Building a Secure Path

Python Game Design

Time: 60 mins

Introduction

In this class, the student/s will learn to create a platform using a list and add multiple tiles to the platform using a for loop. Student/s will also learn to create multi-level platforms using 2D lists and create a safe path for Dr. Cleo.

Python Commands Introduced

● len(object)	Returns the number of items in an object.
● range(number)	Returns a sequence of numbers, starting from 0 by default, increments by 1(by default), and stops before the specified number.
● append(item)	Allows adding the item at the end of a list variable.
● listName[row][column]	Returns the value stored at the specified row and column of the list variable.

Vocabulary

- **Lists** are used to store multiple items in a single variable.
- **Loop** is a block of code that runs multiple times until the specified condition is true.
- **Nested Loop**: A loop written inside another loop.

Learning Objectives

Student/s should be able to:

- ***Recall*** how to store values in a list variable and how to use loops to display multiple tiles on the platform.
- ***Describe*** how to find the number of items in a list variable.
- ***Explain*** how to store and retrieve values stored in 2D lists.
- ***Demonstrate*** how to add a new item at the end of a list.
- ***Create*** and display platforms to create a safe path for Dr. Cleo.

Activities

1. **Class Narrative:** *(2 mins)*
    - Brief the student/s that Dr. Cleo has jumped to safety onto a platform under construction.

2. **Concept Introduction Activity:** *(5 mins)*
    - Let the student/s play the explore activity and observe that Dr. Cleo cannot move ahead as the platform has ended.
    - Brief the student/s that they will complete the path under construction by adding tiles to the platform.
    - Using the slides, explain:
        - how to create a platform
        - how to create a multi-level platform
        - complete the game platform

3. **Activity 1: Create a Platform:** *(12 mins)*

    Teacher Activity: *(6 mins)*
    - Recall the use of loops.
    - Explain to the student/s how to define a function named createWorld() to create a platform by creating a list to store platform tiles, and setting the tile size. Use a for loop to create a tile named platformTile using Sprite() class, add each tile to the platforms list using append() method.
    - Explain to the student/s how to create gaps in the platform by introducing the list variable named grid and updating its value to 1 or 0. Also, explain how to check the value of the object type (obtained from the list variable named grid) and accordingly display the tile.
      Note: Highlight to the student/s that the platforms are placed only when objectType is 1 else no platform is placed.

    Student Activity: *(6 mins)*
    - Guide the students to iterate through the list named platforms to display the platforms and make Cleo stand on the platforms using a for loop.
    - Guide the student/s to create and display the ground tiles and experiment with the values in grid list.
      Note: The object type of ground tile is 2.

4. **Activity 2: Create a Multilevel Platform:** *(12 mins)*

    Teacher Activity: *(5 mins)*
    - Recall to the student/s that the platform was created by displaying the platform tiles at different x-positions and y-position was set to 460.
    - Explain to the student/s that multiple-level platforms can be created by placing the tiles at different x and y positions.
    - Explain to the student/s how to create nested loops in the function createWorld() and how the values are updated in 2D lists.
    - Modify the values in the grid to showcase the creation of tiles at different x and y positions. Ensure that 0's, 1's and 2's are misplaced in the grid such that student/s can notice the need for re-arrangement of tiles.
      Probing question: Which method is used to add an item to the list?
      Expected answer: append() is used to add an item to the end of the list.
    - Highlight the need to rearrange the platform and ground tiles.

    Student Activity: *(7 mins)*
    - Ask the students to click on play to check the output and then set the correct range within the for loop.

- Ask the students to display the platforms for the complete grid.
- Guide the student/s to update the 2D list variable named grid to accurately place the ground tiles in lower rows and the platform tiles at the top row of the platform.

5. **Activity 3: Complete the Platform for the Game:** *(8 mins)*

   Student Activity: *(8 mins)*
   - Guide the student/s to import the list grid from the file grid.py and use it in main.py to complete the platform for the game.
   - Ask students to modify the grid to create a challenging platform to dodge the zombies.

6. **Introduce the Post class project:** *(2 min)*
   - In the bounce-the-ball game, add tiles to the game using a grid.

7. **Test and Summarize the class learnings:** *(5 mins)*
   - Check for understanding through quizzes and summarize learning after respective missions.
   - Summarize the overall class learning towards the end of the class.

8. **Additional activities:**
   - Encourage the student/s to add the electric points for safety from the zombies and change the grid values to place them.
   - Encourage the student/s to reset Dr. Cleo's position when she collides with the fire ignition.

9. **State the Next Class Objective:** *(1 min)*
   - We will learn to add zombies to the game.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-14

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	Building a Secure Path	https://s3-whjr-curriculum-uploads.whjr.online/8005f591-1eaa-4525-8282-df95c9787e71.html
Explore Activity	Building a Secure Path - Explore Activity	https://tynker.com/code/view/633197b91ebe97724b6ca202/
Teacher Activity 1.1	Create a Platform	https://tynker.com/code/project/634033175 41d6063996c8ac2
Teacher Activity 1.1 Solution	Create a Platform - Solution	https://tynker.com/code/project/634031ca83bff75c763c5452
Student Activity 1.1	Display the Platform	https://bfs-dev.tynker.com/code/pr

		oject/634fca693672d6185d022f52
Teacher Reference: Student Activity 1.1 Solution	Display the Platform - Solution	https://bfs-dev.tynker.com/code/project/634fcaa1536c54133e0ed6c2
Teacher Activity 1.2	Create gaps between the Platform	https://tynker.com/code/project/633319a54b8e7e369422a8bc2
Teacher Activity 1.2 Solution	Create gaps between the Platform - Solution	https://tynker.com/code/project/633319a053b9cab154940bdc2
Student Activity 1.2	Add Ground Tiles to the Platform	https://tynker.com/code/project/633199e167cb75056f4a5c45
Teacher Reference: Student Activity 1.2 Solution	Add Ground Tiles to the Platform - Solution	https://tynker.com/code/project/633319981bca40d44fa71e732
Teacher Activity 2	Create Multi-level Platform	https://tynker.com/code/project/6331980fce85873d2d67d502
Teacher Activity 2 Solution	Create Multi-level Platform - Solution	https://tynker.com/code/project/633197fc00e8d961e57a5a52
Student Activity 2	Complete the Platform	https://tynker.com/code/project/633403b4b4ff4b3710a750502
Teacher Reference: Student Activity 2 Solution	Complete the Platform - Solution	https://tynker.com/code/project/633403b574ff4b3710a750513
Student Activity 3	Complete the Game Platform	https://tynker.com/code/project/633194c859c8f048ce7155a2
Teacher Reference: Student Activity 3 Solution	Complete the Game Platform - Solution	https://tynker.com/code/project/633194ae5074536dbe783ac2
Student's Additional Activity 1	Add Fire Tiles	https://tynker.com/code/project/633572ff6d7ce124d43aa322
Teacher Reference: Student's Additional Activity 1 Solution	Add Fire Tiles - Solution	https://tynker.com/code/project/633356cbf8fc06348c141d809
Student's Additional Activity 2	Detect Collision Between Cleo and Fire	https://tynker.com/code/project/6335a14686af2005c55fe502
Teacher Reference: Student's Additional Activity 2 Solution	Detect Collision Between Cleo and Fire - Solution	https://tynker.com/code/project/6335a0a4145acb3996076042
Post Class Project	Bounce the Ball	https://tynker.com/code/project/633ac6fe214c33087369a842
Teacher Reference: Post Class Project Solution	Bounce the Ball - Solution	https://tynker.com/code/project/633ad153b077016273627332