JAVA PROJECT

Topic-

SNAKE_GAME
USING JS & HTML

USN NO.

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Global Academy of Technology

Department Of Electronics and Communication Engineering

Report
On

JAVA MINI PROJECT

IV Semester
Academic Year: 2018-2019

Group No.:6

TITLE: SNAKE GAME USING JAVASCRIPT

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AIM / Objective of the Project:

To design a snake game using JAVASCRIPT and HTML. And create a web page on which game runs.

SYSTEM REQUIREMENTS:

Visual Studio Code Complier,JavaScript,CSS,HTML, Chrome or any web browser to launch the game.

INTRODUCTION:

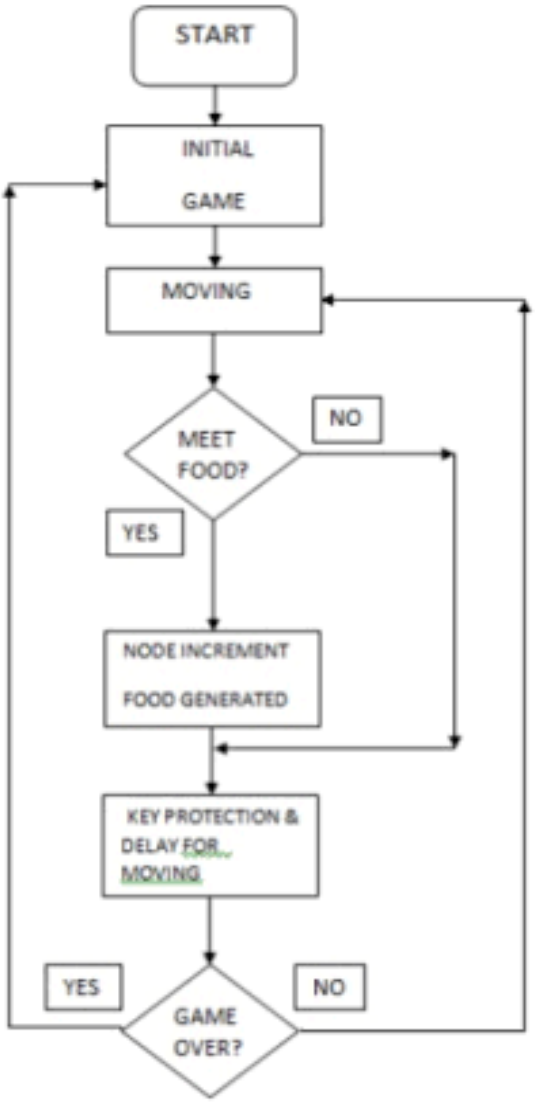
Snake is an older classic video game which was first created in late 70s. Later it was brought to PCs. In this game the player controls a snake. The objective is to eat as many apples as possible. Each time the snake eats an apple, its body grows.

The following is an example game written in JAVASCRIPT based on the game called snake which has been around since the earliest days of home computing and has re-emerged in recent years on mobile phones.
It isn't the world's greatest game, but it does give you an idea of what you can achieve with a relatively simple JAVASCRIPT program, and perhaps the basis by which to extend the principles and create more interesting games of your own.

C0NCEPT OF PROJECT:

1. To reinforce many of the JAVASCRIPT and programming concepts you may have already met.
2. To provide valuable experience of the design and implementation of a large program.
3. To provide a framework for a more challenging, and thus rewarding, laboratory exercise.
4. To move the snake, use **‘up arrow'** for up, **‘down arrow'** for down, **‘left arrow'** for left and **‘right arrow'** for right as well **as ‘w’** for front, **‘s’** for backward, **‘a’** for left, **‘d’** for right. Again, there are constants you can change if you want to alter these settings.
5. Press close the tab to exit the game at any time.
6. The aim of the game is to collect the dots (food) and avoid the obstacles (crosses, borders, and the snake itself). As you collect food, the snake gets longer, so increasing your likelihood of crashing into yourself.
7. When you have collected enough food, you progress onto the next level, where your snake gets longer, and the amount of food to collect to progress through the level gets larger.
8. You get scored according to the length of the snake and the number of 'x' obstacles on the screen.
9. The speed increases every 5 level. You get a bonus when you complete the level of 1000, increasing by 1000 each level (e.g. complete level 5, you get a 5000 bonus). There is no concept of lives. Once you hit an obstacle, that's it, game over.
   Make sure you do not have the caps lock on, otherwise the keys will fail to respond

FLOWCHART:


START
INITIAL
GAME
MOVING
MEET
FOOD?
NO
YES
NODE INCREMENT
FOOD GENERATED
KEY PROTECTION &
DELAY FOR
MOVING
YES
GAME
OVER?
NO

PROGRAM:

The program is divided into 3 sun programs and combined and linked using HTML.

