Laboratory Activity No. 9

Introduction to GUI Development using Pycharm

Course Code: CPE103	**Program:** BSCPE
Course Title: Object-Oriented Programming	**Date Performed:** 03/22/2025
Section: 1-A	**Date Submitted:** 03/22/2025
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1. Objective(s):

This activity aims to familiarize students with the Pycharm framework for GUI Development

2. Intended Learning Outcomes (ILOs):

The students should be able to:
2.1 Identify the main components in a GUI Application
2.2 Create a simple GUI Application using Pycharm Widgets

3. Discussion:

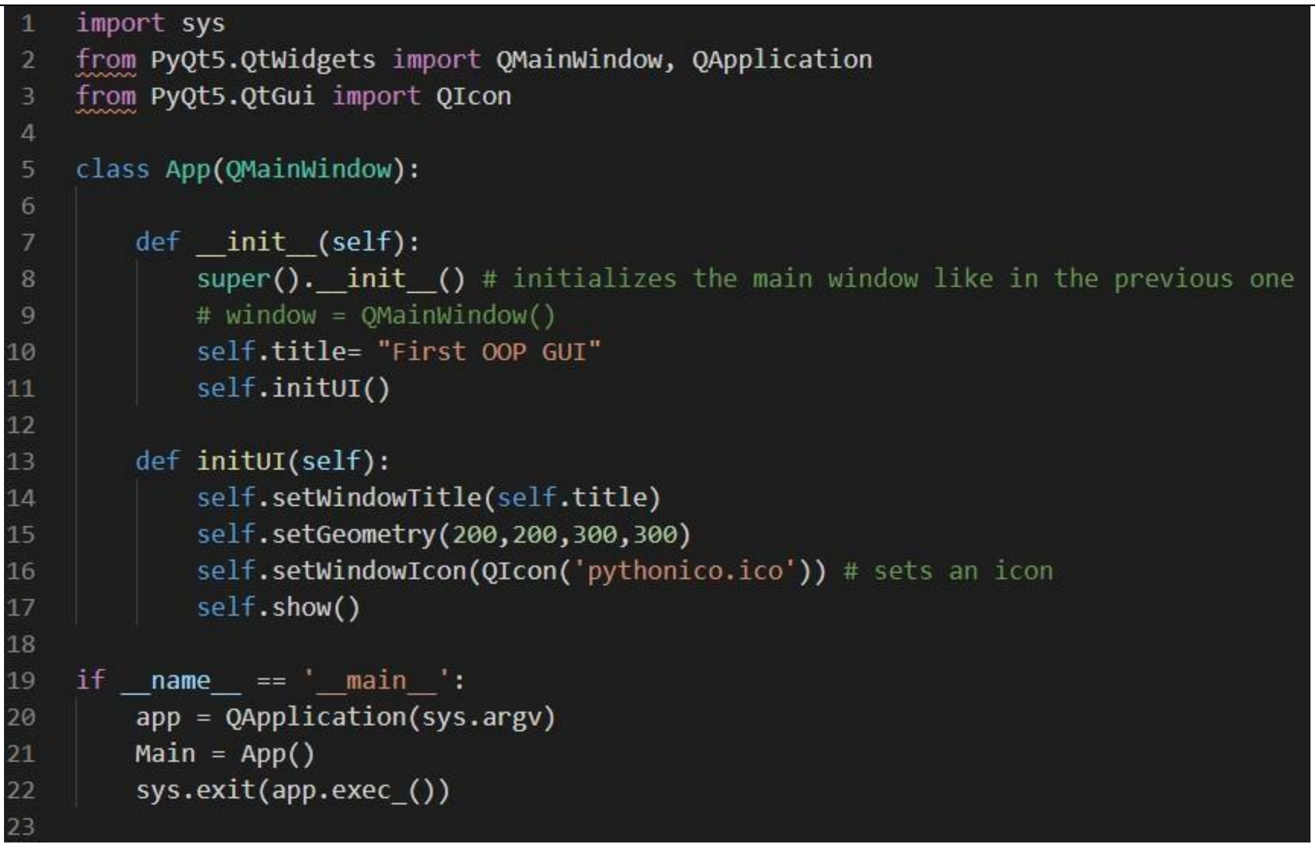
A Graphical User Interface (GUI) application is a program that the user can interact with through graphics (windows, buttons, text fields, checkboxes, images, icons, etc..) such as the Desktop GUI of Windows OS by using a mouse and keyboard unlike with a Command-line program or Terminal program that support keyboard inputs only.

