```java
import java.io.*;
import java.util.*;

public class part1{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        BufferedReader bufferedReader = new BufferedReader(new InputStreamReader(System.in));
        DataInputStream dataInputStream = new DataInputStream(System.in);
        Console console = System.console();

        while (true) {
            System.out.println("\nMenu:");
            System.out.println("1. Command Line Arguments");
            System.out.println("2. Scanner");
            System.out.println("3. BufferedReader");
            System.out.println("4. DataInputStream");
            System.out.println("5. Console");
            System.out.println("6. Exit");
            System.out.print("Enter your choice: ");

            int choice;
            try {
                choice = Integer.parseInt(scanner.nextLine());
            } catch (NumberFormatException e) {
                System.out.println("Invalid input. Please enter a number.");
                continue;
            }

            switch (choice) {
                case 1:
                    commandLineArguments(args);
                    break;
                case 2:
```

```
34                      scannerInput(scanner);
35                      break;
36                  case 3:
37                      bufferedReaderInput(
   bufferedReader);
38                      break;
39                  case 4:
40                      dataInputStreamInput(
   dataInputStream);
41                      break;
42                  case 5:
43                      consoleInput(console);
44                      break;
45                  case 6:
46                      System.out.println("Exiting..."
   );
47                      System.exit(0);
48                  default:
49                      System.out.println("Invalid
   choice. Please enter a number between 1 and 6.");
50              }
51          }
52      }
53
54      private static void commandLineArguments(String
   [] args) {
55          System.out.println("Command Line Arguments
   :");
56          for (String arg : args) {
57              System.out.println(arg);
58          }
59      }
60
61      private static void scannerInput(Scanner
   scanner) {
62          System.out.print("Enter input using Scanner
   : ");
63          String input = scanner.nextLine();
64          System.out.println("Input entered: " +
   input);
65      }
```

```
66
67      private static void bufferedReaderInput(BufferedReader bufferedReader) {
68          try {
69              System.out.print("Enter input using BufferedReader: ");
70              String input = bufferedReader.readLine();
71              System.out.println("Input entered: " + input);
72          } catch (IOException e) {
73              System.out.println("Error reading input: " + e.getMessage());
74          }
75      }
76
77      private static void dataInputStreamInput(DataInputStream dataInputStream) {
78          try {
79              System.out.print("Enter input using DataInputStream: ");
80              String input = dataInputStream.readLine();
81              System.out.println("Input entered: " + input);
82          } catch (IOException e) {
83              System.out.println("Error reading input: " + e.getMessage());
84          }
85      }
86
87      private static void consoleInput(Console console) {
88          if (console == null) {
89              System.out.println("Console not available.");
90              return;
91          }
92          System.out.print("Enter input using Console: ");
93          String input = console.readLine();
```

```
94          System.out.println("Input entered: " +
    input);
95      }
96  }
97
```

OUTPUTS - PART_1

```
Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 1
Command Line Arguments:

Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 2
Enter input using Scanner: 5
Input entered: 5

Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 3
Enter input using BufferedReader: 3
Input entered: 3
```

```
Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 4
Enter input using DataInputStream: 4
Input entered: 4

Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 5
Enter input using Console: 5
Input entered: 5

Menu:
1. Command Line Arguments
2. Scanner
3. BufferedReader
4. DataInputStream
5. Console
6. Exit
Enter your choice: 6
Exiting...
harshkotadiya@Harshs-Laptop CodeSpace_4 %
```

```java
import java.util.Arrays;
import java.util.Scanner;

public class CombinedCalculator {
    public static void main(String[] args) {
        CombinedCalculator calculator = new CombinedCalculator();
        Scanner scn = new Scanner(System.in);

        boolean exit = false;

        while (!exit) {
            System.out.println("Choose an option:");
            System.out.println("1. Addition");
            System.out.println("2. Subtraction");
            System.out.println("3. Multiplication");
            System.out.println("4. Division");
            System.out.println("5. Array Operation");
            System.out.println("6. Exit");

            int choice = scn.nextInt();

            switch (choice) {
                case 1:
                    calculator.performBinaryOperation('+');
                    break;

                case 2:
                    calculator.performBinaryOperation('-');
                    break;

                case 3:
                    calculator.performBinaryOperation('*');
                    break;

