

Lab 1: Java Fundamentals & Project Structure

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Lab Objective

- ▶ Write a simple Java program
- ▶ Learn basic Java project structure
- ▶ Compile and run Java from the terminal
- ▶ Introduce Git version control
- ▶ Transition from terminal to VS Code

Assignment

Write a program that displays the area and perimeter of a rectangle with:

- ▶ Width = 4.5
- ▶ Height = 7.9

Formulas:

$\text{Area} = \text{width} \times \text{height}$

$\text{Perimeter} = 2 \times (\text{width} + \text{height})$

Project Folder Structure

```
RectangleApp/  
  src/  
    main/  
      java/  
        com/  
          yourname/  
            rectangleapp/  
              RectangleCalculator.java  
  .gitignore  
  README.md
```

RectangleCalculator.java

```
package com.yourname.rectangleapp;

public class RectangleCalculator {
    public static void main(String[] args) {
        double width = 4.5;
        double height = 7.9;

        double area = width * height;
        double perimeter = 2 * (width + height);

        System.out.println("Rectangle width: " + width);
        System.out.println("Rectangle height: " + height);
        System.out.println("Area: " + area);
        System.out.println("Perimeter: " + perimeter);
    }
}
```

Compile and Run (Terminal)

```
cd RectangleApp/src/main/java  
javac com/yourname/rectangleapp/RectangleCalculator.java  
java com.yourname.rectangleapp.RectangleCalculator
```

Git Workflow

```
cd RectangleApp  
git init  
git add .  
git commit -m "Initial commit - Rectangle Calculator"
```

Setup Script for Students

```
chmod +x setup.sh  
./setup.sh
```

This script generates:

- ▶ Project folders
- ▶ Java source file
- ▶ README and .gitignore
- ▶ Local Git repository

VS Code Workflow

- ▶ Open the RectangleApp folder in VS Code
- ▶ Install Java Extension Pack
- ▶ Open RectangleCalculator.java
- ▶ Click Run

Using a Makefile

```
make          # compile
make run      # compile and run
make clean    # remove .class files
```

- ▶ Makefile automates terminal commands
- ▶ No IDE required
- ▶ Common in real-world projects

Questions?