Pycharm is an integrated development environment used for programming in Python. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems, and supports web development with Django.

4. Materials and Equipment:

Desktop Computer with Anaconda Python or Pycharm
Windows Operating System

5. Procedure:

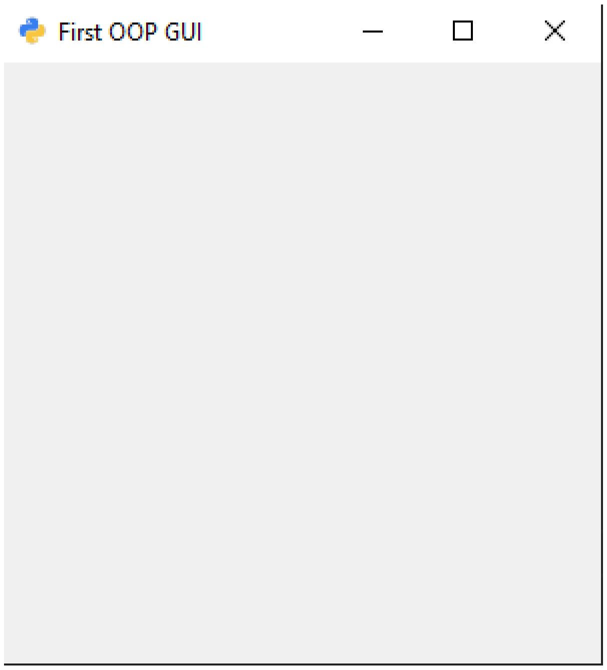


```python
import sys
from PyQt5.QtWidgets import QMainWindow, QApplication
from PyQt5.QtGui import QIcon

class App(QMainWindow):

    def __init__(self):
        super().__init__() # initializes the main window like in the previous one
        # window = QMainWindow()
        self.title= "First OOP GUI"
        self.initUI()

    def initUI(self):
        self.setWindowTitle(self.title)
        self.setGeometry(200,200,300,300)
        self.setWindowIcon(QIcon('pythonico.ico')) # sets an icon
        self.show()

if __name__ == '__main__':
    app = QApplication(sys.argv)
    Main = App()
    sys.exit(app.exec_())

