



COMSATS University Islamabad Abbottabad Campus

LAB 2:

Topics Covered in Lab 2:

Output, Comments, Variables, Data Types, Operators, Type Casting, If-Else Statements, Break, methods with parameters and return values.

Q1: Java Basics

i. Student Grade Calculator

Instructions:

- ☐ Ask the user to enter marks for Quiz (out of 15), Assignment (out of 10), Mid-Term (out of 25), and Final Exam (out of 50).
- ☐ Store these values in variables of appropriate data types.
- ☐ Calculate Total Marks and Average (use type casting to show decimal values).
- ☐ Display the Grade using if-else.
- ☐ Add comments to explain your code.

Grading Rules:

Expected Output Example:

Enter Quiz Marks: 12

Enter Assignment Marks: 9

Enter Mid-Term Marks: 20

Enter Final Marks: 40

Total Marks = 81

Average = 81.0

Grade = A-ii. Pizza Billing System

```
import java.util.Scanner;

public class StudentGradeCalculator {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        // Taking inputs from the user
        System.out.print("Enter Quiz Marks (out of 15): ");
        int quiz = input.nextInt();

        System.out.print("Enter Assignment Marks (out of 10): ");
        int assignment = input.nextInt();

        System.out.print("Enter Mid-Term Marks (out of 25): ");
        int mid = input.nextInt();

        System.out.print("Enter Final Exam Marks (out of 50): ");
        int fin = input.nextInt();

        // Total marks calculation
        int total = quiz + assignment + mid + fin;

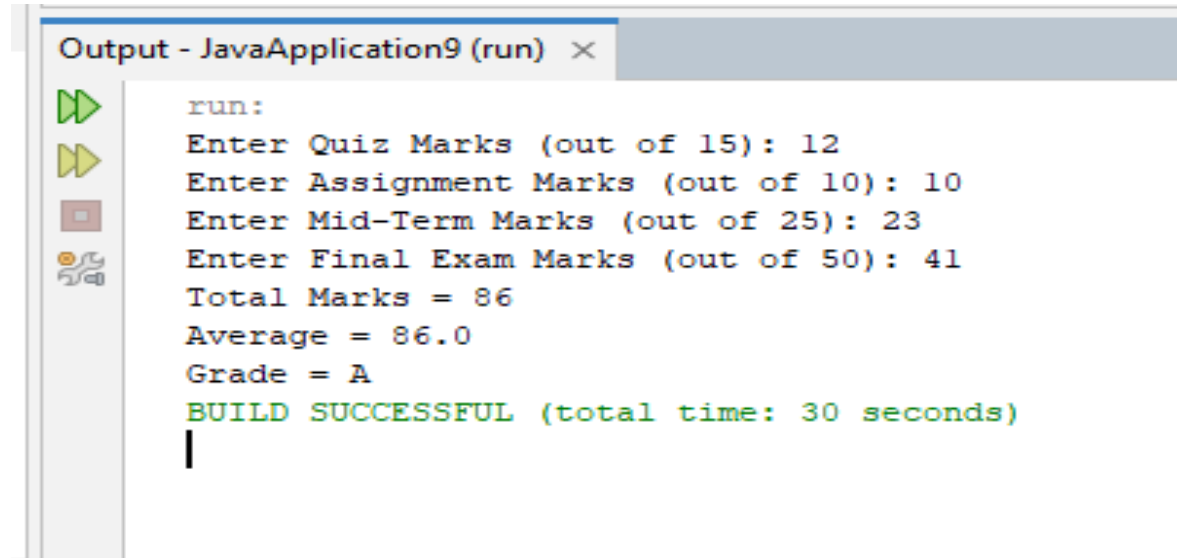
        // Average calculation (type casting to double for decimal value)
        double average = (double) total;

        // Display total and average
        System.out.println("Total Marks = " + total);
        System.out.println("Average = " + average);

        // Grade calculation using if-else
        if (average >= 85) {
            System.out.println("Grade = A");
        } else if (average >= 80) {
            System.out.println("Grade = A-");
        } else if (average >= 75) {
            System.out.println("Grade = B+");
        } else if (average >= 70) {
            System.out.println("Grade = B");
        } else if (average >= 65) {
            System.out.println("Grade = C+");
        } else if (average >= 60) {
            System.out.println("Grade = C");
        } else if (average >= 50) {
            System.out.println("Grade = D");
        } else {
            System.out.println("Grade = F");
        }

        input.close();
    }
}
```

