

Xiaoyu Yan

c4yanxia

1001670293

1. Object

a. Bug:

- (1) x: x coordinate.
- (2) y: y coordinate.
- (3) counter: calculate fade time.
- (4) size: bugs size.
- (5) live: if live=false, bug stops moving and begin to fade out.
- (6) Target: the closest food.
- (7) rad: the angle toward target.
- (8) score: bugs value.
- (9) alpha: bug's alpha value, used to control fade out.
- (10)color: bug's color.
- (11)defColor(): randomly decide new bug's color.
- (12)search(): function to search nearest food.
- (13)update(): calculate bug's new coordinate, speed, moving angle.
- (14)render(): draw bug in canvas.

b. Target:

- (1) x: bug closest food's x coordinate.
- (2) y: bug closest food's y coordinate.
- (3) dx: x coordinate distance between bug and target.
- (4) dy: y coordinate distance between bug and target.
- (5) cos: the cos value of the angle between bug and target.
- (6) sin: the sin value of the angle between bug and target.
- (7) dst: the distance between bug and target.

c. Food:

- (1) x: x coordinate, $x = \text{foodSize} + \text{Math.random()} * (\text{canvas.width} - 2 * \text{foodSize})$;
- (2) y: y coordinate, $y = \text{Math.random()} * (\text{canvas.height} / 2) + \text{canvas.height} / 2 - \text{foodSize}$; # y below 50% of the canvas height.
- (3) size: food size.
- (4) color: food color.
- (5) render(): draw food in canvas.

d. Global:

- (1) canvas: the canvas element.

- (2) btn: Play/Pause button
- (3) TIME: Constant set the game counter.
- (4) time: store game counter.
- (5) clickRadius: click detection rang to kill bugs.
- (6) state: game state: paly, pause, over, win.
- (7) foodSize: constant to define foodsize.
- (8) level: store current game's level.
- (9) score: store player's score.
- (10)fadeTime: constant to define bug fade out time.
- (11)rdm : a random number between 1 to 3, to control randomly generate bugs time.
- (12)foods[]: array to store foods in the game.
- (13)bugs[]: to store active bugs in game.
- (14)frame: frame variable to control frame.
- (15)counter: to track game time.
- (16)loop(): game loop
- (17)changeState(): button function, to switch game state.

2. Data:

- a. local storage variable:

- 1) scoreRecord: store the highest score the player ever get.
- 2) level: which level the player selected.
- 3) levelRecord: the highest level the player reached.
- 4) score: store player's score in a game.

3. Algorithm:

- a. if bug is clicked, set bug's live to false, and start to count time, the bug's alpha = $1 - \text{counter}/\text{fadetime}$. when counter = fade time, delete the bug object.
- b. when the distance between bug and food less than food size, delete the food object. bugs keep searching nearest food before updating position.

4. Challenging:

- a. calculating bugs rotating angle.
- b. delete bug and food in proper time.
- c. switch between different state.