```

2. Run the program and observe the output.

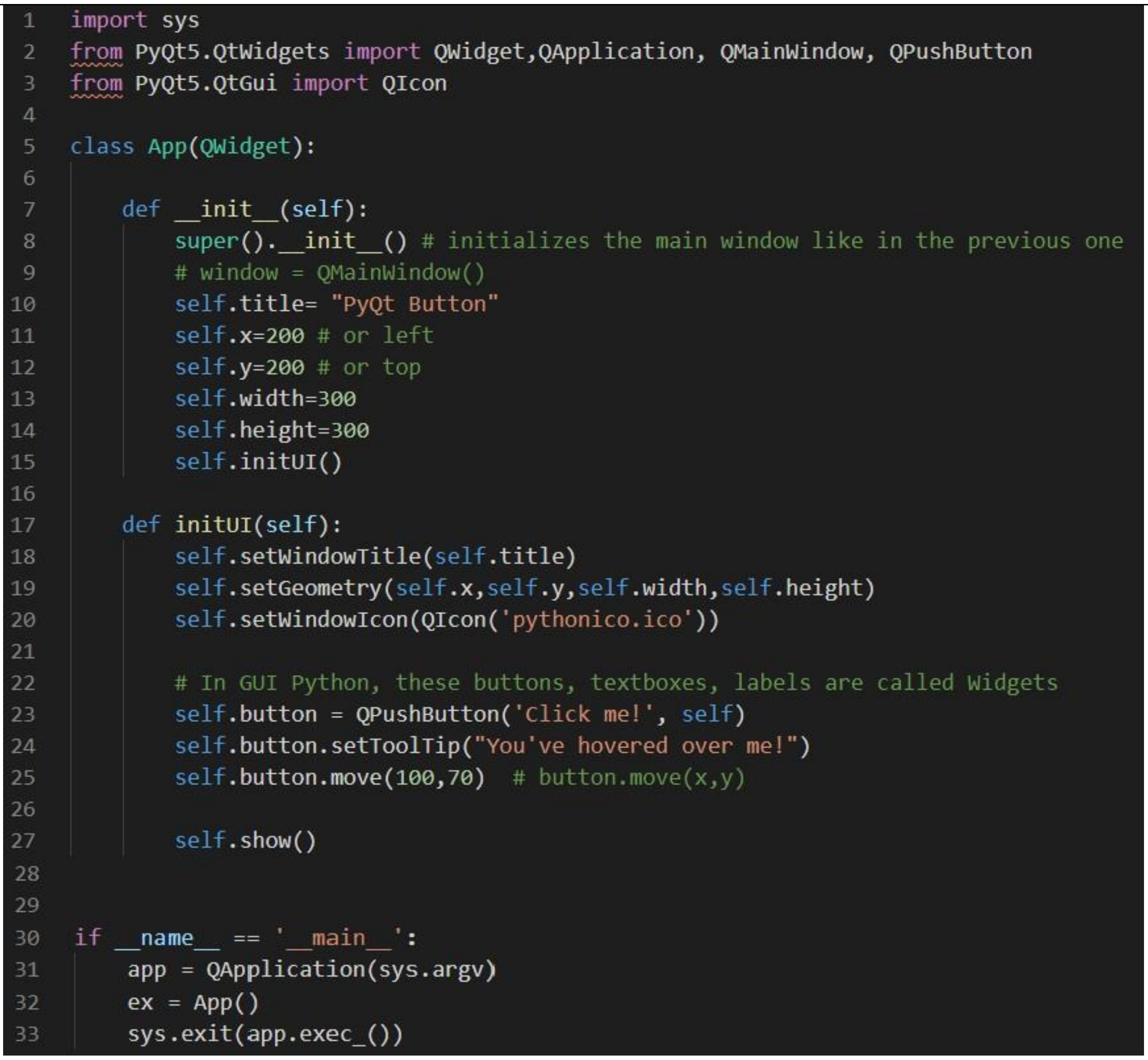
Adding an icon

3. Download any .ico picture from https://icon-icons.com/ or any similar sites.
4. Place the icon in your folder (ex. Oopfa1<lastname>_lab8)
5. Run the program again, the program should now have an icon similar to the program below.



