Snake Game

Objective:

Gaming industry is a multibillion-dollar industry and has maligned the youth to itself. Being fresh CS students and having interest in gaming, we built a snake game using the practical knowledge of C++ GAINED IN Programming Fundamentals Lab classes.

Following is the detail of the components of our code:

Libraries:

We used iostream for regular input-output functions, windows,h for mode(), setup(), draw(), input(), logic() functions and conio.h is necessarily for _kbhit((), _getch() functions.

Variable:

- **gameover** to keep a check on game.
- **width** and **height** are constants which are used to set the size of the walls.
- **choice** for choosing among menu options.
- **mood** for choosing the mode.
- **x** and **y** for snake's head position.
- **fruitx** and **fruity** for positioning of fruit.
- **score** for showing the score.
- **tailx** and **taily** for positioning of tail.
- **ntail** for the length of tail.
- **eDirection** for control.

Mood Function:

This function is for the wall mode off the game in which when the head of the snake collides with the wall, it is game over.

Line of code: 15

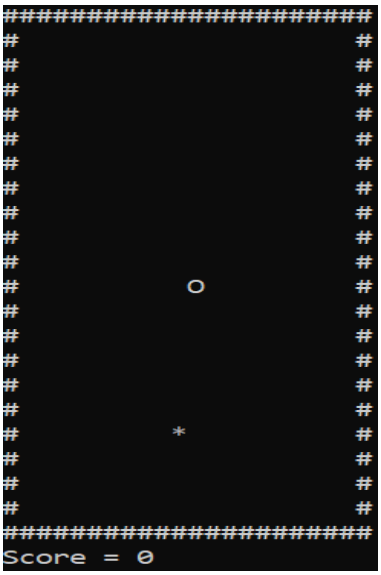
```
15  int mode(int mood)
16  {
17
18
19      switch (mood) {
20      case 1:
21
22          //WHEN HEAD COLLIDES WITH THE WALL PASS TO THE OTHER SIDE AND COME OUT FROM THE PARALLEL WALL
23
24          if (x >= width)x = 0; else if (x < 0)x = width - 1;
25          if (y >= height)y = 0; else if (y < 0)y = height - 1;
26
27          break;
28      case 2:
29
30          //WHEN THE HEAD COLLIDES WITH THE WALL ITS GAME OVER
31
32          if (x > width || x<0 || y>height || y < 0)
33              gameover = true;
34      }
35      return mood;
36  }
```

Setup Function:

Here, we initialized the gameover to false, dir to stop. Though we can generate the snake anywhere, but we have generated it in the middle. And after generating the snake, we then generated the food at any random point but within the height and width of the wall.

Line of code: 38

```
38  void setup()
39  {
40      gameover = false;
41      //DEFINING VALUE OF X AND Y
42      x = width / 2;
43      y = height / 2;
44      srand(time(0));
45      //GENERATION RANDOM FRUIT POSITION
46      fruitx = rand() % width;
47      fruity = rand() % height;
48      score = 0;
49
50  }
```



Draw Function:

Here we just build up the wall boundary. Display the snake from head to tail and the fruit. The walls are shown by '#' character, the snake's body is shown by 'o' characters and the fruit by '*'.

Line of the code: 52

```
52  void draw()
53  {
54      system("cls");//FOR CLEARING THE SCREEN
55      //using loops for displaying everthing on screen from walls to the head and tail if the snake
56      for (int i = 0; i < width + 2; i++)
57          cout << "#";
58      cout << endl;
59
60      for (int i = 0; i < height; i++)
61      {
62          for (int j = 0; j < width; j++)
63          {
64              if (j == 0)
65                  cout << "#";
66              if (i == y && j == x)
67                  cout << "O";
68              else if (i == fruity && j == fruitx)
69                  cout << "*";
70              else
71              {
72                  bool print = false;
73                  for (int k = 0; k < ntail; k++)
74                  {
75                      if (tailx[k] == j && taily[k] == i)
76                      {
77                          cout << "o";
78                          print = true;
79                      }
80
81                  }
82                  if (!print)
83                      cout << " ";
84              }
85              if (j == width - 1)
86                  cout << "#";
87          }
88          cout << endl;
89      }
90
91      for (int i = 0; i < width + 2; i++)
92          cout << "#";
93      cout << endl;
94      cout << "Score = " << score << endl;
95  }
```

