Assignment 2

Tap Tap Bug

In this assignment, you will develop a single-player game where the players should try to kill the bugs trying to eat food. The game must be developed using JavaScript and HTML5 canvas; no third-party libraries are allowed.

Overview

There are 5 pieces of food on the lower half of the table. Once the game starts, every 1 to 3 seconds, one new bug enters the game from the top side of the viewport at a random X coordinate. Bugs walk directly towards the closest food on the table.. The first bug that reaches a food immediately eats the food, and the other bugs walking towards the eaten food will walk towards their next nearest food.

This game is a time-based game, and each play takes 60 seconds. The game ends when either the time is up or when the bugs have eaten all the food. If you still have food in the table after 60 seconds then you move to the next level.

There are three types of bugs in this game: black, red, and orange. Black bugs are the fastest and the orange bugs are the slowest. Accordingly, the fastest the bug, the higher the kill score. Your should keep and store the scores for the player.

Specification

- The game has 2 pages:
  - Start Page
  - Game Page
- The start page shows the user's high score and allows the user to "start" the game at level 1. When the user presses the start button, the game should start. When user finishes level 1, the game should immediately start level 2. Finishing level 2 should show "Game over" dialog with scores and "OK" Button. Pressing "OK" button should take the user to the start page.
- The start page must be responsive (should have the same look & feel on mobile and desktop)! Selecting level 1 should show the highest score of level 1, and selecting level 2 should show the highest score of level 2.
- Figure 1 shows a sample start page (with two radio button for two levels) but the styling and position of elements in this page is all yours to decide.
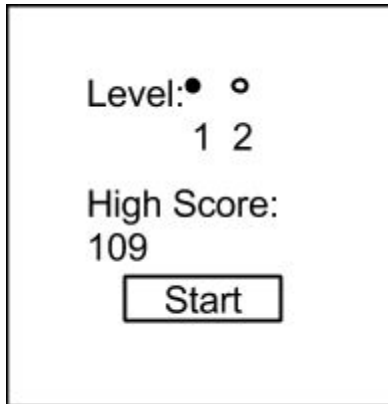
Figure 1 - Start Page

● As shown in Figure 2, the game page consists of an information bar (time, pause button, and score) and a viewport (where the game is rendered)
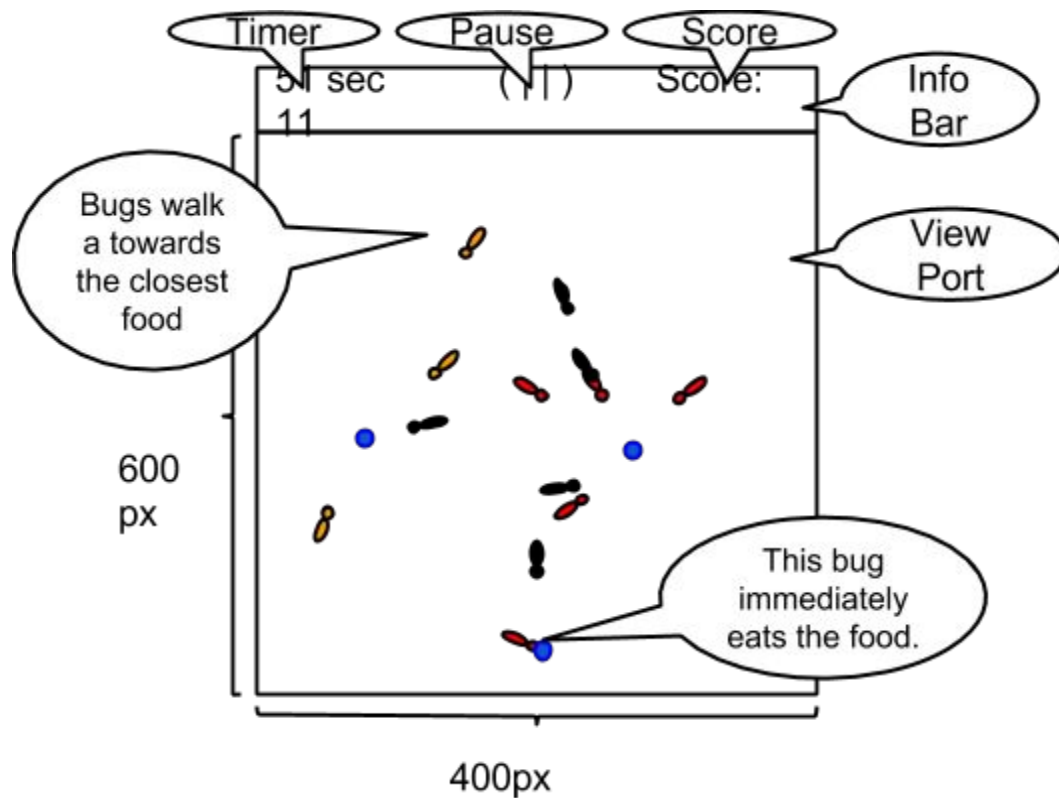

