PRACTICAL 8:

```
package hrhh;

import java.util.Scanner;

public class calculator_1 {

   void complex() {
      Scanner input = new Scanner(System.in);
      System.out.print("Enter the real part of first number: ");
      int r1 = input.nextInt();

      System.out.print("Enter the imaginary part of first number: ");
      int i1 = input.nextInt();

      System.out.print("Enter the real part of second number: ");
      int r2 = input.nextInt();

      System.out.print("Enter the imaginary part of second number: ");
      int i2 = input.nextInt();

      System.out.println("The addition of complex number is: " + (r1 + r2) + " + i" + (i1 + i2));
   }
```

```
void matrix() {
    Scanner input = new Scanner(System.in);
    System.out.print("Enter a1: ");
    int a1 = input.nextInt();

    System.out.print("Enter b1: ");
    int b1 = input.nextInt();

    System.out.print("Enter c1:  ");
    int c1 = input.nextInt();

    System.out.print("Enter d1: ");
    int d1 = input.nextInt();

    System.out.print("Enter a2: ");
    int a2 = input.nextInt();

    System.out.print("Enter b2: ");
    int b2 = input.nextInt();

    System.out.print("Enter c2:  ");
    int c2 = input.nextInt();

    System.out.print("Enter d2: ");
    int d2 = input.nextInt();
```

```
    System.out.print((a1 * a2) + (b1 * b2) + " ");
    System.out.println((a1 * b2) + (b1 * d2) + " ");
    System.out.print((c1 * a2) + (d1 * c2) + " ");
    System.out.print((c1 * b2) + (d1 * d2) + " ");
}

void mathFunctions() {
    Scanner input = new Scanner(System.in);
    System.out.print("Enter a number to test Math functions: ");
    double num = input.nextDouble();

    // Demonstrating Java Math class functions
    System.out.println("Square root of " + num + " = " + Math.sqrt(num));
    System.out.println("Power (" + num + "^2) = " + Math.pow(num, 2));
    System.out.println("Absolute value of " + num + " = " + Math.abs(num));

}

public static void main(String[] args) {
    calculator_1 cal = new calculator_1();
    Scanner input = new Scanner(System.in);
    int num1 = 0;
    int num2 = 0;

    while (true) {
```

```
// Show operation choices
System.out.println("\nChoose from below operations: ");
System.out.println("1] Addition       |  5] Complex Number");
System.out.println("2] Subtraction    |  6] Matrix Multiplication");
System.out.println("3] Multiplication |  7] Math Functions");
System.out.println("4] Division       |");

System.out.print("Enter your choice (1-7): ");
int choice = input.nextInt();
input.nextLine(); // clear buffer

if (choice >= 1 && choice <= 4) {
   System.out.print("Enter the first number: ");
   num1 = input.nextInt();
   System.out.print("Enter the second number: ");
   num2 = input.nextInt();
   input.nextLine(); // Clear buffer
}

switch (choice) {
   case 1:
      System.out.println("The sum of the two numbers is: " + (num1 + num2));
      break;

   case 2:
      System.out.println("The difference of the two numbers is: " + (num1 - num2));
```

```
    break;

case 3:
    System.out.println("The product of the two numbers is: " + (num1 * num2));
    break;

case 4:
    if (num2 != 0)
        System.out.println("The division of the two numbers is: " + ((float) num1 / num2));
    else
        System.out.println("Cannot divide by zero!");
    break;

case 5:
    cal.complex();
    break;

case 6:
    cal.matrix();
    break;

case 7:
    cal.mathFunctions();
    break;

default:
```

```
                System.out.println("Invalid choice!");
            }

            System.out.print("\nDo you want to continue? (yes/no): ");
            String user = input.nextLine().toLowerCase();

            if (!user.equals("yes")) {
                System.out.println("Exiting calculator. Thank you!");
                break;
            }
        }

        input.close();
    }
}
```

Outputs:

```
Choose from below operations:
1] Addition       |  5] Complex Number
2] Subtraction    |  6] Matrix Multiplication
3] Multiplication |  7] Math Functions
4] Division       |
Enter your choice (1-7): 1
Enter the first number: 2
Enter the second number: 3
The sum of the two numbers is: 5
```

Do you want to continue? (yes/no): yes

Choose from below operations:

1] Addition | 5] Complex Number

2] Subtraction | 6] Matrix Multiplication

3] Multiplication | 7] Math Functions

4] Division |

Enter your choice (1-7): 2

Enter the first number: 5

Enter the second number: 3

The difference of the two numbers is: 2

Do you want to continue? (yes/no): yes

Choose from below operations:

1] Addition | 5] Complex Number

2] Subtraction | 6] Matrix Multiplication

3] Multiplication | 7] Math Functions

4] Division |

Enter your choice (1-7): 3

Enter the first number: 5

Enter the second number: 5

The product of the two numbers is: 25

Do you want to continue? (yes/no): yes

Choose from below operations:

1] Addition | 5] Complex Number

2] Subtraction | 6] Matrix Multiplication

3] Multiplication | 7] Math Functions

4] Division |

Enter your choice (1-7): 5

Enter the real part of first number: 4

Enter the imaginary part of first number: 5

Enter the real part of second number: 6

Enter the imaginary part of second number: 7

The addition of complex number is: 10 + i12

Do you want to continue? (yes/no): yes

Choose from below operations:

1] Addition | 5] Complex Number

2] Subtraction | 6] Matrix Multiplication

3] Multiplication | 7] Math Functions

4] Division |

Enter your choice (1-7): 7

Enter a number to test Math functions: 4

Square root of 4.0 = 2.0

Power (4.0^2) = 16.0

Absolute value of 4.0 = 4.0

Do you want to continue? (yes/no): yes

Choose from below operations:

1] Addition | 5] Complex Number

2] Subtraction | 6] Matrix Multiplication

3] Multiplication | 7] Math Functions

4] Division |

Enter your choice (1-7): 6

Enter a1: 3

Enter b1: 4

Enter c1: 5

Enter d1: 6

Enter a2: 7

Enter b2: 8

Enter c2: 9

Enter d2: 23

53 116

89 178

Do you want to continue? (yes/no):