Input Function:

In the input function, we used switch statements and when the _kbhit() function occurs we just maintained the switch cases (w, a, s, d) and change the direction respectively. The x key is for closing the game.

Line of the code: 97

```
 97    void input()
 98    {
 99        //for controls
100        if (_kbhit())
101        {
102            switch (_getch())
103            {
104            case 'a':
105                dir = LEFT;
106                break;
107            case 'w':
108                dir = UP;
109                break;
110            case 'd':
111                dir = RIGHT;
112                break;
113            case 's':
114                dir = DOWN;
115                break;
116            case 'x':
117                gameover = true;
118
119            }
120        }
121
122    }
```

```
|          KEYBOARD          |
|----------------------------|
|  |  |  |   |  |  |  |  |  |
|----------------------------|
|  |  | w |   |  |  |  |  |  |
|----------------------------|
|  | a | s | d |  |  |  |  |  |
|----------------------------|
|  |  | x |   |  |  |  |  |  |
|----------------------------|
|        |        |          |
|----------------------------|
|____________________________|
      ~Controls~                          |w = "up"    |
       |s = "down" |
       |a = "left" |
       |d = "right"|
       |x = "EXIT" |
```

Logic Function:

In the logic function, we first initialized the tail. And after that, we switched the position of the snake's body with its previous position. And after that, the program simply needs to implement the body according to the keyboard hit. Next, as this follows the concept of an open maze, so when it disappears at one side, it appears from the other side, so we kept in mind that once it touches the right wall it appears from the other left wall and vice-versa and same follows for the up and down walls. Next, the head touches the body, the game crashes. For the scoring system we added 10 points hen the head touches the food (their position becomes the same). And every touch increases the score.

Line of code: 124

```
void logic()
{
    int prevx = tailx[0];
    int prevy = taily[0];
    int prev2x, prev2y;
    tailx[0] = x;
    taily[0] = y;
    //LOOP FOR TAIL TO FOLLOW THE HEAD
    for (int i = 1; i < ntail; i++)
    {
        prev2x = tailx[i];
        prev2y = taily[i];
        tailx[i] = prevx;
        taily[i] = prevy;
        prevx = prev2x;
        prevy = prev2y;
    }
    //FOR CHANGING THE DIREXTION OF THE SNAKE HEAD
    switch (dir)
    {
    case RIGHT:
        x++;
        break;
    case LEFT:
        x--;
        break;
    case UP:
        y--;
        break;
    case DOWN:
        y++;
        break;
    default:
        break;
    }
    //FOR MODE
    mode(mood);
    for (int i = 0; i < ntail; i++)
        if (tailx[i] == x && taily[i] == y)
            gameover = true;
    //FOR INCRMENTING THE SCORE AND GENERATING NEW FRUIT POSITION
    if (x == fruitx && y == fruity)
    {
        score += 10;
        srand(time(0));
        fruitx = rand() % width;
        fruity = rand() % height;
        ntail++;
    }
}
```

```
#                          #
#                          #
#                          #
#                          #
#                o         #
#                o         #
#                o         #
#                o         #
#                o         #
#                oo0       #
#                          #
#                          #
#                          #
#                          #
#                          #
#                          #
#                          #
#                  *       #
#                          #
############################
Score = 70
Game End
Your Total Score is = 70
```

Main Function:

The main boy calls all the function and has the instructions to show the main menu and give a response according to the user input.