OUTPUT:



```
Output - JavaApplication9 (run) ×
run:
Enter Quiz Marks (out of 15): 12
Enter Assignment Marks (out of 10): 10
Enter Mid-Term Marks (out of 25): 23
Enter Final Exam Marks (out of 50): 41
Total Marks = 86
Average = 86.0
Grade = A
BUILD SUCCESSFUL (total time: 30 seconds)
|
```

II.

Instruction

- Ask user for pizza size (small, medium, large) → validate using while(true) until correct.
- Assign base price: small=100, medium=200, large=300.
- Ask if user wants pepperoni: small=+30, medium/large=+50.
- Ask if user wants extra cheese: +20.
- Use continue for invalid inputs, break when valid.
- Show final bill.

Sample Run:

Enter pizza size: mini

Invalid! Try again.

Enter pizza size: small

Do you want pepperoni? yes

Do you want extra cheese? no

Your final bill is: 130 rupees

```

package pizzaillingsystem;

import java.util.Scanner;

public class PizzailingSystem {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int price = 0; // base price

        // Loop until valid pizza size is entered
        while (true) {
            System.out.print("Enter pizza size (small / medium / large): ");
            String size = sc.nextLine().toLowerCase();

            if (size.equals("small")) {
                price = 100;
                break; // valid input → exit loop
            } else if (size.equals("medium")) {
                price = 200;
                break;
            } else if (size.equals("large")) {
                price = 300;
                break;
            } else {
                System.out.println("Invalid! Try again.");
                continue; // invalid input → repeat loop
            }
        }

        // Ask if user wants pepperoni
        System.out.print("Do you want pepperoni? (yes/no): ");
        String pepperoni = sc.nextLine().toLowerCase();
        if (pepperoni.equals("yes")) {
            if (price == 100) { // small
                price += 30;
            } else { // medium or large
                price += 50;
            }
        }

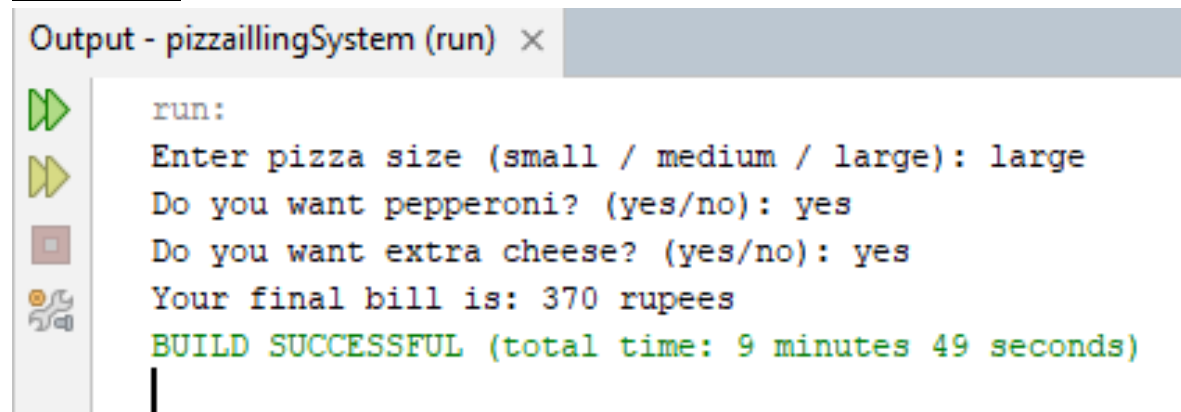
        // Ask if user wants extra cheese
        System.out.print("Do you want extra cheese? (yes/no): ");
        String cheese = sc.nextLine().toLowerCase();
        if (cheese.equals("yes")) {
            price += 20;
        }

        // Display final bill
        System.out.println("Your final bill is: " + price + " rupees");

        sc.close();
    }
}