The programs are as follows:

1.FILE NAME: snake.js

```
const base = require('./base')
Object.getOwnPropertyNames(base).map(p => global[p] = base[p])

// Constants
const NORTH = { x: 0, y:-1 }
const SOUTH = { x: 0, y: 1 }
const EAST  = { x: 1, y: 0 }
const WEST  = { x:-1, y: 0 }

// Point operations
const pointEq = p1 => p2 => p1.x == p2.x && p1.y == p2.y

// Booleans
const willEat   = state => pointEq(nextHead(state))(state.apple)
const willCrash = state => state.snake.find(pointEq(nextHead(state)))
const validMove = move => state =>
  state.moves[0].x + move.x != 0 || state.moves[0].y + move.y != 0

// Next values based on state
const nextMoves = state => state.moves.length > 1 ? dropFirst(state.moves) :
state.moves
const nextApple = state => willEat(state) ? rndPos(state) : state.apple
const nextHead  = state => state.snake.length == 0
  ? { x: 2, y: 2 }
  : {
    x: mod(state.cols)(state.snake[0].x + state.moves[0].x),
    y: mod(state.rows)(state.snake[0].y + state.moves[0].y)
  }
const nextSnake = state => willCrash(state)
  ? []
  : (willEat(state)
    ? [nextHead(state)].concat(state.snake)
```

```
    : [nextHead(state)].concat(dropLast(state.snake)))

// Randomness
const rndPos = table => ({
  x: rnd(0)(table.cols - 1),
  y: rnd(0)(table.rows - 1)
})

// Initial state
const initialState = () => ({
  cols:  20,
  rows:  14,
  moves: [EAST],
  snake: [],
  apple: { x: 16, y: 2 },
})

const next = spec({
  rows:  prop('rows'),
  cols:  prop('cols'),
  moves: nextMoves,
  snake: nextSnake,
  apple: nextApple
})

const enqueue = (state, move) => validMove(move)(state)
  ? merge(state)({ moves: state.moves.concat([move]) })
  : state

module.exports = { EAST, NORTH, SOUTH, WEST, initialState, enqueue, next, }
```

2.FILE NAME: web.js

```
const canvas = document.getElementById('canvas')
const ctx = canvas.getContext('2d')

// Mutable state
let state = initialState()

// Position helpers
const x = c => Math.round(c * canvas.width / state.cols)
const y = r => Math.round(r * canvas.height / state.rows)

// Game loop draw
const draw = () => {
  // clear
  ctx.fillStyle = '#232323'
  ctx.fillRect(0, 0, canvas.width, canvas.height)

  // draw snake
  ctx.fillStyle = 'rgb(0,200,50)'
  state.snake.map(p => ctx.fillRect(x(p.x), y(p.y), x(1), y(1)))

  // draw apples
  ctx.fillStyle = 'rgb(255,50,0)'
  ctx.fillRect(x(state.apple.x), y(state.apple.y), x(1), y(1))

  // add crash
  if (state.snake.length == 0) {
    ctx.fillStyle = 'rgb(255,0,0)'
    ctx.fillRect(0, 0, canvas.width, canvas.height)
  }
}

// Game loop update
const step = t1 => t2 => {
  if (t2 - t1 > 100) {
    state = next(state)
    draw()
    window.requestAnimationFrame(step(t2))
  } else {
    window.requestAnimationFrame(step(t1))
  }
}
```

```
// Key events
window.addEventListener('keydown', e => {
  switch (e.key) {
    case 'w': case 'h': case 'ArrowUp':    state = enqueue(state, NORTH); break
    case 'a': case 'j': case 'ArrowLeft':  state = enqueue(state, WEST);  break
    case 's': case 'k': case 'ArrowDown':  state = enqueue(state, SOUTH); break
    case 'd': case 'l': case 'ArrowRight': state = enqueue(state, EAST);  break
  }
})

// Main
draw(); window.requestAnimationFrame(step(0))
```

