user is correct or incorrect |
| displayList | List | Local | lookup | A derivative list from the values of qaDict. Is run through a for loop to create labels for each row |
| self.overlayRemove() | Method | Local | Fixed | Method to delete the self.overlay canvas object when right mouse button is released |
| event | string? | Local | bind | string? Parameter of overlayRemove, contains information about a given event |

## processes() Class variables

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| --- | --- | --- | --- | --- |
| Variable | Data type | Scope | Created by | Comments |
| self.\_\_init\_\_() | Method | Local | Fixed | Runs when the class is called. Everything below this row until the next method is defined within this method. |
| self.gameStart() | Method | Local | Fixed | Called to start the game. In general is responsible for running every other method  Everything below this row until the next method is defined within this method. |
| self.score | Integer | Local | Fixed | Used to keep track of the user score |
| self.qaDict | Dictionary | Local | Fixed | Used to store the previous questions, and user answers |
| questionNo | Integer | Local | Fixed | Used to keep track of the question number |
| self.windowSequence() | Method | Local | Fixed | A method which will call the question Screen, then subsequently, the answer Screen  Everything below this row until the next method is defined within this method. |
| questionNumber | Integer | Local | Parameter | Parameter of self.windowSequence(). Stores the current question number |
| correctOrFalse | Boolean | Local | Method (self.answerCheck()) | checks to see if the answer is correct or incorrect. Boolean used for if statement |
| self.settingCheck() | Method | Local | Fixed | checks to see if the setting is valid. Returns Boolean  Everything below this row until the next method is defined within this method. |
| validSetting | Boolean | Local | Fixed | Stores if the setting is valid, 1 for valid, 0 for invalid |
| self.settings | dictionary | Local | Lookup (checkbutton.get) | Dictionary of the user outputs and the corresponding names for the game type check buttons |
| self.sDict | dictionary | Local | Dictionary Comprehension | Derivation of self.settings dictionary. New dictionary filtered for enabled game types, all given the value of 0.  Will be used to determine if every game type selected has been played |
| self.inputCheck() | Method | Local | Fixed | Checks to see if the user’s input is valid. Returns Boolean  Everything below this row until the next method is defined within this method. |
| input | string | Local | Parameter | Parameter of self.inputCheck(). Stores the value of the user’s answer |
| self.answerCheck() | Method | Local | Fixed | Checks to see if the user’s answer is correct. Returns Boolean  Everything below this row until the next method is defined within this method. |
| input | string | Local | Parameter | Parameter of self.answerCheck(). Stores the value of the user’s answer |
| question | String | Local | Parameter | Parameter of self.answerCheck(), stores the question in the form of a string |
| self.questionCaller() | Method | Local | Fixed | Determines which game type should be called based on user’s choice and previous questions  Everything below this row until the next method is defined within this method. |
| nextQuestion | String | Local | Fixed | Used to store the string which will be used in if statement to determine the function that needs to be called |
| self.addCreator() | Method | Local | Fixed | Returns an addition question in form of a string |
| self.subCreator() | Method | Local | fixed | Returns a subtraction question in form of a string |
| self.multCreator() | Method | Local | Fixed | Returns a multiplication question in form of a string. |