```

OUTPUT:



```
Output - pizzaillingSystem (run) ×
run:
Enter pizza size (small / medium / large): large
Do you want pepperoni? (yes/no): yes
Do you want extra cheese? (yes/no): yes
Your final bill is: 370 rupees
BUILD SUCCESSFUL (total time: 9 minutes 49 seconds)
|
```

Q2: Practice function Question

i. Basic Calculator

Implement following methods:

- `int add (int a, int b)`
- `int subtract (int a, int b)`
- `long multiply (int a, int b)`
- `double divide (int a, int b) → guard against divide by zero.`

Demonstrate each method with user input.

```
package basiccalculator; // ✅ must match your project name

import java.util.Scanner;

public class BasicCalculator {

    // Method to add two integers
    public static int add(int a, int b) {
        return a + b;
    }

    // Method to subtract two integers
    public static int subtract(int a, int b) {
        return a - b;
    }

    // Method to multiply two integers (long in case of large result)
    public static long multiply(int a, int b) {
        return (long) a * b;
    }

    // Method to divide two integers (double result, guard against divide by zero)
    public static double divide(int a, int b) {
        if (b == 0) {
            System.out.println("Error: Division by zero is not allowed!");
            return 0.0;
        }
        return (double) a / b;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

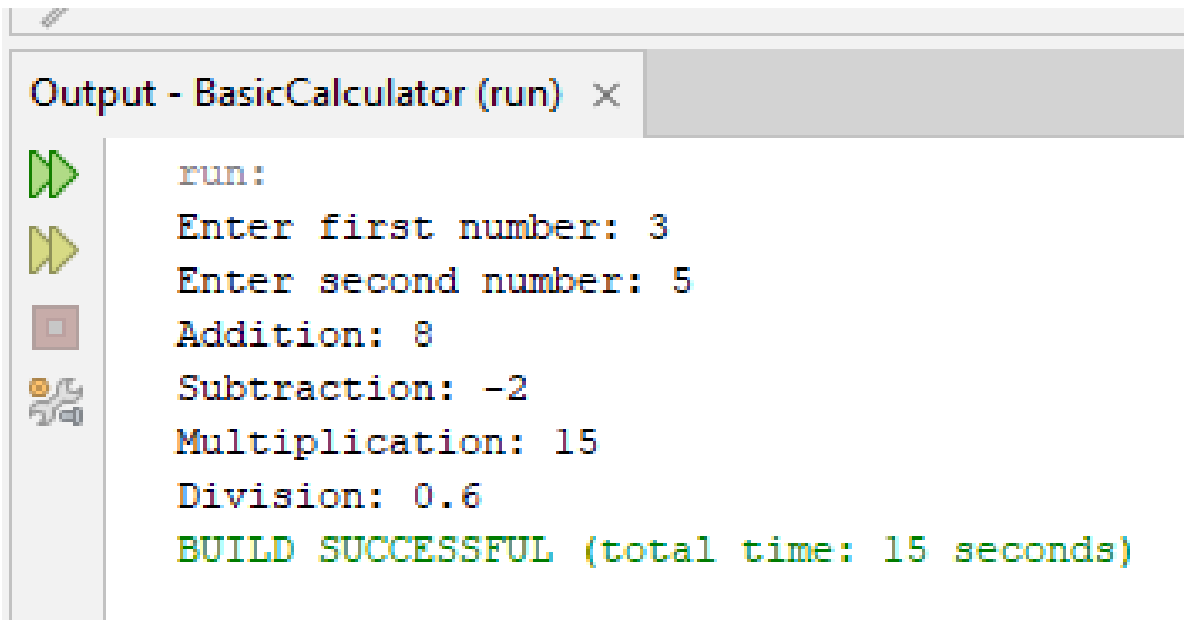
        // Taking user input
        System.out.print("Enter first number: ");
        int num1 = sc.nextInt();

        System.out.print("Enter second number: ");
        int num2 = sc.nextInt();

        // Demonstrating all functions
        System.out.println("Addition: " + add(num1, num2));
        System.out.println("Subtraction: " + subtract(num1, num2));
        System.out.println("Multiplication: " + multiply(num1, num2));
        System.out.println("Division: " + divide(num1, num2));

        sc.close();
    }
}
```

OUTPUT:



```
run:
Enter first number: 3
Enter second number: 5
Addition: 8
Subtraction: -2
Multiplication: 15
Division: 0.6
BUILD SUCCESSFUL (total time: 15 seconds)
```

ii. Student Marks Calculator

Implement the following functions:

- `int totalMarks (int m1, int m2, int m3)` → returns the sum of three subject marks.
- `double averageMarks (int m1, int m2, int m3)` → returns the average.
- `char grade (double avg)` → returns grade (A, B, C, F) based on average.