Creating Buttons

1. Create a new .py file named **gui_buttons.py** then copy the program as shown below:

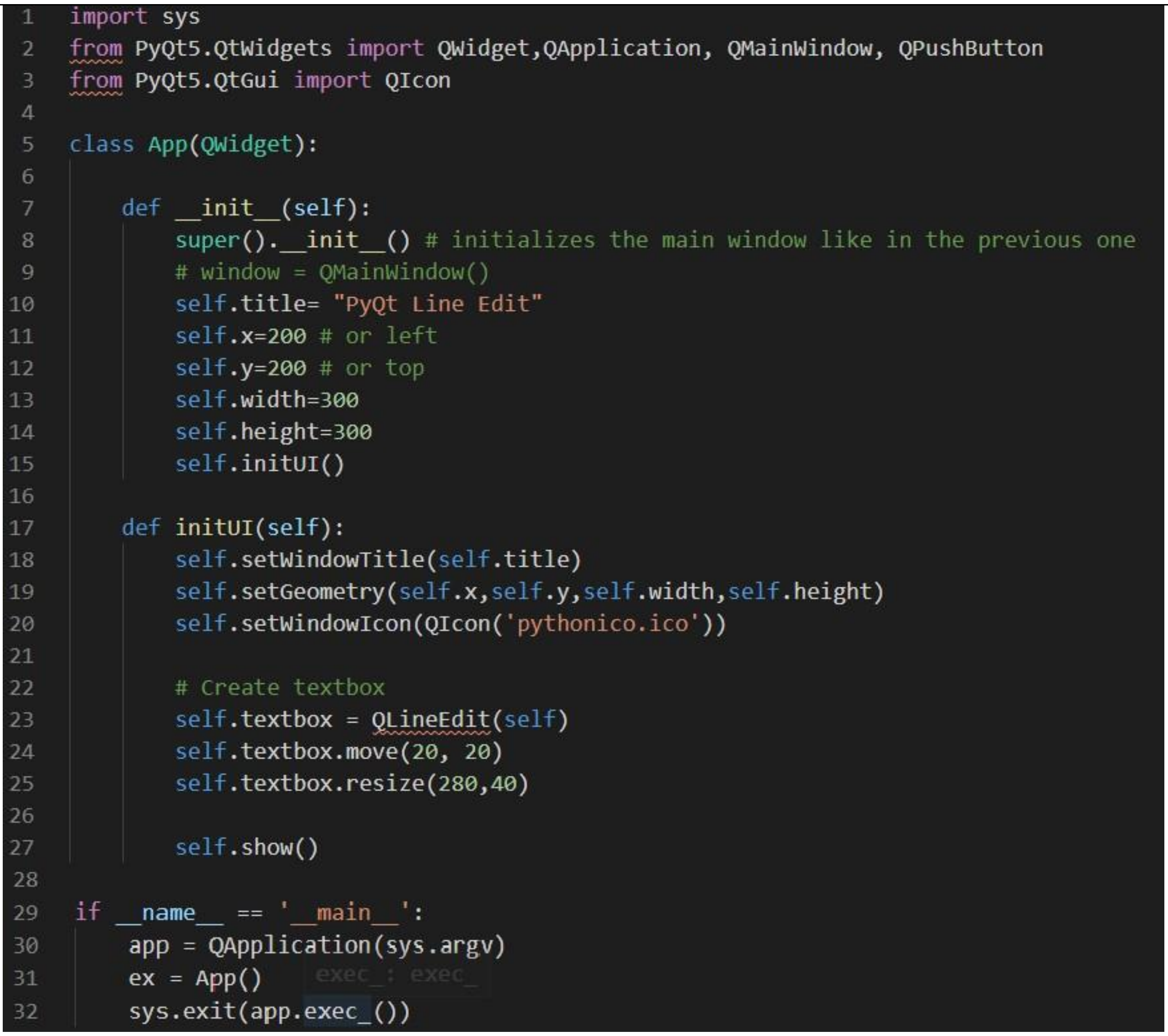


```python
import sys
from PyQt5.QtWidgets import QWidget,QApplication, QMainWindow, QPushButton
from PyQt5.QtGui import QIcon

class App(QWidget):

    def __init__(self):
        super().__init__() # initializes the main window like in the previous one
        # window = QMainWindow()
        self.title= "PyQt Button"
        self.x=200 # or left
        self.y=200 # or top
        self.width=300
        self.height=300
        self.initUI()

    def initUI(self):
        self.setWindowTitle(self.title)
        self.setGeometry(self.x,self.y,self.width,self.height)
        self.setWindowIcon(QIcon('pythonico.ico'))

        # In GUI Python, these buttons, textboxes, labels are called Widgets
        self.button = QPushButton('Click me!', self)
        self.button.setToolTip("You've hovered over me!")
        self.button.move(100,70)  # button.move(x,y)

        self.show()


if __name__ == '__main__':
    app = QApplication(sys.argv)
    ex = App()
    sys.exit(app.exec_())
```

2. Run the program and observe the output.
3. Add a new button named button2 named Register to the GUI that will display “this button does nothing.. yet..” when it is hovered.

Creating Text Fields

1. Create a new file named **gui_text.py** and copy the code shown below:



```python
import sys
from PyQt5.QtWidgets import QWidget,QApplication, QMainWindow, QPushButton
from PyQt5.QtGui import QIcon

class App(QWidget):

    def __init__(self):
        super().__init__() # initializes the main window like in the previous one
        # window = QMainWindow()
        self.title= "PyQt Line Edit"
        self.x=200 # or left
        self.y=200 # or top
        self.width=300
        self.height=300
        self.initUI()

    def initUI(self):
        self.setWindowTitle(self.title)
        self.setGeometry(self.x,self.y,self.width,self.height)
        self.setWindowIcon(QIcon('pythonico.ico'))

        # Create textbox
        self.textbox = QLineEdit(self)
        self.textbox.move(20, 20)
        self.textbox.resize(280,40)

        self.show()

if __name__ == '__main__':
    app = QApplication(sys.argv)
    ex = App()
    sys.exit(app.exec_())
```