```

```
35                  case 4:
36                      calculator.
   performBinaryOperation('/');
37                      break;
38
39                  case 5:
40                      calculator.
   performArrayOperation();
41                      break;
42
43                  case 6:
44                      exit = true;
45                      System.out.println("Exiting the
    program. Goodbye!");
46                      break;
47
48                  default:
49                      System.out.println("Invalid
   choice. Please choose a valid option.");
50              }
51          }
52
53          scn.close();
54      }
55
56      private void performBinaryOperation(char
   operator) {
57          double[] numbers = inputNumbers();
58          double firstNumber = numbers[0];
59          double secondNumber = numbers[1];
60
61          switch (operator) {
62              case '+':
63                  System.out.println("The Addition of
    " + firstNumber + " and " + secondNumber + " is "
    + addition(firstNumber, secondNumber));
64                  break;
65
66              case '-':
67                  System.out.println("The Subtraction
    of " + firstNumber + " and " + secondNumber + " is
```

```
67  " + subtraction(firstNumber, secondNumber));
68                  break;
69
70              case '*':
71                  System.out.println("The
    Multiplication of " + firstNumber + " and " +
    secondNumber + " is " + multiplication(firstNumber
    , secondNumber));
72                  break;
73
74              case '/':
75                  System.out.println("The Division
    of " + firstNumber + " and " + secondNumber + " is
     " + division(firstNumber, secondNumber));
76                  break;
77
78              default:
79                  System.out.println("Invalid
    operation");
80                  break;
81          }
82      }
83
84      private void performArrayOperation() {
85          double[] arr = getArrayInput();
86
87          System.out.println("Choose an array
    operation:");
88          System.out.println("1. Variance");
89          System.out.println("2. Standard Deviation"
    );
90          System.out.println("3. Average");
91
92          Scanner scn = new Scanner(System.in);
93          int arrayOperationChoice = scn.nextInt();
94
95          switch (arrayOperationChoice) {
96              case 1:
97                  System.out.println("Variance: " +
    varianceOfArray(arr));
98                  break;
```

```
 99
100             case 2:
101                 System.out.println("Standard
    Deviation: " + standardDeviationOfArray(arr));
102                 break;
103
104             case 3:
105                 System.out.println("Average: " +
    calculateMean(arr));
106                 break;
107
108             default:
109                 System.out.println("Invalid array
    operation");
110                 break;
111         }
112     }
113
114     private double[] inputNumbers() {
115         double numbers[] = new double[2];
116         Scanner scan = new Scanner(System.in);
117
118         System.out.println("Enter First Number:");
119         double firstNumber = scan.nextDouble();
120         numbers[0] = firstNumber;
121
122         System.out.println("Enter Second Number :"
    );
123         double secondNumber = scan.nextDouble();
124         numbers[1] = secondNumber;
125
126         return numbers;
127     }
128
129     private double[] getArrayInput() {
130         Scanner scanner = new Scanner(System.in);
131         System.out.println("Enter the size of the
    array:");
132         int size = scanner.nextInt();
133
134         double[] array = new double[size];
```

```
135         System.out.println("Enter the elements of
    the array:");
136         for (int i = 0; i < size; i++) {
137             array[i] = scanner.nextDouble();
138         }
139 
140         return array;
141     }
142 
143     private double addition(double firstNumber,
    double secondNumber) {
144         return firstNumber + secondNumber;
145     }
146 
147     private double subtraction(double firstNumber
    , double secondNumber) {
148         return firstNumber - secondNumber;
149     }
150 
151     private double multiplication(double
    firstNumber, double secondNumber) {
152         return firstNumber * secondNumber;
153     }
154 
155     private double division(double firstNumber,
    double secondNumber) {
156         if (secondNumber != 0) {
157             return firstNumber / secondNumber;
158         } else {
159             System.out.println("Error: Cannot
    divide by zero");
160             return Double.NaN;
161         }
162     }
163 
164     private double sumOfArray(double[] array) {
165         return Arrays.stream(array).sum();
166     }
167 
168     private double varianceOfArray(double[] array
    ) {
```

```
169         double mean = calculateMean(array);
170         double sumSquaredDifferences = 0;
171
172         for (double num : array) {
173             sumSquaredDifferences += Math.pow(num
     - mean, 2);
174         }
175
176         return sumSquaredDifferences / array.
    length;
177     }
178
179     private double standardDeviationOfArray(double
    [] array) {
180         return Math.sqrt(varianceOfArray(array));
181     }
182
183     private double calculateMean(double[] array) {
184         return Arrays.stream(array).sum() / array.
    length;
185     }
186 }
187
```

OUTPUTS - PART_2

```
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
1
Enter First Number:
5
Enter Second Number :
5
The Addition of 5.0 and 5.0 is 10.0
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
3
Enter First Number:
5
Enter Second Number :
5
The Multiplication of 5.0 and 5.0 is 25.0
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
```

```
The Multiplication of 5.0 and 5.0 is 25.0
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
4
Enter First Number:
0
Enter Second Number :
5
The Division of 0.0 and 5.0 is 0.0
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
5
Enter the size of the array:
5
Enter the elements of the array:
1
2
3
4
5
Choose an array operation:
1. Variance
2. Standard Deviation
3. Average
1
Variance: 2.0
```

```
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
5
Enter the size of the array:
5
Enter the elements of the array:
1
1
1
1
1
Choose an array operation:
1. Variance
2. Standard Deviation
3. Average
1
Variance: 0.0
Choose an option:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Array Operation
6. Exit
6
Exiting the program. Goodbye!
```