Task: Ask the user for 3 subject marks, use functions, and display total, average, and grade

```
package studentmarkscalculator; // ✓ make sure project name = StudentMarksCalculator

import java.util.Scanner;

public class Studentmarkscalculator
{
    // Function to calculate total marks
    public static int totalMarks(int m1, int m2, int m3) {
        return m1 + m2 + m3;
    }

    // Function to calculate average marks
    public static double averageMarks(int m1, int m2, int m3) {
        return (m1 + m2 + m3) / 3.0;
    }

    // Function to calculate grade based on average
    public static char grade(double avg) {
        if (avg >= 80) {
            return 'A';
        } else if (avg >= 60) {
            return 'B';
        } else if (avg >= 40) {
            return 'C';
        } else {
            return 'F';
        }
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Input marks
        System.out.print("Enter marks for Subject 1: ");
        int m1 = sc.nextInt();

        System.out.print("Enter marks for Subject 2: ");
        int m2 = sc.nextInt();

        System.out.print("Enter marks for Subject 3: ");
        int m3 = sc.nextInt();

        // Calculate results
        int total = totalMarks(m1, m2, m3);
        double avg = averageMarks(m1, m2, m3);
        char grd = grade(avg);

        // Display results
        System.out.println("\n--- Results ---");
        System.out.println("Total Marks = " + total);
        System.out.println("Average Marks = " + avg);
        System.out.println("Grade = " + grd);

        sc.close();
    }
}
```


OUTPUT:

```
Output - studentmarkscalculator (run) ×
Enter marks for Subject 1: 15
Enter marks for Subject 2: 20
Enter marks for Subject 3: 30

--- Results ---
Total Marks = 65
Average Marks = 21.666666666666668
Grade = F
BUILD SUCCESSFUL (total time: 26 seconds)
```

iii. Temperature Converter

Implement the following functions:

□ `double celsiusToFahrenheit (double c)` $F = (C * 9/5) + 32$

□ `double fahrenheitToCelsius (double f)` $C = (F - 32) * 5/9$

Task: Ask the user for temperature and conversion choice. Use functions to convert and show the result.



```
package temperature.converter;
import java.util.Scanner;
public class TemperatureConverter {
    // Function: Celsius → Fahrenheit
    public static double celsiusToFahrenheit(double c) {
        return (c * 9.0 / 5.0) + 32;
    }
    // Function: Fahrenheit → Celsius
    public static double fahrenheitToCelsius(double f) {
        return (f - 32) * 5.0 / 9.0;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("=== Temperature Converter ===");
        System.out.println("1. Celsius to Fahrenheit");
        System.out.println("2. Fahrenheit to Celsius");
        System.out.print("Enter your choice (1 or 2): ");
        int choice = sc.nextInt();
        if (choice == 1) {
            System.out.print("Enter temperature in Celsius: ");
            double c = sc.nextDouble();
            double f = celsiusToFahrenheit(c);
            System.out.println(c + " °C = " + f + " °F");
        } else if (choice == 2) {
            System.out.print("Enter temperature in Fahrenheit: ");
            double f = sc.nextDouble();
            double c = fahrenheitToCelsius(f);
            System.out.println(f + " °F = " + c + " °C");
        } else {
            System.out.println("❌ Invalid choice!");
        }
        sc.close();
    }
}
```

OUTPUT:

Output - Temperature Converter (run) ×



run:

=== Temperature Converter ===

1. Celsius to Fahrenheit

2. Fahrenheit to Celsius

Enter your choice (1 or 2): 1

Enter temperature in Celsius: 33

33.0 °C = 91.4 °F

BUILD SUCCESSFUL (total time: 1 minute 23 seconds)

|