The Kingdom of Darkmire

Python Game Design

Time: 60 mins

Introduction

In this class, student/s will be introduced to the Processing module of Python. They will learn about canvas size, and how to load, display and set a background image for the canvas. Students will understand the concepts of setup(), draw() and run() functions. They will also learn the structure and advantages of dictionaries.

Python Commands Introduced

- setup()
  The function is called once when the program starts. It's used to define initial environment properties such as screen size and background color and to load media such as images and fonts as the program starts.

- draw()
  The function is called after the setup() function automatically and continuously executes the lines of code contained inside its block until the program is stopped. The function draw() should never be called explicitly.

- run()
  Runs the sketch/program by calling setup() and draw() functions.

- global
  Variables are made accessible throughout the program by making them global.

- size()
  Sets the width and height of the canvas.

- loadImage()
  Loads an image into a variable.

- background()
  The background() function sets the color of the canvas. It can also be used to set an image to the canvas. The width and height of the canvas should be the same as that of the image.

- image()
  Draws an image on the canvas. The parameters passed are: 1. Image variable., 2. x-position, 3. y-position, 4. width, 5. height

- Processing module
  The Processing module of Python is a powerful and easy-to-use Graphics Library

Vocabulary

- Dictionary: Used to store multiple information in a single variable. The information is stored as key-value pairs.

Learning Objectives

Student(s) should be able to:
- ***Implement*** the code structure using setup(), draw(), and run() functions
- ***State*** the commands used to load and display background image and other images.
- ***Explain*** the advantages of storing data in dictionaries over individual variables.
- ***Create*** a title screen for a game using images.

Activities

1. **Class Narrative:** *(2 min)*

   - **Introduce the class progression:** "The Legend of Zonan" to the student/s.This class is the beginning of a series of classes that end in C16.
   - **Introduce the class narrative:** Student/s will help develop a game for the Funtendo game company. In the game narrative, the protagonist Zonan will overcome the challenges to recover the gem stolen from the Kingdom of Darkmire.

2. **Concept Introduction Activity:** *(5 mins)*
   - Let the student/s observe the game output on the slide and understand the class outcome.
   - In this class, student/s will learn to set a background image, add character images and change the position of Zonan to help him uncover clues.

3. **Activity 1: Set a Background for the Kingdom:** *(10 min)*

   Teacher Activity:
   - Introduce the concept of game canvas. Describe the need for setting the size of the game canvas.

   Student Activity:
   - Guide the student/s to set the width and height of the canvas depending on the background image selected.
   - Guide the student/s to load images into variables and use them as a parameter of the background() function.
   Note: Discuss in detail the path of the image location and the use of quotes(" ") and slash(\) while mentioning the image path and name.
   - Introduce the processing module of Python. Explain the syntax of the import statement. Discuss why the global keyword needs to be used for the image variables.

4. **Activity 2: Create the game characters:** *(15 min)*

   Teacher Activity:
   - Introduce the student/s to the image() function.
   - Discuss the advantage of passing variables as parameters rather than passing the values directly.
   - Note: The variables for x position, y position, width, and height are initialized above the setup() function so that they can be accessed in any of the functions. If a variable is initialized within a block, it will be local to the block unless the keyword global is used.

Student Activity:
- Recall the use of loadImage().
- Guide the student/s to load images of Zonan and the Guard.
- Guide the student/s to write an image() function to display Zonan and the Guard.
  Probing question: "What would happen if the parameters passed to the image() function are in the order, image name, width, height, x-position, and y-position?"
  Expected Answer: "We would get an error since the parameters should be passed in the correct order function definition."

5. **Activity 3: Change Zonan's position:** *(10 mins)*

   Teacher Activity:
   - Introduce the concept and syntax of Python dictionaries.
   - Discuss the advantages of using a dictionary.
   - Create a dictionary for Kyla and use it in the image() function.

