SNAKE GAME

MINI PROJECT using Python

Introduction
A snake game is an arcade maze game which has been developed by Gremlin Industries and published by Sega in October 1976. It is considered to be a skillful game and has been popularized among people for generations. The snake in the Snake game is controlled using the four direction buttons relative to the direction it is headed in. The player's objective in the game is to achieve maximum points as possible by collecting food or fruits. The player loses once the snake hits the wall or hits itself.

For the python beginners, those who are interested in making something easier in your domain can definitely try this out and the module Turtle was made exactly for this purpose for the beginners to try out and can also submit as a part of the project. This program will be done in Python 3.

So, we will be creating a Python-based-game using the following modules:

Turtle: It is a pre-installed python library that enables users to create shapes and pictures by providing them a virtual canvas.
Time: This function is used to count the number of seconds elapsed since the epoch.
Random: This function is used to generate random numbers in Python by

using a random module.

Support
The following code can be easily done using the PyCharm application which is specially made for Python programs.
Also, VSCode can be used for this program. Install Python3 from extensions of VSCode. Then, save the program in the form of your_filename.py

Below is the step-by-step Approach to create a Snake Game using Turtle module:
Step 1: We will be importing modules into the program and giving default values for the game.

```
import turtle
import time
import random

delay = 0.1
score = 0
high_score = 0
```

Step 2: Now, we will be creating the display of the game, i.e, the window screen for the game where we will create the head of the snake and food for the snake in the game and displaying the scores at the header of the game.

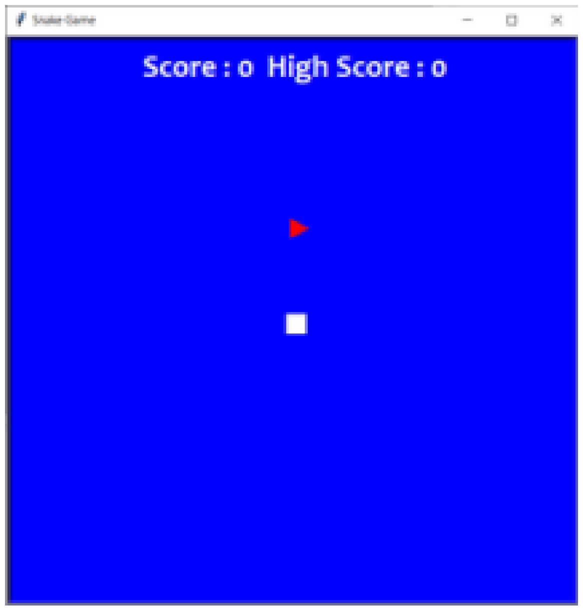
```
# Creating a window screen
wn = turtle.Screen()
```

```
wn.title("Snake Game")
wn.bgcolor("blue")

# the width and height can be put as user's choice
wn.setup(width=600, height=600)
wn.tracer(0)
# head of the snake
head = turtle.Turtle()
head.shape("square")
head.color("white")
head.penup()
head.goto(0, 0)
head.direction = "Stop"


# food in the game
food = turtle.Turtle()
colors = random.choice(['red', 'green', 'black'])
shapes = random.choice(['square', 'triangle', 'circle'])
food.speed(0)
food.shape(shapes)
food.color(colors)
food.penup()
food.goto(0, 100)


pen = turtle.Turtle()
pen.speed(0)
pen.shape("square")
pen.color("white")
pen.penup()
pen.hideturtle()
pen.goto(0, 250)
pen.write("Score : 0 High Score : 0", align="center",
                font=("candara", 24, "bold"))
```



Score : 0 High Score : 0

Step 3: Now, we will be validating the key for the snake’s movements. By clicking the keywords normally used for gaming ‘w’, ‘a’, ‘s’ and ‘d’, we can operate the snake’s movements around the screen.

```
# assigning key directions
def group():
        if head.direction != "down":
                head.direction = "up"



def godown():
        if head.direction != "up":
```

```
        head.direction = "down"


def goleft():
    if head.direction != "right":
        head.direction = "left"


def goright():
    if head.direction != "left":
        head.direction = "right"


def move():
    if head.direction == "up":
        y = head.ycor()
        head.sety(y+20)
    if head.direction == "down":
        y = head.ycor()
        head.sety(y-20)
    if head.direction == "left":
        x = head.xcor()
        head.setx(x-20)
    if head.direction == "right":
        x = head.xcor()
        head.setx(x+20)


wn.listen()
wn.onkeypress(group, "w")
wn.onkeypress(godown, "s")
wn.onkeypress(goleft, "a")
wn.onkeypress(goright, "d")
```

Step 4: Now, lastly, we will create the gameplay where the following will be happening:

