The Final Combat

Python Game Design

Time: 60 mins

Introduction

In this class, the student/s will learn how to draw the health meters for Zonan and the dark wizard using fill() and rect() functions. They will learn to store the health value in a dictionary and update it using arithmetic operators. The student/s will help Zonan fight with the dark wizard by launching fireballs to recover the gem.

Python Commands Introduced

● rect(x,y,w,h,r)	A rectangle with specified x and y coordinates, width w, and height h, and radius r for rounded corners is drawn.
● fill(r,g,b)	Select the color by the specified red, green, and blue values for the shapes to be drawn.
● noStroke()	Disables drawing the outline of the shapes created after it.

Vocabulary

- **Health meters** are used in the game to display the current health value of the character.

Learning Objectives

Student(s) should be able to:

- ***Recall*** how to detect collisions between game objects.
- ***Describe*** how to use arithmetic operators to update dictionary values.
- ***Demonstrate*** how to draw colored rounded rectangles.
- ***Program*** health meters for Zonan and the dark wizard to help Zonan defeat the dark wizard and get the gem back.

Activities

1. **Class Narrative:** *(2 mins)*
    - Brief the student/s that Zonan has reached the dark wizard's lair and he noticed that the dark wizard is flying with the gem. The dark wizard attacks with spell balls. Zonan needs to protect himself and defeat the dark wizard by launching fireballs to recover the gem. Use the ALT key on the Windows system and the OPTION key on the MacBook to fire the fireballs.

2. **Concept Introduction Activity:** *(5 mins)*
    - Let the student/s play the explore activity and notice how the health meters look and how the values in the health meter were reduced for Zonan and the dark wizard on getting attacked.

- Inquire the student/s about what happens when the dark wizard's health meter is reduced to zero.
- Brief the student/s that we will learn to create the health meters in activity 1. In activity 2, the student/s will learn to update the health of Zonan and the dark wizard. In activity 3, the student/s will learn to reflect the updated health count in the health meters.

3. **Activity 1: Create the Health Meters:** *(15 mins)*

   Teacher Activity: *(9 mins)*
- Inquire the student/s about the shape of the health meter.
- Explain to the student/s how rectangles can be drawn in processing.py using rect() and color can be filled using fill().
- Demonstrate to the student/s to create the health meters with a border by skipping the noStroke() function and then, explain how the noStroke() function can be used to disable drawing the borders of the shapes created after.

   Student Activity: *(6 mins)*
- Guide the student/s to draw the health meter for Zonan using rect() and fill() functions.
- Let the student/s explore the width value so that it looks appropriate in size on the screen.
- Probing question: Why is the noStroke() function written only before drawing the shapes for the dark wizard's health meter?
  Expected answer: noStroke() function disables drawing the borders of the shapes created after and since it is already disabled, there is no repetition needed.

4. **Activity 2: Update the Health Count:** *(12 mins)*

   Teacher Activity: *(6 mins)*
- Ask student/s when does the dark wizard's health in the meter reduces.
  Expected answer: The dark wizard's health reduces by touching the fireball.
- Probe the students to name the function that can be used to detect the collision of any two game objects.
- Show the student/s that the dark wizard's health count is added as a key-value pair in the dictionary **wizard** in the **game.py** file. Explain to the student/s how to update the health count of the dark wizard when struck by the fireball.
- Summarize how the dark wizard's health count was updated and printed.

   Student Activity 2: *(6 mins)*
- Guide the student/s to update the health count of Zonan when struck by the spell ball.

5. **Activity 3: Update the Health Meters:** *(10 mins)*

   Student Activity 3: *(10 mins)*
- Teacher brings to notice of the student/s that updating the health count was not reflected in the health meters.
- Teacher revises that two rectangles were used for creating the health meters. One for total health and the other for the current value of health.
- Probing question: Which parameter in the rect() function should be modified to reflect the current health count?
  Expected answer: The width of the rectangle as it indicates the current health count.

- Instruct the student/s on how the health meters can be updated by storing the health count in a variable and passing the variable as a width parameter to the rect() function. Let the student/s explore that the rectangle doesn't fit and hence the health count needs to be multiplied by a number.
- Guide the student/s to update the health meters for Zonan and the dark wizard.
- Let the student/s experiment with the number that is multiplied by width to fit in the health meter.

6. **Introduce the Post class project:** *(2 min)*
    - Create and display the fuel meter in the Onerous Drive - III game.

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 create Zonan's fireball count indicator using shapes.
    - Encourage the student/s to indicate different levels of Zonan's health using colors.

9. **State the Next Class Objective:** *(1 min)*
    - We will learn Object Oriented Concepts using Python.

U.S. Standards:

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

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	The Final Combat	https://s3-whjr-curriculum-uploads.whjr.online/998c1bda-614f-4083-9373-88ac02fb091e.html
Explore Activity	Explore Activity: The Final Combat	https://tynker.com/code/view/631e2edf18b6265fcc63b292/
Teacher Activity 1	Create the Health Meter for the Dark Wizard	https://tynker.com/code/project/631b05199e9f7f0b633c9a62
Teacher Activity 1 Solution	Create the Health Meter for the Dark Wizard - Solution	https://tynker.com/code/project/631b086f391c18372e2dd602
Student Activity 1	Create the Health Meter for Zonan	https://tynker.com/code/project/631e2c14ee9b9541dc0ecfc2
Teacher Reference: Student Activity 1 Solution	Create the Health Meter for Zonan - Solution	https://tynker.com/code/project/631e2c330f350d4f3e16c722
Teacher Activity 2	Update the Health Count of the Dark Wizard	https://tynker.com/code/project/631e2cc1a0631244086d25d2

Teacher Reference: Teacher Activity 2 Solution	Update the Health Count of the Dark Wizard - Solution	https://tynker.com/code/project/631e2cf4103f43140a3815e2
Student Activity 2	Update the Health Count of Zonan	https://tynker.com/code/project/631e2d8f0dbb3024eb7dbbd2
Teacher Reference: Student Activity 2 Solution	Update the Health Count of Zonan - Solution	https://tynker.com/code/project/631e2dbf725a79672e282092
Student Activity 3	Update the Health Meters	https://tynker.com/code/project/631e2ecfd1b7e330581420d2
Teacher Reference: Student Activity 3 Solution	Update the Health Meters - Solution	https://tynker.com/code/project/631e2edf18b6265fcc63b292
Student Additional Activity 1	Create a Fireball Count Indicator	https://tynker.com/code/project/631e305d19f88f19403c5c42
Teacher Reference: Student Additional Activity 1 Solution	Create a Fireball Count Indicator - Solution	https://tynker.com/code/project/631e3075067c704ed1097e22
Student Additional Activity 2	Enhance the Health Meter	https://tynker.com/code/project/631e310abb9bc07ec412b122
Teacher Reference: Student Additional Activity 2 Solution	Enhance the Health Meter - Solution	https://tynker.com/code/project/631e3120ea57e21d164a3942
Post Class Project	The Onerous Drive - III	https://tynker.com/code/project/6310692721a44362681c5652
Teacher Reference: Post Class Project Solution	The Onerous Drive - III - Solution	https://tynker.com/code/project/630e2c1ade23cc02984281c2