   Student Activity 3.1:
   - Guide the student/s to create dictionaries for Zonan and the guard and use them in the image() function to display the images.
     Probing question: "What would happen if the key-value pairs are separated by semicolons instead of commas?"
     Expected Answer: "We would get an error since the key-value pairs have to be separated by commas."

   Student Activity 3.2:
   - Guide the student/s to change the position of Zonan by changing the values in the dictionary.
   - Ask the students to hover over the markers to obtain the coordinates of the new position near the characters.

6. **Introduce the Post class project:** *(1 min)*
   - The project is based on a game called Balance the Ball. The background of the game is set for the student/s. The student/s has to add a player and the ball in the specified position.

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

8. **Additional activities:**
   - Encourage the student/s to restore the kingdom by loading and displaying a new background image.
   - Encourage the student/s to increase security by placing two soldiers at the entrance of the kingdom.

9. **State the Next Class Objective:** *(2 min)*
   - In the next class, student/s will create another level in the game. They will help Zonan cross a haunted bridge using keyboard controls, to reach the magical jungle

U.S. Standards:

CSTA: 2-AP-11, 2-AP-13

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	The Kingdom of Darkmire	https://s3-whjr-curriculum-uploads.whjr.online/38197374-96a5-4b31-b814-7596522012a0.html
Teacher Activity 1	Create Canvas	https://tynker.com/code/project/62e95b58f9305f121b517162
Teacher Reference: Teacher Activity 1 Solution	Solution of TA1	https://tynker.com/code/project/62e95856ff5c73376f3ef0b2
Student Activity 1	Set a Background for the Kingdom	https://tynker.com/code/project/62e95c40bc25697b2c548512
Teacher Reference: Student Activity 1 Solution	Solution of SA1	https://tynker.com/code/project/62e958b1200a042a78324192
Teacher Activity 2	Create Kyla	https://tynker.com/code/project/62e95cafd78dd93855243932
Teacher Reference: Teacher Activity 2 Solution	Solution of TA2	https://tynker.com/code/project/62e95878023bc141764912c2
Student Activity 2	Create the Game Characters	https://tynker.com/code/project/62e95d71833a331fbc5f33d2
Teacher Reference: Student Activity 2 Solution	Solution of SA2	https://tynker.com/code/project/62e958c808d9af0c1f095272
Teacher Activity 3	Create dictionary for Kyla	https://tynker.com/code/project/62e95ead2ef7101e845a9ba2
Teacher Reference: Teacher Activity 3 Solution	Solution of TA3	https://tynker.com/code/project/62e95893f80da722336fa212
Student Activity 3.1	Create dictionaries	https://tynker.com/code/project/62e95a95736e9c18b649f8a6
Teacher Reference: Student Activity 3.1 Solution	Solution of SA3.1	https://tynker.com/code/project/62e958e8bc7c4c767d641e32
Student Activity 3.2	Change Zonan's position	https://tynker.com/code/project/62e95970976ee02f647314c2
Teacher Reference: Student Activity 3.2 Solution	Solution of SA3.2	https://tynker.com/code/project/62e958fecc5a782f8c118752
Student Additional Activity 1	Restore the kingdom	https://tynker.com/code/project/62ecd6cd0905d9573d26afc2
Teacher Reference: Student Additional Activity 1 Solution	Solution of SAA1	https://tynker.com/code/project/62ecd785e2487552006dfa62
Student Additional Activity 2	Increase security	https://tynker.com/code/project/62ecd9c281469f45e71d78b2

Teacher Reference: Student Additional Activity 2 Solution	Solution of SAA2	https://tynker.com/code/project/62ecda8d47f1b16c177506f5
Post Class Project	Balance the Ball	https://tynker.com/code/project/63076b2c07625a4be971b912
Teacher Reference: Post Class Project Solution	Solution of Post Class Project	https://tynker.com/code/project/62f205dfac014325fd3d2972