Line of code: 176

Input:

The user uses the prescribed keyboard keys to play the game:

- **Keys:**

[W] = Up

[A] = Left

[S] = Down

[D] = Right

Output:

Using the keys, the user can toggle through the menu and navigate the snake to get food.

Program:

```
#include <iostream>
#include <conio.h>//FOR INPUT OUTPUT PURPOSE
#include <windows.h>//FOR FUNCTIONS IN WINDOWS API
using namespace std;
//GLOBALLY DECLARE VARIBALE
char again;
bool gameover;
const int width = 20, height = 20;
int goback, choice, mood, x, y, fruitx, fruity, score;
int tailx[100], taily[100];
int ntail;
enum  eDirection { STOP = 0, RIGHT, LEFT, DOWN, UP };
eDirection  dir;
//FUNCTION TO CHOOSE A MODE
int mode(int mood)
{


      switch (mood) {
      case 1:

            //WHEN HEAD COLLIDES WITH THE WALL PASS TO THE OTHER SIDE AND COME OUT FROM
THE PARALLEL WALL
```

```
            if (x >= width)x = 0; else if (x < 0)x = width - 1;
            if (y >= height)y = 0; else if (y < 0)y = height - 1;

            break;
      case 2:

            //WHEN THE HEAD COLLIDES WITH THE WALL ITS GAME OVER

            if (x > width || x<0 || y>height || y < 0)
                  gameover = true;
      }
      return mood;
}
//FUNCTION TO GENERATE THE FRUIT
void setup()
{
      gameover = false;
      //DEFINING VALUE OF X AND Y
      x = width / 2;
      y = height / 2;
      srand(time(0));
      //GENERATION RANDOM FRUIT POSITION
      fruitx = rand() % width;
      fruity = rand() % height;
      score = 0;

}
//FUCTION TO DRAW THE WALLS IN THE GAME AND HEAD OF THE SNAKE AND THE OTHER BODY OF SNAKE
void draw()
{
      system("cls");//FOR CLEARING THE SCREEN
      //using loops for displaying everything on screen from walls to the head and tail
if the snake
      for (int i = 0; i < width + 2; i++)
            cout << "#";
      cout << endl;

      for (int i = 0; i < height; i++)
      {
            for (int j = 0; j < width; j++)
            {
                  if (j == 0)
                        cout << "#";
                  if (i == y && j == x)
                        cout << "O";
                  else if (i == fruity && j == fruitx)
                        cout << "*";
                  else
                  {
                        bool print = false;
                        for (int k = 0; k < ntail; k++)
                        {
                              if (tailx[k] == j && taily[k] == i)
                              {
```

```
                                    cout << "o";
                                    print = true;
                              }

                        }
                        if (!print)
                              cout << " ";
                  }
                  if (j == width - 1)
                        cout << "#";
            }
            cout << endl;
      }

      for (int i = 0; i < width + 2; i++)
            cout << "#";
      cout << endl;
      cout << "Score = " << score << endl;
}
//FUNCTION TO TAKE INPUT CONTROL FROM THE USER
void input()
{
      //for controls
      if (_kbhit())
      {
            switch (_getch())
            {
            case 'a':
                  dir = LEFT;
                  break;
            case 'w':
                  dir = UP;
                  break;
            case 'd':
                  dir = RIGHT;
                  break;
            case 's':
                  dir = DOWN;
                  break;
            case 'x':
                  gameover = true;

            }
      }

}
//FUNCTION TO APPLY LOGIC
void logic()
{

      int prevx = tailx[0];
      int prevy = taily[0];
      int prev2x, prev2y;
