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| Project | Snakes Game |
| Programmer | Lee Sik On |
| Project objects | Snake.html |
|  | This single html file integrates all of html, style, and java scripts into one portable object. |
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Introduction

This is my enhancement on the popular Food eating Snake game. The aim is at automating the playing of the game instead of enhancing the game.

The following walks through its features:

Game opening and ending:

1. Open the game, and a 5-segment Snake moves at the top of the canvas towards the right, a red food is also planted on the canvas.
2. The Snake will reach the right wall, crash, and the game is over.

Game restarting, pausing, resuming:

1. Click [Restart game] to restart. The button turns into [Pause game]. Click it, and the game will pause. The button changes into [Resume game]. Click it to resume game.

Left right up down arrows:

1. Use the left and right arrow keys to steer the Snake. Note that left right is from the perspective of the Snake.
2. Use the up arrow to speed up, and the down arrow to slow down, the Snake. This is achieved by adjusting the interval between each Snake move. The interval is indicated on the screen as “nnn mini-sec between moves”.

Speed up and Slow down buttons:

1. Besides up down arrow, you can also click the [Speed Up] and [Slow Down] buttons to do the same.

Food eating and planting:

1. Try to steer the Snake towards the food. When you hit the food, the food will disappear, a new food is created at another location at random, and the Snake length will grow by one segment, and your score increases by 10.
2. The current Snake length and the game score is shown on the screen too.

Headlight button:

1. It is hard to aim for the food from far. Click the [Headlight] button to turn on head light. You will see a beam of light coming from the head of the Snake pointing to its direction of movement. It helps you aim for the food. Use it. The headlight can be turned off by clicking the button again.

Snake lengths:

1. The game becomes harder and more interesting with a longer Snake. The Snake grows by one segment for each food eaten.
2. You can however make the Snake grow faster by clicking the [Longer] button. The length of the Snake will grow by one segment on each move until its length catches up with the Minimum Snake length.
3. Clicking the [Shorter] button will decrease the Minimum Snake length. This however have no impact on the current Snake.
4. The Minimum Snake length will be used as the starting Snake length when the game is next restarted.

Beacons for steering:

1. Instead of using the left right arrows to steer the Snake, Beacons can be used. Pause the game, click the [Upgrade] button next to “Beacon is off” and see the text changes into “Beacon is on”. Now resume the game.
2. Click on a spot on the wall in front of the Snake head, you will see a Beacon appearing.
3. A Beacon is a diagonal line drawn on a spot. You will also see one set of horizontal and one set of vertical parallel lines emitting from it.
4. The diagonal line should look like “/”. The parallel lines will clearly tell you if the Snake is moving towards it.
5. Intuitively, you can deduce that if the Snake is moving right towards to a Beacon, the “/” will reflect the Snake up. You should be able to figure out the rest.
6. If “/” will bounce the Snake to the opposite direction you desired, click the Beacon one more time, and it will turn into “\’ which will reflect the Snake to the other direction.
7. If you do not want the Beacon, click it one more time, and it will disappear.
8. Beacons are discarded once the Snake reflects off it.
9. Go ahead and plant one or more Beacons to steer the Snake towards to food. You should also plant additional Beacons behind the food to prevent the Snake from hitting the walls after consuming the food, while you wait for the next food to appear and plant new Beacons.

Sweet-spot and Auto Beacons:

1. You can use Beacons to steer the Snake to pick up the food without crashing into the wall nor itself. The game has an option to automate that. This is achieved by a feature called auto Beacon.
2. Click the [Upgrade] button next to “Beacon is on” and see the text changes into “Beacon is auto”.
3. Now use either Beacons or left right arrows to steer the Snake to move up along the left wall. It will come to this spot called Sweet-spot. This is the spot on the left wall but one spot below the top wall.
4. When the Snake reaches the Sweet-spot, provided that it is moving in the up direction, 120 Beacons will be automatically generated on the canvas. These Beacons will guide the Snake to sweep the entire canvas, and then return the Snake moving up to the Sweet-spot, triggering the generation of another set of 120 sweeping Beacons.
5. Now watch the Snake sweep the canvas repeatedly. Use up arrow to speed it up.

Smart Beacons:

1. After watching the Snake sweep the canvas for a while, you will wonder why the Snake does not take the obvious short cuts to speed up.
2. Click the [Upgrade] button next to “Beacon is auto” and see the text changes into “Beacon is smart”. You will see the Snake skipping unnecessary sweeps and go straight for the food, and then straight back to the Sweet-spot for next cycle.

Manual food designation:

1. Food is created on the canvas at random. However, there is a hidden feature to pre-determine the next food location manually. Click [Pause game], and then mouse click somewhere on the canvas, preferably towards the bottom. You will not see anything happen, yet. Now click [Resume game], and the Snake continues to move towards the food. When the Snake reaches and eat the food, the game goes into pause, and the new food appears when you clicked earlier. You can click [Resume game] to resume.
2. If the game does not pause, it is because the manual food location you clicked earlier happens to be on the Snake body now that when it is to be planted, and so that spot is discarded. You can just attempt this manual food planting again.
3. Only one manual food can be planted at one time. This feature also helps programmers test the program logic for situations where the food appears on trickly locations.

Hiding Beacons:

1. Now that the Snake is sweeping the canvas automatically and smartly, you do not need to see Beacons.
2. Click [Down grade] button next to the text “Beacons and guidelines are drawn” and see it turns into “Beacons are drawn”. You will notice that the guidelines disappear, but Beacons are still draw as a short diagonal line.
3. Click the button one more time and see the text turns into “Beacons are not drawn”. Now Beacons are invisible, but the Snake continues to sweep the canvas smartly for food.

Keyboard and manual Beacons:

1. While the Snake is sweeping the canvas is automatically and smartly, the Snake continues to respond to left right arrows and manual Beacon planting.
2. However, the Snake is not smart enough to adjust its Beacons to respond to your interference. Chances are, any of your steering will cause the Snake to crash, and the game will end.
3. Try it. You will have better chance crashing the game with left right arrows than Beacon planting as the Snake does refresh the Beacons twice in each sweep.

High score

1. When the game is over, the score stays on the screen, and if it is higher than the last high-score, it replaces the high score.

Future enhancements

1. Tidy up the code to better name and manage program parameters, as constant, use let for variables, loading and on-the-fly changing of program parameters. Use of local storage to keep the high score.
2. Track the time elapsed between consecutive key-clicking, and if short enough, allow the increase/decrease of numbers to speed up on each click.
3. Creation of wormhole tunnels.
4. The game can be enhanced with further logic capable of analyzing any situation to attempt to bring the snake out of any messy situation whenever possible, and return to the smart sweeping cycle. If it is impossible, further analyze if wormhole tunnels can help, apply if so.
5. An animation of the crashing Snake at game over will make the ending more interesting.
6. How about the ability to back track a few steps upon a game crash, or even during the game. The back tracking can be achieved by either chopping off a few segments from the Snake head, or by the Snake array keeping a few invisible segments at the tail for recovery.