The snake will grow its body when the snake eats the fruits.
Giving color to the snake's tail.
After the fruit is eaten, the score will be counted.
Checking for the snake's head collisions with the body or the wall of the window screen.
Restarting the game automatically from the start after the collision.
The new shape and color of the fruit will be introduced every time the window is restarted.
The score will be returned to zero and a high score will be retained until the window is not closed.

```
segments = []

# Main Gameplay
while True:
        wn.update()
        if head.xcor() > 290 or head.xcor() < -290 or head.ycor() > 290 or
head.ycor() < -290:
                time.sleep(1)
                head.goto(0, 0)
                head.direction = "Stop"
                colors = random.choice(['red', 'blue', 'green'])
                shapes = random.choice(['square', 'circle'])
                for segment in segments:
                    segment.goto(1000, 1000)
                segments.clear()
                score = 0
                delay = 0.1
                pen.clear()
                pen.write("Score : {} High Score : {} ".format(
                    score, high_score), align="center", font=("candara", 24,
"bold"))
            if head.distance(food) < 20:
                x = random.randint(-270, 270)
                y = random.randint(-270, 270)
                food.goto(x, y)

                # Adding segment
                new_segment = turtle.Turtle()
                new_segment.speed(0)
                new_segment.shape("square")
                new_segment.color("orange") # tail colour
                new_segment.penup()
                segments.append(new_segment)
                delay -= 0.001
                score += 10
                if score > high_score:
                    high_score = score
                pen.clear()
                pen.write("Score : {} High Score : {} ".format(
                    score, high_score), align="center", font=("candara", 24,
"bold"))
        # Checking for head collisions with body segments
        for index in range(len(segments)-1, 0, -1):
                x = segments[index-1].xcor()
                y = segments[index-1].ycor()
                segments[index].goto(x, y)
        if len(segments) > 0:
                x = head.xcor()
                y = head.ycor()
                segments[0].goto(x, y)
        move()
        for segment in segments:
                if segment.distance(head) < 20:
                        time.sleep(1)
                        head.goto(0, 0)
                        head.direction = "stop"
                        colors = random.choice(['red', 'blue', 'green'])
                        shapes = random.choice(['square', 'circle'])
                        for segment in segments:
                                segment.goto(1000, 1000)
                        segment.clear()

                        score = 0
                        delay = 0.1
                        pen.clear()
                        pen.write("Score : {} High Score : {} ".format(
                                score, high_score), align="center", font=("candara",
24, "bold"))
        time.sleep(delay)
```

```
wn.mainloop()
```

Below the complete program based on the above approach:

```
# import required modules
import turtle
import time
import random

delay = 0.1
score = 0
high_score = 0



# Creating a window screen
wn = turtle.Screen()
wn.title("Snake Game")
wn.bgcolor("blue")
# the width and height can be put as user's choice
wn.setup(width=600, height=600)
wn.tracer(0)

# head of the snake
head = turtle.Turtle()
head.shape("square")
head.color("white")
head.penup()
head.goto(0, 0)
head.direction = "Stop"

# food in the game
food = turtle.Turtle()
colors = random.choice(['red', 'green', 'black'])
shapes = random.choice(['square', 'triangle', 'circle'])
food.speed(0)
food.shape(shapes)
food.color(colors)
food.penup()
food.goto(0, 100)

pen = turtle.Turtle()
pen.speed(0)
pen.shape("square")
pen.color("white")
pen.penup()
pen.hideturtle()
pen.goto(0, 250)
pen.write("Score : 0 High Score : 0", align="center",
          font=("candara", 24, "bold"))



# assigning key directions
def group():
    if head.direction != "down":
        head.direction = "up"
```

```
def godown():
        if head.direction != "up":
                head.direction = "down"


def goleft():
        if head.direction != "right":
                head.direction = "left"
def goright():
        if head.direction != "left":
                head.direction = "right"


def move():
        if head.direction == "up":
                y = head.ycor()
                head.sety(y+20)
        if head.direction == "down":
                 y = head.ycor()
                head.sety(y-20)
        if head.direction == "left":
                x = head.xcor()
                head.setx(x-20)
        if head.direction == "right":
                 x = head.xcor()
                head.setx(x+20)
```

```
wn.listen()
wn.onkeypress(group, "w")
wn.onkeypress(godown, "s")
wn.onkeypress(goleft, "a")
wn.onkeypress(goright, "d")

segments = []

# Main Gameplay
while True:
        wn.update()
        if head.xcor() > 290 or head.xcor() < -290 or head.ycor() > 290 or
head.ycor() < -290:
                time.sleep(1)
                head.goto(0, 0)
                head.direction = "Stop"
                colors = random.choice(['red', 'blue', 'green'])
                shapes = random.choice(['square', 'circle'])
                for segment in segments:
                        segment.goto(1000, 1000)
                segments.clear()
                score = 0
                delay = 0.1
                pen.clear()
                pen.write("Score : {} High Score : {} ".format(
                        score, high_score), align="center", font=("candara", 24,
"bold"))
        if head.distance(food) < 20:
                x = random.randint(-270, 270)
                y = random.randint(-270, 270)
                food.goto(x, y)

                # Adding segment
                new_segment = turtle.Turtle()
                new_segment.speed(0)
                new_segment.shape("square")
                new_segment.color("orange") # tail colour
                new_segment.penup()
                segments.append(new_segment)
                delay -= 0.001
                score += 10
                if score > high_score:
                        high_score = score
                pen.clear()
                pen.write("Score : {} High Score : {} ".format(
                        score, high_score), align="center", font=("candara", 24,
"bold"))
        # Checking for head collisions with body segments
        for index in range(len(segments)-1, 0, -1):
                x = segments[index-1].xcor()
                y = segments[index-1].ycor()
                segments[index].goto(x, y)
        if len(segments) > 0:
                x = head.xcor()
                y = head.ycor()
```

```
            segments[0].goto(x, y)
        move()
        for segment in segments:
            if segment.distance(head) < 20:
                time.sleep(1)
                head.goto(0, 0)
                head.direction = "stop"
                colors = random.choice(['red', 'blue', 'green'])
                shapes = random.choice(['square', 'circle'])
                for segment in segments:
                    segment.goto(1000, 1000)
                segment.clear()

                score = 0
                delay = 0.1
                pen.clear()
                pen.write("Score : {} High Score : {} ".format(
                    score, high_score), align="center", font=("candara",
24, "bold"))
        time.sleep(delay)

wn.mainloop()
```