

# Recon Mission

## Python Game Design

**Time:** 60 mins

## Introduction

In this class, the student/s will learn to create and move Dr. Cleo using Inheritance. Student/s will also learn to add a game camera and help move Dr. Cleo around the sci-fi city to inspect the damages caused by the gas leakage.

## Python Commands Introduced

- |                                     |   |
|-------------------------------------|---|
| • <code>class Player(Sprite)</code> | This defines the class Player as a child class to the parent class Sprite             |
| • <code>translate(x, y)</code>      | This instruction repositions the origin of the canvas to specified x and y-positions. |

## Vocabulary

- **Inheritance** allows the creation of parent and child classes in such a way that the child class inherits the properties and methods of the parent class without repeating the code.
- **Game Camera** allows setting the view for the game such that all the necessary game elements are visible while playing.

## Learning Objectives

Student/s should be able to:

- **Demonstrate** how to create parent and child class.
- **Describe** how to create objects of the child class.
- **Explain** how to add new properties and methods to the child class.
- **Demonstrate** how to set the game camera.
- **Create** Dr. Cleo as an object of the child class and move her around the sci-fi city to inspect the damages caused by the gas leakage.

## Activities

1. **Class Narrative: (2 mins)**
  - Brief the student/s that Dr. Cleo needs to move around the city to inspect the damages caused by the gas leakage.
2. **Concept Introduction Activity: (5 mins)**
  - Let the student/s play the explore activity and observe that Dr. Cleo moves horizontally using the left and right arrow keys.

- Using the slides, explain:
  - how to create Dr. Cleo as a child class
  - add movement to Dr. Cleo using arrow keys
  - set the game camera

### 3. Activity 1: Create Dr. Cleo using Inheritance: (12 mins)

#### **Teacher Activity:** (6 mins)

- Explain to the student/s that a new class needs to be created to add the functionality of movement to only Dr. Cleo.
- Explain to the student/s how to create a child class `Player()` from the parent class `Sprite()` and create an object of the child class.
- Highlight to the student/s that `cleoImg` is now replaced by the animation `cleoIdleRight` using the code written in the file `sprite.py`.
- Explain inheritance by using the example on the slides. We can create multiple child classes for multiple dog breeds by inheriting the parent class `Dog()`.

**Note:** The teacher must use the words like parent class and child class.

#### **Student Activity:** (6 mins)

- Guide the student/s to create the child class `Player()` from the parent class `Sprite()` and create an object, Dr. Cleo, using inheritance.

### 4. Activity 2: Move Dr. Cleo: (12 mins)

#### **Student Activity:** (12 mins)

- Recall for the student/s that to move Dr. Cleo horizontally, the x-position will increase or decrease.
- Explain to the student/s using slides how to create a property `velX` in the child class `Player()` and update the current x-position by adding `velX` to it to move Dr. Cleo.  
Probing question: Why do we use `self`?  
Expected answer: `self` represents the instance of the class.
- Guide the student/s to move Dr. Cleo horizontally by creating a property `velX` and adding it to the x-position of Dr. Cleo in the class method `updatePosition()` and then, calling `cleo.updatePosition()` in the `draw()` function.
- Guide the student/s to control Dr. Cleo's movement when the arrow keys are pressed and released by calling the method `setvelX()` of the child class `Player()`.

### 5. Activity 3: Add a Game Camera: (12 mins)

#### **Teacher Activity:** (7 mins)

- Explain to the student/s about the `translate()` instruction. Experiment and let the student/s observe and learn that `translate()` instruction allows repositioning the origin of the game screen. Also, highlight that any shape drawn or image that is shown after the `translate()` instruction will be placed as per the new position of the origin.
- Experiment with the values in the following order:
  - `x = 0, y = 0` (Highlight that the background is placed properly at (0,0).)
  - `x = 300, y = 0` (Highlight that the background is shifted by 300 pixels to the right.)
  - `x = -300, y = 0` (Highlight that the background is shifted by 300 pixels to the left.)
  - `x = cleo.x, y = 0` (Highlight that the background moves along with Dr. Cleo but the background moves to the right instead of moving backward.)

Probing question: How can we show the reverse movement of the background i.e. background moving to the left?

Expected answer: As we want the background to move left, we will pass negative cleo.x.

- $x = -\text{cleo.x}$ ,  $y=0$
- Highlight the problem that the player is placed very near to the left edge of the canvas.

**Student Activity: (5 mins)**

- Guide the student/s to pass values such that the game camera follows Dr. Cleo without placing the player in the corner.

**6. Introduce the Post class project: (2 min)**

- In the virus blaster game, add horizontal movement to the nanobot using arrow keys.

**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 restrict the camera movement after reaching the left edge of the game world.
- Encourage the student/s to stop Dr. Cleo's Movement after she reaches the left edge of the game world.

