

# SNAKE GAME

## ABSTRACT:

- The abstract of a project snake game typically summarizes the development of a Snake Game application, which is a computer action game where the goal is to control a snake to move and collect food in a map.
- The project involves designing and implementing the game's functionality, including the snake's movement, collision detection, scoring, and user interface. The project aims to provide an engaging and interactive gaming experience for users.

## Introduction:

- The Snake Game is a classic arcade game where the player controls a snake. The objective is to eat apples that appear randomly on the screen. With each apple eaten, the snake grows longer. The game ends if the snake collides with the walls or itself.
- This Python program implements a basic Snake game using the pygame library. The Snake moves based on keyboard input, and the game keeps track of the score and generates random apples for the Snake to "eat."

## Tools Used:

- Python 3 is used to demonstrate basic game development concepts like handling keyboard input, collision detection, and game loops.
- Pygame is a cross-platform set of Python modules designed for writing video games. It provides functionalities for handling graphics, sounds, and user inputs.
- **It is Simple to use.** And it offers powerful control over game elements like sprites, events, and more.

## Installation of Pygame:

- We can install the pygame library in command window or visual studio code or online python compiler and it runs the code to implement the game
- We can install the pygame using this “pip install pygame”.

## Project Structure:

- The main class that handles the game's initialization, rendering, and game logic.
- **Main Components:**
  - Snake: Represented as a list of tuples where each tuple contains the x and y coordinates of the snake's body segments.
  - Apple: Randomly placed on the screen for the snake to eat.
  - Score: Increases by 1 each time the snake eats an apple.

## METHODOLOGY:

### Snake Game Class Initialization:

- Display setup: Initializes the game window size (800x600) and sets up Pygame.
- Snake Initialization: The snake starts at three positions with its direction set to RIGHT.
- Apple Initialization: A random position is generated for the apple on the screen.
- Score Initialization: Score starts at 0.
- Pygame Setup: Initializes fonts and sets the display caption.

### Key Constants:

- **Direction Constants:**
  - UP = 1
  - RIGHT = 2
  - DOWN = 3
  - LEFT = 4
- These constants are used to control the direction in which the snake moves based on player input.

### Snake and Apple Drawing:

- **Draw Snake Method:**
  - Loops through the snake's list of body segments and draws each one as a 20x20 green rectangle.
- **Draw Apple Method:**
  - The apple is drawn as a red rectangle of the same size at its randomly generated coordinates.

### Apple Eating Logic:

- **Snake Growth:**
  - If the snake's head reaches the position of the apple, the snake grows by one segment, and a new apple is placed at a random location.
- **Score Increment:**
  - The score increases by 1 when the snake eats an apple.

### Movement and Collision Detection:

- **Handling Direction Changes:**
  - The direction of the snake changes based on arrow key input, but the snake is not allowed to reverse direction immediately.

- **Collision Logic:**

- The game ends if the snake collides with the wall or if the head touches any part of the body.

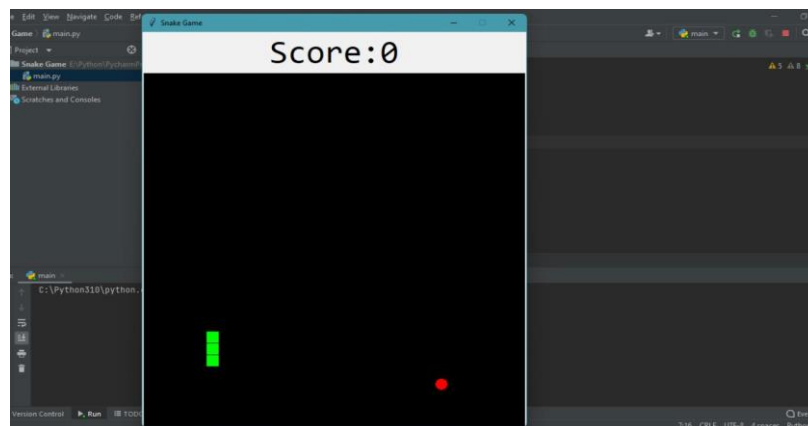
## **Game Loop (run Method):**

- **Main Game Loop:**

- This loop continuously updates the game state by redrawing the screen, snake, apple, and score. It also checks for user input and updates the snake's position.
- The loop runs at a controlled speed of 10 frames per second (FPS) using `clock.tick(10)`.

## **Result and Findings of Snake Game:**

- Successful implementation of the snake's movement, including forward, backward, left, and right movements.



- Effective collision detection, ensuring the snake does not overlap with itself or the game boundaries. Accurate scoring system, which increments the score when the snake consumes food.

## **CONCLUSION:**

- The Snake Game project provides an excellent introduction to game development using Python and Pygame. It showcases fundamental concepts such as real-time user input handling, object movement, collision detection, and score management.
- By implementing the Snake Game, we explore how a simple yet engaging game can be developed from scratch, combining basic programming techniques like loops, conditionals, and graphical rendering.