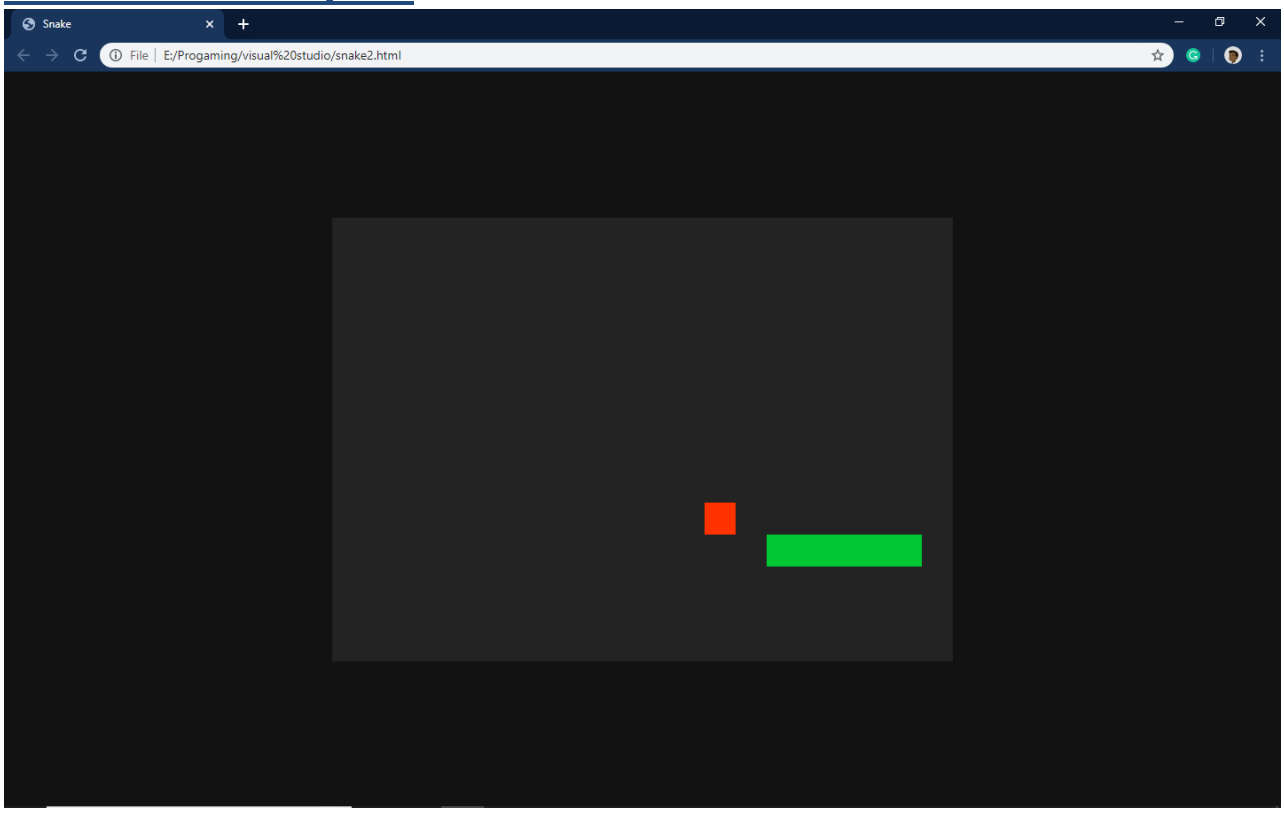
3.FILE NAME: base.js

```
const adjust    = n => f => xs => mapi(x => i => i == n ? f(x) : x)(xs)
const dropFirst = xs => xs.slice(1)
const dropLast  = xs => xs.slice(0, xs.length - 1)
const id        = x => x
const k         = x => y => x
const map       = f => xs => xs.map(f)
const mapi      = f => xs => xs.map((x, i) => f(x)(i))
const merge     = o1 => o2 => Object.assign({}, o1, o2)
const mod       = x => y => ((y % x) + x) % x // http://bit.ly/2oF4mQ7
const objOf     = k => v => ({ [k]: v })
const pipe      = (...fns) => x => [...fns].reduce((acc, f) => f(acc), x)
const prop      = k => o => o[k]
const range     = n => m => Array.apply(null, Array(m - n)).map((_, i) => n + i)
const rep       = c => n => map(k(c))(range(0)(n))
const rnd       = min => max => Math.floor(Math.random() * max) + min
const spec      = o => x => Object.keys(o)
  .map(k => objOf(k)(o[k](x)))
  .reduce((acc, o) => Object.assign(acc, o))

module.exports = { adjust, dropFirst, dropLast, id, k, map, merge, mod, objOf,
pipe, prop, range, rep, rnd, spec }
```

FILE NAME : snake2.html

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>Snake</title>
    <link rel="stylesheet" href="web.css">
    <script>require=()=>({}); module={}; module.exports=()=>({})</script>
  </head>
  <body>

    <canvas id="canvas" width="700" height="500"></canvas>
    <script src="base.js"></script>
    <script src="snake.js"></script>
    <script src="web.js"></script>
  </body>
</html>
```

Simulated Output:



Acknowledgement:

We Gowrav S, Gokul Sai R ,Harshitha.H.R and Amogh.C are thankful to you Dileep Kumar Sir,for giving us an opportunity to showcase our project on JAVA and its application and understand the concept to its full extent.

Thank you Sir.