      tailx[0] = x;
      taily[0] = y;
```

```
	//LOOP FOR TAIL TO FOLLOW THE HEAD
	for (int i = 1; i < ntail; i++)
	{
		prev2x = tailx[i];
		prev2y = taily[i];
		tailx[i] = prevx;
		taily[i] = prevy;
		prevx = prev2x;
		prevy = prev2y;
	}
	//FOR CHANGING THE DIREXTION OF THE SNAKE HEAD
	switch (dir)
	{
	case RIGHT:
		x++;
		break;
	case LEFT:
		x--;
		break;
	case UP:
		y--;
		break;
	case DOWN:
		y++;
		break;
	default:
		break;
	}
	//FOR MODE
	mode(mood);
	for (int i = 0; i < ntail; i++)
		if (tailx[i] == x && taily[i] == y)
			gameover = true;
	//FOR INCRMENTING THE SCORE AND GENERATING NEW FRUIT POSITION
	if (x == fruitx && y == fruity)
	{
		score += 10;
		srand(time(0));
		fruitx = rand() % width;
		fruity = rand() % height;
		ntail++;
	}
}
// MAIN FUNCTION
int main()
{
back:
	//MAIN MENU
	cout << "\t\t\t\t~WELCOME~ :)\n";
	cout << "\t\t  _____________________________________ \n"
		"\t\t |              MAIN MENU              | \n"
		"\t\t |             -----------             | \n"
		"\t\t |             ~ SNAKE GAME ~          | \n"
		"\t\t |                                     | \n"
		"\t\t |            1.  PLAY (default mode) | \n"
```

```
		"\t\t |                                      | \n"
		"\t\t |            2.  MODE                 | \n"
		"\t\t |                                      | \n"
		"\t\t |            3.  EXIT                 | \n"
		"\t\t |                                      | \n"
		"\t\t |            4.  CONTROLS             | \n"
		"\t\t |______________________________________| \n\n\n"
		"\n";

	cout << "\t\t\tENTER ->>";    cin >> choice;
	// FOR SELECTING A MODE
	if (choice == 2)
	{


		cout << "\t\tCHOOSE A MODE FOR THE GAME\n"
			<< "\t\tAVAILABLE MODE ARE TWO\n"
			<< "\t\tPRESS 1 FOR NO WALLS\n"
			<< "\t\tPRESS 2 FOR  WALLS\n";
		cin >> mood;
		mode(mood);
		setup();
		while (!gameover)
		{
			draw();
			input();
			logic();
			Sleep(10);
		}
		cout << "\t\tGame End" << endl;
		cout << "\t\tYour Total Score is = " << score << endl;
	}

	//FOR DEFAULT MODE AND START GAME  GAME
	else if (choice == 1)
	{
		mood = 1;
		mode(mood);
		setup();
		while (!gameover)
		{
			draw();
			input();
			logic();
			Sleep(10);
		}
		cout << "Game End" << endl;
		cout << "Your Total Score is = " << score << endl;


	}
	else if (choice == 3)
	{
		score = 0;
		cout << "\tGame End" << endl;
```

```
            cout << "\tYour Total Score is = " << score << endl;
            exit;

      }
      else if (choice == 4)
      {
            //SHOWING CONTROLS ON KEYBOARD
            cout << endl;
            cout << "\t\t\t |           KEYBOARD          |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |  |   |   |   |   |   |   | |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |  |   | w |   |   |   |   | |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |  | a | s | d |   |   |   | |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |  |   | x |   |   |   |   | |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |          |        |         |\n"
                  "\t\t\t |-----------------------------|\n"
                  "\t\t\t |_____________________________|\n";
            cout << "\t\t\t\t~Controls~";
            cout << "\t\t\t\t |w = \"up\"   |\n"
                  "\t\t\t\t |s = \"down\" |\n"
                  "\t\t\t\t |a = \"left\" |\n"
                  "\t\t\t\t |d = \"right\"|\n"
                  "\t\t\t\t |x = \"EXIT\" |\n";
            cout << endl;
            cout << "\t\t\tPRESS 1 to GoBack ->>"; cin >> goback;
            cout << endl;
            if (goback == 1)
            {
                  goto back;
            }
      }


}
```