**9. State the Next Class Objective: (1 min)**

- We will learn to make Dr. Cleo jump the platforms and fall using gravity.

## U.S. Standards:

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

Links Table		
Activity	Activity Name	Link
Class Presentation	Recon Mission	<a href="https://s3-whjr-curriculum-uploads.whjr.online/d5d80861-0604-4cdb-9334-e7b4ee830433.html">https://s3-whjr-curriculum-uploads.whjr.online/d5d80861-0604-4cdb-9334-e7b4ee830433.html</a>
Explore Activity	Recon Mission: Explore Activity	<a href="https://tynker.com/code/view/6335499a0c853d1bc9754862/">https://tynker.com/code/view/6335499a0c853d1bc9754862/</a>
Teacher Activity 1	Create Dr. Cleo	<a href="https://tynker.com/code/project/63352589cc69986fb17e32f6">https://tynker.com/code/project/63352589cc69986fb17e32f6</a>
Teacher Activity 1 Solution	Create Dr. Cleo: Solution	<a href="https://tynker.com/code/project/63352d8de55a431ebf0abb22">https://tynker.com/code/project/63352d8de55a431ebf0abb22</a>
Student Activity 1	Create Dr. Cleo	<a href="https://tynker.com/code/project/633c083b72ecb970f750a682">https://tynker.com/code/project/633c083b72ecb970f750a682</a>

Teacher Reference: Student Activity 1 Solution	Create Dr. Cleo: Solution	<a href="https://tynker.com/code/project/63352d416d67bd1be05877e2">https://tynker.com/code/project/63352d416d67bd1be05877e2</a>
Student Activity 2.1	Move Dr. Cleo	<a href="https://tynker.com/code/project/63354800906267393451f5b2">https://tynker.com/code/project/63354800906267393451f5b2</a>
Teacher Reference: Student Activity 2.1 Solution	Move Dr. Cleo: Solution	<a href="https://tynker.com/code/project/633532af6d81df5c4e45de52">https://tynker.com/code/project/633532af6d81df5c4e45de52</a>
Student Activity 2.2	Control Dr. Cleo's Movement	<a href="https://tynker.com/code/project/633548cfdeae6371270cc403">https://tynker.com/code/project/633548cfdeae6371270cc403</a>
Teacher Reference: Student Activity 2.2 Solution	Control Dr. Cleo's Movement: Solution	<a href="https://tynker.com/code/project/633548836dd78e20f57f8562">https://tynker.com/code/project/633548836dd78e20f57f8562</a>
Teacher Activity 3	Add a Game Camera	<a href="https://tynker.com/code/project/633549fe3761a8575018f55e">https://tynker.com/code/project/633549fe3761a8575018f55e</a>
Teacher Activity 3 Solution	Add a Game Camera: Solution	<a href="https://tynker.com/code/project/633549ed3761a8575018f552">https://tynker.com/code/project/633549ed3761a8575018f552</a>
Student Activity 3	Add a Game Camera	<a href="https://tynker.com/code/project/63354a1e7b07f432dc7da472">https://tynker.com/code/project/63354a1e7b07f432dc7da472</a>
Teacher Reference: Student Activity 3 Solution	Add a Game Camera: Solution	<a href="https://tynker.com/code/project/6335499a0c853d1bc9754862">https://tynker.com/code/project/6335499a0c853d1bc9754862</a>
Student's Additional Activity 1	Restrict the Camera Movement	<a href="https://tynker.com/code/project/633496c2f47a5f08810e8b62">https://tynker.com/code/project/633496c2f47a5f08810e8b62</a>
Teacher Reference: Student's Additional Activity 1 Solution	Restrict the Camera Movement: Solution	<a href="https://tynker.com/code/project/633496783c7618334d5cf2b2">https://tynker.com/code/project/633496783c7618334d5cf2b2</a>
Student's Additional Activity 2	Restrict Dr.Cleo's Movement	<a href="https://tynker.com/code/project/6334965311f3382a1c7d9e02">https://tynker.com/code/project/6334965311f3382a1c7d9e02</a>
Teacher Reference: Student's Additional Activity 2 Solution	Restrict Dr.Cleo's Movement: Solution	<a href="https://tynker.com/code/project/633493f24f9e39395e2e3a22">https://tynker.com/code/project/633493f24f9e39395e2e3a22</a>
Post Class Project	Move the Nanobot	<a href="https://tynker.com/code/project/6336b8e6a085ba3ebf035db2">https://tynker.com/code/project/6336b8e6a085ba3ebf035db2</a>
Teacher Reference: Post Class Project Solution	Move the Nanobot: Solution	<a href="https://tynker.com/code/project/632c254c559fdc73fd0e2952">https://tynker.com/code/project/632c254c559fdc73fd0e2952</a>