Note: Notes such as “Everything checked unless otherwise stated” are default values. To ensure quick testing, and keep the number of free variables down so testing could be accurate, default values are given for every aspect that is being tested. If something is set at a default value, that something is then tested separately for other values to ensure that there are no errors. The default value is chosen normally as it a) is a value which should be accepted by the program, and b) is a value which will allow quick testing. For example. Round mode is a default value for many of the tests because there is a limit until the end of the program. Round entry is normally set at 5 as to ensure that the games end quicker.

## Checking Round Entry – Everything checked unless otherwise stated

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| roundEntry state | Round mode ticked | roundEntry enabled | roundEntry enabled |
| roundEntry state | Unlimited mode ticked | roundEntry disabled | roundEntry disabled |
| roundEntry input  (type error) – No input | Enter “”, press start | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (type error) – Short input | Enter “a”, press start | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (type error) – Long input | Enter “asldkfjssdfsdfsdfsdfsdfsd”, press start | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (type error) – float | Enter “5.5”, press start | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (range/boundary error) – Upper boundary | Enter “19” (Num < 20), press start. | program begins normally; question screen displayed | program begins normally; question screen displayed |
| roundEntry input  (range/boundary error) – Upper boundary | Enter “20”, press start. | program begins normally; question screen displayed | program begins normally; question screen displayed |
| roundEntry input  (range/boundary error) – Upper boundary | Enter “21” (Num > 20), press start. | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (range/boundary error) – Lower boundary | Select only 1 game type, enter “1” (1 <= Num <= 20) in roundEntry.  Press start. | program begins normally; question screen displayed | program begins normally; question screen displayed |
| roundEntry input  (range/boundary error) – Lower boundary | Select 2 game types, enter “2” (2 <= Num <= 20) in roundEntry.  Press start. | program begins normally; question screen displayed | program begins normally; question screen displayed |
| roundEntry input  (range/boundary error) – Lower boundary | Select 3 game types, enter “3” (3 <= Num <= 20) in roundEntry.  Press start. | program begins normally; question screen displayed | program begins normally; question screen displayed |
| roundEntry input  (range/boundary error) – Lower boundary | Select only 1 game type, enter “0” (num < 1) in roundEntry  Press start. | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (range/boundary error) – Lower boundary, negative values | Select only 1 game type, enter “-1” in roundEntry  Press start. | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (range/boundary error) – Lower boundary | Select 2 game types, enter “1” (num < 2) in roundEntry  Press start. | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (range/boundary error) – Lower boundary | Select 3 game types, enter “2” (num < 3) in roundEntry  Press start. | Shown roundEntryError message on pressing start button, and the program refuses to go forward | Shown roundEntryError message on pressing start button, and the program refuses to go forward |
| roundEntry input  (correct input) | input any number between 4 – 19 inclusive | program begins normally; question screen displayed | program begins normally; question screen displayed |
| Entry box state  (Phantom entries)   * Test due to discovered error in which user could still type in the roundEntry after questionScreen was displayed | Have the round Entry be clicked on with an input of 5, press start and on the question screen, without clicking on anything else, type in numbers. | In final screen, the total num of rounds is displayed as 5 | In final screen, the total num of rounds is displayed as 5 |

## Question type check buttons – Round mode, round entry set at 5 unless otherwise stated

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| Invalid setting handling  (Every button is ticked off)   * Added due to bug in which if all settings are ticked off, the program cannot continue | Tick everything off, press start | Shown questionTypeError message on pressing start button, and the program refuses to go forward | Shown questionTypeError message on pressing start button, and the program refuses to go forward |
| All selected question types must be played at least once   * To account for the bug in which if the questions were chosen purely at random, there was a chance that the question types chosen would not be played | select subtraction and addition | In the first 2 questions, both question types are asked | In the first 2 questions, both question types are asked |
| All selected question types must be played at least once | select subtraction, addition and multiplication | In the first 3 questions, all question types are asked | In the first 3 questions, all question types are asked |
| Single type game | select multiplication only | Only multiplication questions are played | Only multiplication questions are played |

## Mode buttons – All question types checked, round entry set at 5, unless otherwise stated

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| Radio Button | Select radio button, press start | Game plays for 5 rounds | Game plays for 5 rounds |
| Check Button | Select check button, press start | Game plays for more than 20 rounds, well over the given number of rounds, assume it will play forever (infinity is impossible to check) | Game plays for more than 20 rounds, well over the given number of rounds, assume it will play forever (infinity is impossible to check) |