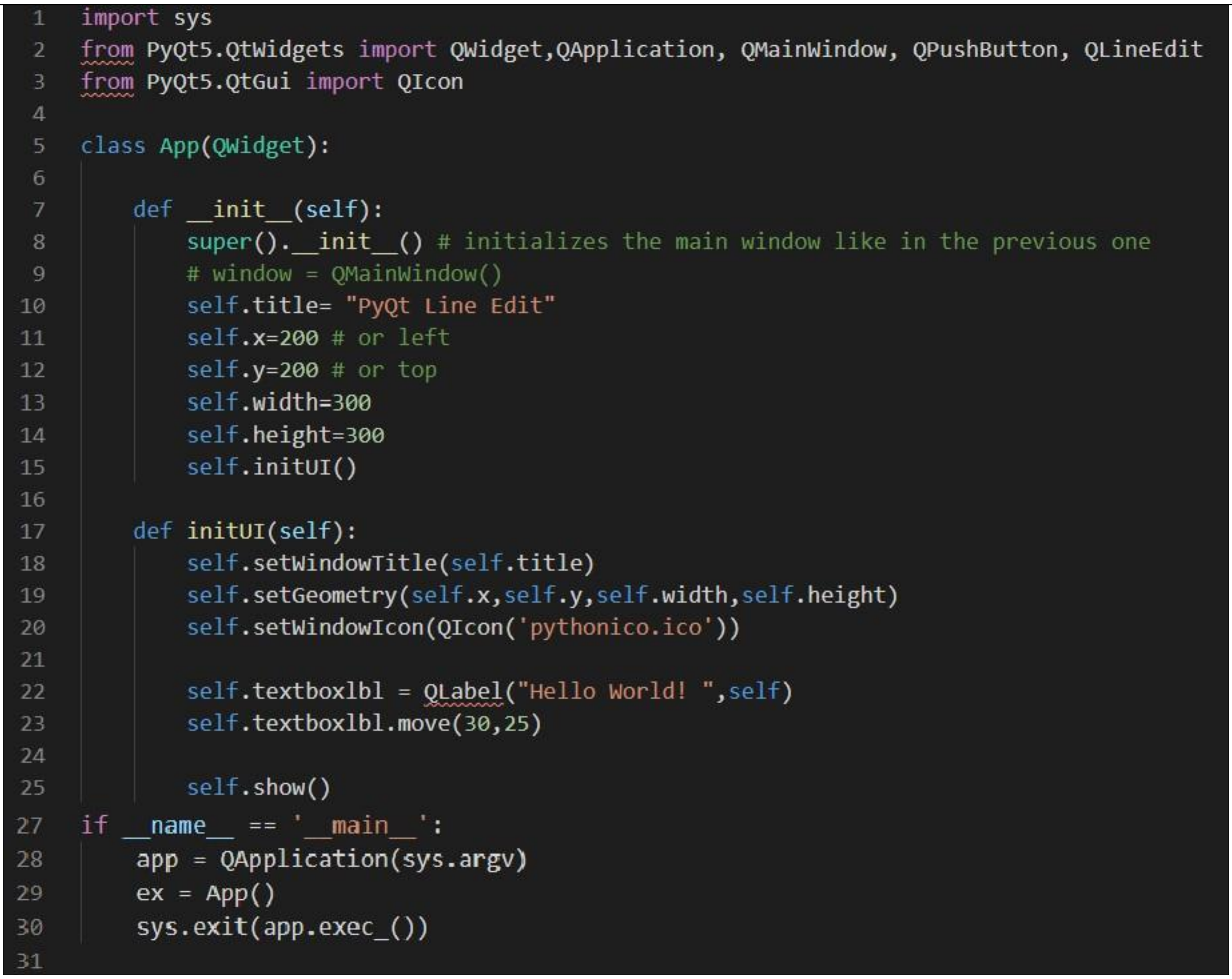
2. Run the program and observe the error.
3. Add an import QLineEdit to the Pycharm.Widgets import
4. Run the program and observe the output.
5. Add the following code below self.textbox.resize()

```python
self.textbox.setText("Set this text value")
```

4. Run the program again then resize the textbox so that it fits in the Window and that its height is just above the written text's height.

