Institute of Geographical Information Systems

CS-212 - Object Oriented Programming LAB

Semester: Fall 2025	**Class: SCEE-IGIS - 2024**
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LAB 07: Using Header Files to keep class in separate files

Task # 1:

1. Create a header file named currency_converter.h

- Declare a class CurrencyConverter with private attributes:
- float usdRate; // 1 USD to PKR
- float eurRate; // 1 EUR to PKR
- float gbpRate; // 1 GBP to PKR
- Provide public member functions:
    - Constructor(s) to initialize conversion rates.
    - void setRates(float usd, float eur, float gbp) — updates the exchange rates.
    - float convertToUSD(float pkr) — converts PKR to USD.
    - float convertToEUR(float pkr) — converts PKR to EUR.
    - float convertToGBP(float pkr) — converts PKR to GBP.
    - void displayRates() — displays current conversion rates.

2. Implement all functions in currency_converter.cpp.

3. Write a main.cpp program that:

- Creates an object of the CurrencyConverter class.
- Sets initial rates (e.g., 1 USD = 280 PKR, 1 EUR = 300 PKR, 1 GBP = 350 PKR).
- Takes an amount in PKR from the user.
- Displays equivalent values in USD, EUR, and GBP.
- Optionally allows the user to update exchange rates.

Example Output:

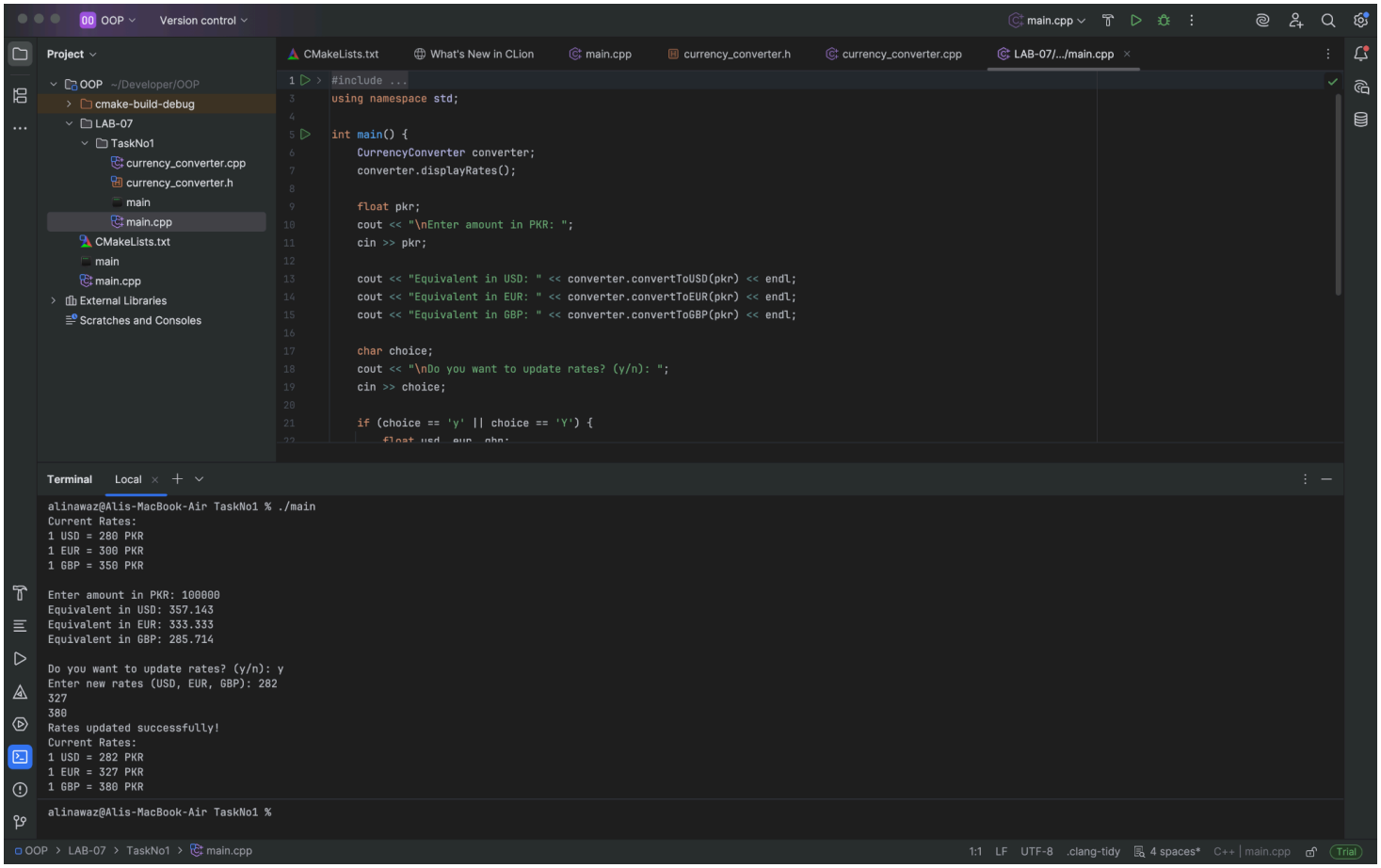
```
--- Currency Converter ---
Current Rates:
1 USD = 280 PKR
1 EUR = 300 PKR
1 GBP = 350 PKR

Enter amount in PKR: 5600
Equivalent in USD: 20.00
Equivalent in EUR: 18.67
Equivalent in GBP: 16.00
```

If the user updates rates:

```
Enter new rates (USD, EUR, GBP): 285 310 355
Rates updated successfully!
```

Screenshot:



Task # 2:
Objective:

Upon completion of this task, students will be able to:

- Design and implement a class structure in C++.
- Use constructors, destructors, and member functions effectively.
- Practice clean class design and modularization using header files.

Task Description:

1. Create a header file named **design_example.h**

Declare a class **Box** representing a 3D box.

Include **private attributes**:

- float length;
- float width;
- float height;

Provide **public member functions**:

- Constructor(s) and Destructor.
- `void setDimensions(float l, float w, float h)` — sets box dimensions.
- `float calculateVolume()` — computes and returns volume.
- `float calculateSurfaceArea()` — computes and returns total surface area.
- `void display()` — displays dimensions, volume, and surface area.

2. Implement all functions in **design_example.cpp**.

3. Write a **main.cpp** program that:

- Creates multiple **Box** objects.
- Sets different dimensions for each box.
- Displays their dimensions, volume, and surface area.
- Demonstrates the effect of constructor and destructor calls (use messages).

Example Output

```
Box 1:
Length = 4, Width = 3, Height = 2
Volume = 24
Surface Area = 52

Box 2:
Length = 6, Width = 4, Height = 3
```

```
Volume = 72
Surface Area = 108
```

General Requirements

- All data members in classes must be private.
- No global variables are allowed.
- Each module must have a .h and a .cpp file for separation of declaration and implementation.
- The main.cpp file must demonstrate the usage of each module.
- Use appropriate comments and indentation.
- Test your program with multiple sets of inputs.

Deliverables

Submit the following files for each task:

- **Header (.h)** file
- **Source (.cpp)** file
- **main.cpp**

Screenshot: