**Game Test Cases**

**Timer Testing**

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| **Test Case ID: 1** | **Steps to reproduce** | **Test Data Input** | **Expected Outcome** | **Actual Outcome** |
| 1.1) Timer is started on page load and starts counting down automatically from 4 minutes | 1) Refresh/Run website  2) Click on Play Game in the navigation | Null | Timer countdown from 4 minutes to 0 seconds. | Expected outcome. |
| 1.2) Set another timer | 1) Change time in dropdown  2) Click set time button | 1 minute | Timer starts the countdown from 1 minute down to 0 seconds. | Expected outcome. |
| 1.3) Run without timer | 1) Let the game run.  2) Click the button run without timer | Null | The timing should indicate, “Timer is turned off”.  The game over container should not be shown. | Expected outcome. |
| 1.4) Interval time determined by range slider | 1) Let the game run  2) Change the interval time using the range slider | Null | The traversal of each bug should be 6 seconds from bottom to top.  When the interval timing is changed, it should not affect the staying down of bugs for 4 seconds or the colour change of bugs. | Expected outcome. |

**Restart Button Testing**

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| **Test Case ID: 2** | **Steps to reproduce** | **Test Data Input** | **Expected Outcome** | **Actual Outcome** |
| 2.1) Restart game when game is running | 1) Let the game run.  2) Click the restart button. | Null | Timing is reset to the last selected time; If the game is running without a timer then timing will be set to default 4 minutes. | Expected outcome. |
| 2.2) Click the restart button when game is over | 1) Let the game timing finish.  2) When game over div is shown click restart button | Null | Timing is reset to the last selected time; If the game is running without a timer then timing will be set to default 4 minutes. | Expected outcome. |
| 2.3) Restart can be pressed anytime | 1) Click restart button anytime. | Null | The game resets time and restarts. | Expected outcome. |

**Game Over (countdown timer finished) Testing**

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| **Test Case ID: 3** | **Steps to reproduce** | **Test Data Input** | **Expected Outcome** | **Actual Outcome** |
| 3.1) Bugs/circles disappear on game over. | 1) Let the game timing finish and the game over div will be shown | Null | Bugs all disappear, and no new bugs appear. | Expected outcome. |
| 3.2) Game score is shown in the game over div | 1) Let the game timing finish and the game score will be shown | Null | Game score will be shown on the game over div relative and with the score shown in the corner when of the game container. | Expected outcome. |
| 3.3) Play again button is pressed | 1) Let the game finish and the game over container will be shown  2) Click the play again button | Null | Timing is reset to the last selected time; If the game is running without a timer then timing will be set to default 4 minutes.  The bugs lifecycle begins again. | Expected outcome. |
| 3.4) The user changes the range slider when there are no bugs left on screen | 1) Let the game finish  2) When the game timer is over increase and decrease the interval time of refresh by dragging the range slider | Null | No errors should be shown. The sliding of the range slider when the game is over should not cause any programmatic problems that may occur. | Expected outcome. |
| 3.5) When game over, game score stops counting | 1) Let the game finish and try to catch bugs after timer is over and bugs are finishing their cycle. | Null | Game score is not counted when the game is over, and bugs are finishing the cycle of floating up | Expected outcome. |

**Collision Detection Testing**

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| **Test Case ID: 4** | **Steps to reproduce** | **Test Data Input** | **Expected Outcome** | **Actual Outcome** |
| 4.1) Bug/circle hits the net | 1) Let the game run  2) Manoeuvre the character and net using the arrow keys | Null | The game score is added by one and a game sound is played. | Expected outcome. |
| 4.2) Bug/circle hits the character | 1) Let the game run  3) Manoeuvre the character | Null | The game score is reduced by one and a game sound is played. | Expected outcome. |
| 4.3) The bug/ circle reaches the top of the game. | 1) Let the game run  2) Avoid contact with the bug so it can traverse up | Null | The bug disappears. | Expected outcome. |
| 4.4) Ensure that the character or net does not run of the game div. | 1) Let the game run  2) Manoeuvre the character and net using the arrow keys to all sides of the game | Null | The character and net should always stay in the game regardless of any side it collides with. | Expected outcome. |