Figure 2 - Game Page

● Look & feel of this page is yours to design.
● The food should not appear within the top 20% of the table
● The timer is count-down and shows the remaining time to the end of the game.
● The pause button must be in the center of the the information bar.
● The viewport of the game is 400px x 600px.

- You should draw a realistic bugs on the screen using canvas, you can not import image.
- You should draw a realistic food on the screen using importing an image.
- Bugs enter the game from the top of the view port.
- Bugs enter the game very 1 - 3 seconds (the time is randomly selected from a uniform distribution) at a random X coordination (uniformly selected from 10 to 390 px).
- Bugs have different speeds, different kill scores, and different probabilities for entering the game:

Type	Speed in Level 1	Speed in Level 2	Score	Probability
Black	150px per second	200px per second	5	0.3
Red	75px per second	100px per second	3	0.3
Orange	60px per second	80px per second	1	0.4

- Note that in Level 2 bugs move a little bit faster than Level 1.
- Bugs smoothly walk and change direction towards the closest food at the current time.
- When a bug reaches a food, it immediately eats the food. You should redirect the bugs towards their nearest food afterwards.
- Each click (or tap) at the relative coordinates of (X, Y) in the game viewport, kills any bug within its 30px radius.
- If an bug is killed, you give the user the kill score and you should fade out the bug from the screen in 2 seconds.
- If the user pressed the pause button the game should be paused, the pause button icon should change to play. The game resumes when the user presses the button again.
- When the game finishes, you should show the user their score and two options to restart and exit the game.
- Game is over either when the time is up or when there is no food on the table.

Note that, since bugs have different speed they can overlap. Slow bugs should wait for the other one to pass through; bugs with same speed should allow the right bug to go through. Allow the high speed bug to pass the lower speed bug (the slow bug should move a little left or right to allow the high-speed-bug to pass through) like a car if they are going in the same direction.

Requirements

1. You should develop your application using HTML5, CSS3, and JavaScript. Switching between the start page and the game page should happen using JavaScript, so you can use one HTML5 file as well.
2. The game entry page should be called **a2.html.**
3. You **cannot** use any third-party libraries.
4. You have to draw the bugs in canvas. You can import the foods as an image, if you you want.

5. Your code should work on Google Chrome 43+.

Deliverables

Your assignment should be submitted as a zip file on MarkUs:

- `a2.zip`: All HTML5, CSS3, JavaScript, and image files.
- The `README` should include your name, CDF ID and prefered email so the TA can contact you if necessary.

Marking Scheme

Scheme	Weight
Responsiveness of the start page; Game over, and return to start page.	1
Score (display/update in start page, maintain highest score for each level.)	1
Info Bar design (using canvas)	1
Paused works as expected.	1
Bug enters randomly into the game (in 3 different speed for different bugs).	1
Draw foods and bugs in canvas.	1
Collision detection and avoidance (includes smooth movement of bugs).	5
Food elimination.	1
Tapping kills bug.	1
Second level with faster bug movement.	1
Bug redirects to closest food.	3
Overall experience of the game (Mark will be deducted for any problems that the game might have for this item)	5

Good luck!