## Mode and question types buttons

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| Removing error messages   * Bug in which the error message would stay even if setting was valid if the other error still stood | select round mode, but don’t input anything into roundEntry. Deselect every question type, press start. Then click unlimited mode and press start again | 2 error messages, one for round entry and one for question type appears, the one for round entry is then removed on second click | 2 error messages, one for round entry and one for question type appears, the one for round entry is then removed on second click |
| Removing error messages | select round mode, but don’t input anything into roundEntry. Deselect every question type, press start. Then enter 5 in round entry and press start again | 2 error messages, one for round entry and one for question type appears, the one for round entry is then removed on second click | 2 error messages, one for round entry and one for question type appears, the one for round entry is then removed on second click |
| Removing error messages | select round mode, but don’t input anything into roundEntry. Deselect every question type, press start. Then select one question type | 2 error messages, one for round entry and one for question type appears, the one for question type entry is then removed on second click | 2 error messages, one for round entry and one for question type appears, the one for question type entry is then removed on second click |

## InputBox – All question types checked, round mode, 5 rounds

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| inputBox input  (type error) – No input | Enter “”, press submit | Shown inputError message on pressing start button, and the program refuses to go forward | Shown inputError message on pressing start button, and the program refuses to go forward |
| inputBox input  (type error) – short input | Enter “a”, press submit | Shown inputError message on pressing start button, and the program refuses to go forward | Shown inputError message on pressing start button, and the program refuses to go forward |
| inputBox input  (type error) – floats | Enter 0.01, press submit | Shown inputError message on pressing start button, and the program refuses to go forward | Shown inputError message on pressing start button, and the program refuses to go forward |
| inputBox input  (length error) | Enter “123456789112” (12 in length), press submit | Program moves on normally; displays answer screen | Program moves on normally; displays answer screen |
| inputBox input  (length error) | Enter “1234567891123” (13 in length), press submit | Shown tooLongError message on pressing start button, and the program refuses to go forward | Shown tooLongError message on pressing start button, and the program refuses to go forward |
| correct or incorrect | Answer correctly | Program moves forward, correct background (green) is displayed, the correct message is displayed, the correct question, user input and answer is displayed, the button is also the correct shade of green. | Program moves forward, correct background (green) is displayed, the correct message is displayed, the correct question, user input and answer is displayed, the button is also the correct shade of green. |
| correct or incorrect | Answer incorrectly  (answer must be at 12 or less than 12) | Program moves forward, false background (red) is displayed, the incorrect message is displayed, the correct question, user input and answer is displayed, the button is also the correct shade of red | Program moves forward, false background (red) is displayed, the incorrect message is displayed, the correct question, user input and answer is displayed, the button is also the correct shade of red |

## Overlay – All question types ticked, 5 rounds, round mode unless otherwise specified

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| Overlay display  (Unlimited mode) | Select unlimited mode, press right click on the first question page | Overlay is not displayed | Overlay is not displayed |
| Overlay display  (Round mode) | Select round mode, press right click on the first question page | Overlay is displayed | Overlay is displayed |
| Overlay formatting | Press right click on the first question page without clicking the submit button | Overlay is displayed with noneError message | Overlay is displayed with noneError message |
| Overlay formatting   * Bug in which the error messages, because they were created last, would then be displayed over the overlay | Press right click on the first page after clicking the submit button without entering anything. | Overlay is above everything | Overlay is above everything |
| Overlay formatting | Enter the first question correctly, enter the second question incorrectly, press right click | Overlay displays a green row and a red row with the correct question, user input and real answer | Overlay displays a green row and a red row with the correct question, user input and real answer |
| Overlay formatting | Run the max 20 rounds of questions. | Questions do not exceed the frame | Questions do not exceed the frame |
| Recursion   * Bug in which the overlay would not reset every round | Run 5 rounds, click restart, run 5 again | The Overlay is refreshed each time | The Overlay is refreshed each time |

## Recursion – All question types ticked, 5 rounds, round mode unless otherwise specified

|  |  |  |  |
| --- | --- | --- | --- |
| Feature being checked | Method of Checking | Expected Result | Actual Result |
| Recursion   * Bug in which the score would not reset every round | Run the program twice with the restart button | Score becomes reset after the first game. | Score becomes reset after the first game |
| Recursion | Run the program twice, but changing the number of rounds | Score becomes reset, and the number of rounds changes accordingly | Score becomes reset, and the number of rounds changes accordingly |
| Recursion | Run the program twice, but untick a question type | Score becomes reset, and the question types changes accordingly | Score becomes reset, and the question types changes accordingly |