Intro to PyGame Guide

Prerequisites

1. Install Python- https://www.python.org/downloads/
2. Install PyGame from the terminal by typing - `pip install pygame`
3. Errors after Installation?
   1. "How to Fix The "Module Not Found" Error for Pygame in Under 2 Minutes!"
   2. Video Link- https://youtu.be/0x_MEKr0OJQ?si=6C_77LalgrcocVlN

Basics of GameDev

1. Games are run within **infinite loops**.
2. A game runs by changing/updating frames each iteration of that loop.
3. So each frame/image is dynamically generated while the game is running.
   1. This would be controlled by the Game loop (infinite).
   2. The position of enemies, player movement, and health, etc. all changes per frame.
4. We check the player input (using EventHandler) every frame constantly to update what frame is being drawn.
5. Render the animation, movement, and state of each object in the game *each frame*.

Generating a Frame

1. Check player input -- Check the event loop from EventHandler.
2. Use that information to place elements on the screen (player and enemy position, etc).
3. Clear this frame (Refresh Screen).
4. Repeat up to 30-60 times per second (fps).

PyGame - Intro

1. The basic structure of a PyGame project consists of-
   1. Game Window (UI)
   2. Game Loop
   3. EventHandler

Basic PyGame Project Setup

check "pygame_example.py" for this code, and try it out if you want to.

```
import pygame

# Initialize Game
pygame.init()
## Game Window Title
pygame.display.set_caption("Test Game")

# Global Variables
run: bool = True

## Game Window Dimensions
SCREEN_WIDTH: int = 800
SCREEN_HEIGHT: int = 600

## Create Player
player = pygame.Rect((300, 250, 50, 50))

if __name__ == "__main__":
    # 1. Create Game Window
    screen = pygame.display.set_mode((SCREEN_WIDTH, SCREEN_HEIGHT))

    # 2. Create Game Loop -- So that the game/window keeps running
    while (run):
        # Refresh the Screen - Color it black
        ## We need to do this so previous objects don't keep showing up.
        screen.fill((0, 0, 0))

        # 2.1. Draw Elements
        ## Draw Player
        pygame.draw.rect(screen, (250, 0, 0), player)

        # Define Controls
        key = pygame.key.get_pressed()
        if (key[pygame.K_a] == True):
            player.move_ip(-1, 0)
            # move_ip(x, y) == move in place
            # (-x, 0) == Move left, don't affect y coordinate
        elif (key[pygame.K_d] == True):
            player.move_ip(1,0)
        elif (key[pygame.K_w] == True):
            player.move_ip(0,-1)
```

```
        elif (key[pygame.K_s] == True):
            player.move_ip(0,1)
        else:
            pass

        # 3. EventHandler
        ## Event Handler listens for events - keypresses, mouseclicks, etc.
        ## Iterate through the EventHandler
        for event in pygame.event.get():
            # Check for "quit" event ("Escape Button pressed" == Quit the Game)
            if event.type == pygame.QUIT:
                run = False

        # Update Screen to draw elements/update game state -- ideally should
happen every frame
        pygame.display.update()

    # Quit Window
    pygame.quit()
```

Sources used

1. "The ultimate introduction to Pygame":
    1. https://youtu.be/AY9MnQ4x3zk?si=bIVSZfSraEoiJWua
2. "Get Started in Pygame in 10 minutes!":
    1. https://youtu.be/y9VG3Pztok8?si=yNB6ELr7J8OfMu5k