Creating Labels

1. Create a new file called **gui_labels.py** and copy the following code below:



```python
import sys
from PyQt5.QtWidgets import QWidget,QApplication, QMainWindow, QPushButton, QLineEdit
from PyQt5.QtGui import QIcon

class App(QWidget):

    def __init__(self):
        super().__init__() # initializes the main window like in the previous one
        # window = QMainWindow()
        self.title= "PyQt Line Edit"
        self.x=200 # or left
        self.y=200 # or top
        self.width=300
        self.height=300
        self.initUI()

    def initUI(self):
        self.setWindowTitle(self.title)
        self.setGeometry(self.x,self.y,self.width,self.height)
        self.setWindowIcon(QIcon('pythonico.ico'))

        self.textboxlbl = QLabel("Hello World! ",self)
        self.textboxlbl.move(30,25)

        self.show()
if __name__ == '__main__':
    app = QApplication(sys.argv)
    ex = App()
    sys.exit(app.exec_())
```

2. Run the program and observe the output.
3. Add the necessary Widget at the import line to make the program run.
4. Center the label by adjusting the parameters of .move(). This is called Absolute Positioning.
5. Create a new label called "This program is written in Pycharm" and place it at the center and below the Hello World!

6. Supplementary Activity:

Task

Create an Object-Oriented GUI Application for a simple Account Registration System with the following required information: first name, last name, username, password, email address, contact number.

Requirements:

- The GUI must be centered on your screen.
- The GUI Components should be organized according to the order of information required using Absolute Positioning.
- The position of the components should be automatically computed based on the top component.
- All the text fields should be accompanied with their corresponding label on the left side while the text field is on the right side.
- There should a program title other than the Window Title.
- There should be a submit button and clear button at the bottom (submit button on the left, clear button on the right).
- The program should be launched on **main.py** while the GUI Codes should be on a separate file called **registration.py**

Questions

1. What are the common GUI Applications that general end-users such as home users, students, and office employees use? (give at least 3 and describe each)
   - Web Browsers like Google Chrome, Opera Gx, that are search engines and use to access web applications. And is also used for browsing the internet.
   - Microsoft Office like Word, spreadsheets and powerpoint, that are tools for school tasks.
   - Media Players like VLC, Allows to view images or video.
   Almost all application use GUI.

2. Based from your answer in question 1, why do you think home users, students, and office employees use those GUI programs?
   - They use them because it makes their life and daily tasks easier, web browsers provide instant access to information and Microsoft Office are often used by students to do their school works.

3. How does Pycharm help developers in making GUI applications, what would be the difference if developers made GUI programs without GUI Frameworks such as Pycharm or Tkinter?
   - It offers syntax highlighting and debugging, which generally makes coding and troubleshooting much easier , without Tkinter or PyQT, developers will have to manually make graphics, mouse activities, and window management which would be time consuming.

4. What are the different platforms a GUI program may be created and deployed on? (Three is required then state why might a program be created on that specific platform)
   - **Windows** that many business and students used, a lot of it is compatible with it.
   - **MacOS** used by designer and professionals who prefers Apple ecosystem.
   - **Linus** is ideal for Open-Source development and server based applications.

5. What is the purpose of **app = QApplication(sys.argv)**, **ex = App()**, and **sys.exit(app.exec_())**?

   - App = Qapplicatoin(sys.argv) initializes the application and manages events.

   - Ex = App() creates and displays the GUI window

   - Sys.exit(app.exec_()) runs the event loop and ensures the program exits properly when consumed

7. Conclusion:

- GUI applications are essential tools for home users, students, and office employees because they simplify everyday tasks, provide access to information, and enhance productivity. Developers rely on platforms like PyCharm and frameworks such as Tkinter to efficiently build these programs, as they streamline the process and reduce complexity. Whether deployed on Windows, macOS, or Linux, these applications cater to diverse needs and ensure compatibility with users' preferred systems. Their functionality and accessibility make them indispensable in both personal and professional life.

8. Assessment Rubric: