# Week 3 - Level 1 - 10 Practice Problems

1.Write a program to take user input for the age of all 10 students in a class and check whether the student can vote depending on his/her age is greater or equal to 18.

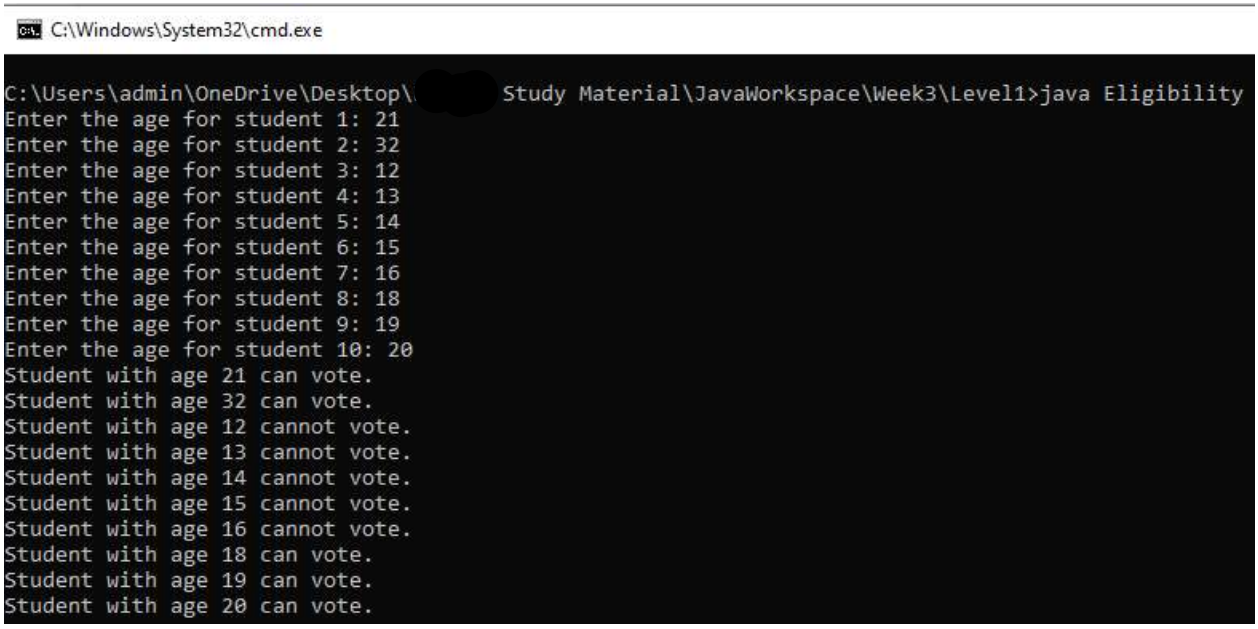
**Hint =>**

a. Define an array of 10 integer elements and take user input for the student's age.
b. Loop through the array using the length property and for the element of the array check If the age is a negative number print an invalid age and if 18 or above, print The student with the age ___ can vote. Otherwise, print The student with the age ___ cannot vote.

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class Eligibility {
   public static void main(String[] args) {
      // Create an array for 10 ages
      int[] ages = new int[10];
      // Set up a scanner object
      Scanner myobj = new Scanner(System.in);
      // Get 10 ages from the user
      for (int i = 0; i < ages.length; i++) {
         System.out.print("Enter the age for student " + (i + 1) + ": ");
         ages[i] = myobj.nextInt();
      }
      // Check each age to see voting eligibility
      for (int i = 0; i < ages.length; i++) {
         int age = ages[i];
         if (age < 0) {// if age is negative:invalid age
            System.out.println("Student with age " + age + ": Invalid age");
         } else if (age >= 18) {// Can vote if age is 18 or more
            System.out.println("Student with age " + age + " can vote.");
         } else {// not eligible
            System.out.println("Student with age " + age + " cannot vote.");
         }
      }
   }
}
```

Output Verification:




2. Write a program to take user input for 5 numbers and check whether a number is positive, negative, or zero. Further for positive numbers check if the number is even or odd. Finally compare the first and last elements of the array and display if they equal, greater or less

**Hint =>**

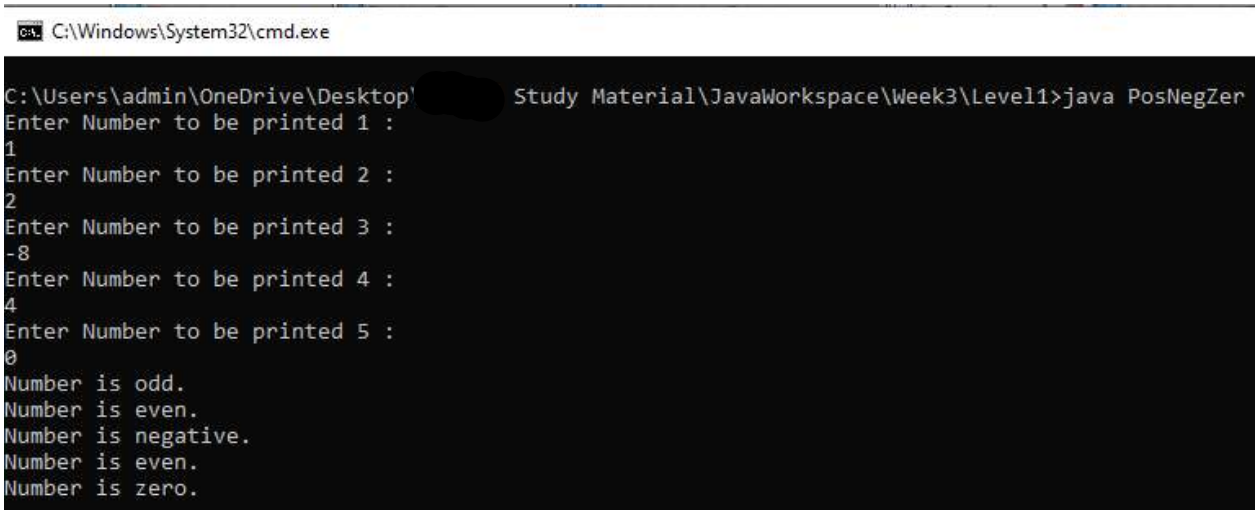
a. Define an integer array of 5 elements and get user input to store in the array.
b. Loop through the array using the length If the number is positive, check for even or odd numbers and print accordingly
c. If the number is negative, print negative. Else if the number is zero, print zero.
d. Finally compare the first and last element of the array and display if they equal, greater or less

Ans) Code:

```
//import java utility scanner

import java.util.Scanner;

//declare class

public class PosNegZer {

   public static void main(String[] args) {

      // Create an array to store 5 numbers

      int[] num = new int[5];

      // Create a Scanner object

      Scanner myobj = new Scanner(System.in);

      // Loop to get 5 numbers from the user
```

```
        for (int i = 0; i < num.length; i++) {
            System.out.println("Enter Number to be printed " + (i + 1) + " :");//prompt user for input
            num[i] = myobj.nextInt(); // Save the input in the array
        }
        // Loop to check each number in the array
        for (int i = 0; i < num.length; i++) {
            // If the number is 0, print "zero"
            if (num[i] == 0) {
                System.out.println("Number is zero.");
            }
            // If the number is positive, check if it's even or odd
            else if (num[i] > 0) {
                if (num[i] % 2 == 0) {
                    System.out.println("Number is even.");
                } else {
                    System.out.println("Number is odd.");
                }
            }
            // If the number is not 0 and not positive, it is negative
            else {
                System.out.println("Number is negative.");
            }
        }
    }
}
```

Output Verification:




3. Create a program to print a multiplication table of a number.

**Hint =>**

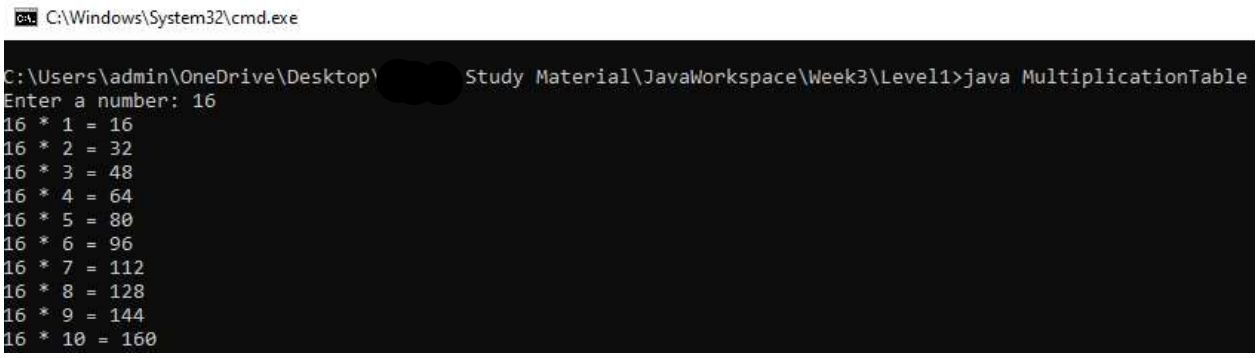
a. Get an integer input and store it in the number variable. Also, define a integer array to store the results of multiplication from 1 to 10
b. Run a loop from 1 to 10 and store the results in the multiplication table array
c. Finally, display the result from the array in the format number * i = ___

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class MultiplicationTable {
    public static void main(String[] args) {
        // Set up Scanner object
        Scanner myobj = new Scanner(System.in);
        // Prompt the user to enter a number
        System.out.print("Enter a number: ");
        int number = myobj.nextInt();//store values in array
        // Define an array
        int[] table = new int[10];
        // Fill the array with results
        for (int i = 1; i <= 10; i++) {
            table[i - 1] = number * i;  // Store multiplication in array
```

```
        }
        // Print the multiplication table using the array
        for (int i = 1; i <= 10; i++) {
            System.out.println(number + " * " + i + " = " + table[i - 1]);
        }
    }
}
```

Output Verification:




4. Write a program to store multiple values in an array up to a maximum of 10 or until the user enters a 0 or a negative number. Show all the numbers as well as the sum of all numbers

**Hint =>**

a. Create a variable to store an array of 10 elements of type double as well as a variable to store the total of type double initializes to 0.0. Also, the index variable is initialized to 0 for the array
b. Use infinite while loop as in ***while (true)***
c. Take the user entry and check if the user entered 0 or a negative number to break the loop
d. Also, ***break*** from the loop if the index has a value of 10 as the array size is limited to 10.
e. If the user entered a number other than 0 or a negative number inside the while loop then assign the number to the array element and increment the index value
f. Take another ***for*** loop to get the values of each element and add it to the total
g. Finally display the total value

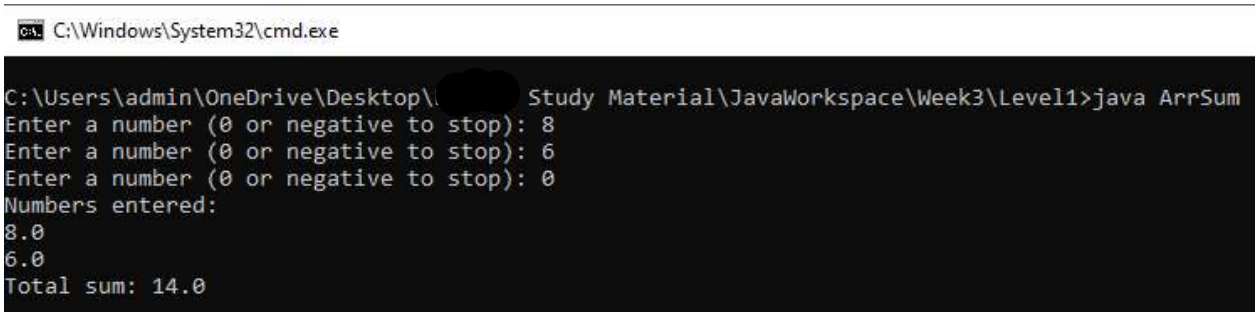
Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class ArrSum {
```

```
public static void main(String[] args) {
    // Create an array to hold up to 10 double numbers
    double[] numbers = new double[10];
    // Variable to hold the total sum of numbers
    double total = 0.0;
    // Index to track the next available position in the array
    int index = 0;
    // Set up Scanner object
    Scanner myobj = new Scanner(System.in);
    // Use loop to get user input
    while (true) {
        // Break out if the array is full
        if (index == numbers.length) {
            break;
        }
        // Prompt the user to enter a number
        System.out.print("Enter a number (0 or negative to stop): ");
        double value = myobj.nextDouble();
        // Break the loop if the user enters 0 or a negative number
        if (value <= 0) {
            break;
        }
        // Store the entered number in the array
        numbers[index] = value;
        // Increment the index for the next number
        index++;
    }
    // Use a for loop to display all entered numbers and calculate the total
    System.out.println("Numbers entered:");
    for (int i = 0; i < index; i++) {
        // Print each number
```

```
            System.out.println(numbers[i]);
            // Add the number to the total
            total += numbers[i];
        }
        // Display the total sum of the numbers
        System.out.println("Total sum: " + total);
    }
}
```

Output Verification:




5. Create a program to find the multiplication table of a number entered by the user from 6 to 9 and display the result

**Hint =>**

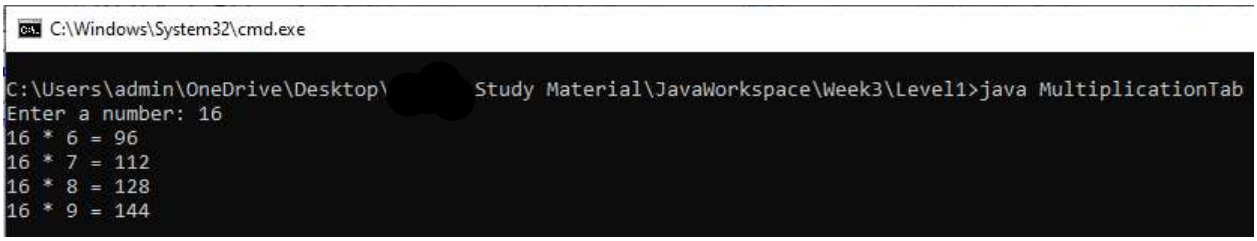
a. Take integer input and store it in the variable number as well as define an integer array to store the multiplication result in the variable multiplicationResult
b. Using a for loop, find the multiplication table of numbers from 6 to 9 and save the result in the array
c. Finally, display the result from the array in the format number * i = ___

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class MultiplicationTab {
    public static void main(String[] args) {
        // Set up Scanner object
        Scanner myobj = new Scanner(System.in);
        // Prompt the user to enter a number
```

```
        System.out.print("Enter a number: ");
        int number = myobj.nextInt();
        // Define an array
        int[] table = new int[10];
        // Fill the array with results
        for (int i = 6; i <= 9; i++) {
            table[i - 1] = number * i;  // Store multiplication result in the array
        }
        // Print the multiplication table using the array
        for (int i = 6; i <= 9; i++) {
            System.out.println(number + " * " + i + " = " + table[i - 1]);
        }
    }
}
```

Output Verification:




6. Create a program to find the mean height of players present in a football team.

**Hint =>**

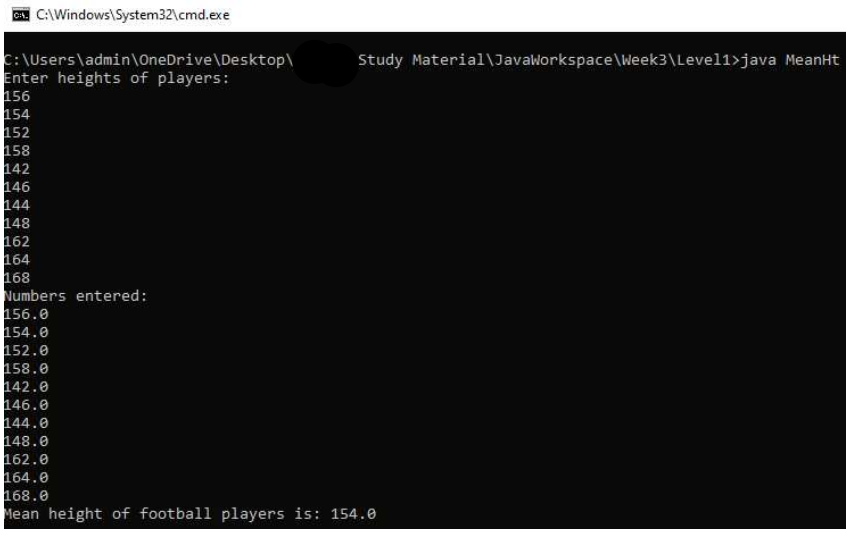
a. The formula to calculate the mean is: mean = sum of all elements / number of elements
b. Create a double array named heights of size 11 and get input values from the user.
c. Find the sum of all the elements present in the array.
d. Divide the sum by 11 to find the mean height and print the mean height of the football team

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class MeanHt {
```

```
    public static void main(String[] args) {
        Scanner myobj = new Scanner(System.in);  // Create Scanner to get input
        double[] heights = new double[11];         // Array to hold 11 players' heights
        double total = 0.0;                        // Variable to store the total of heights
        System.out.println("Enter heights of players: ");
        // Loop to read each player's height
        for (int i = 0; i < heights.length; i++) {
            heights[i] = myobj.nextDouble();       // Read and store height in the array
        }
        System.out.println("Heights entered:");
        // Loop to print heights and add them to total
        for (int i = 0; i < heights.length; i++) {
            System.out.println(heights[i]);        // Print each height
            total += heights[i];                   // Add height to total
        }
        double mean = total / 11.0;                // Calculate the average height
        System.out.println("Mean height of football players is: " + mean); // Print the mean
}
}
```

Output Verification:



7. Create a program to save odd and even numbers into odd and even arrays between 1 to the number entered by the user. Finally, print the odd and even numbers array

**Hint =>**

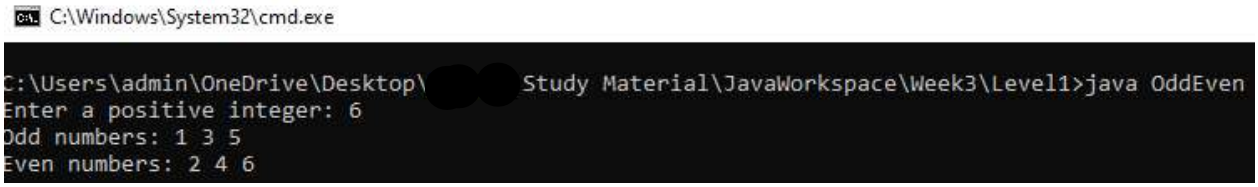
a. Get an integer input from the user, assign it to a variable ***number,*** and check for Natural Number. If not a natural number then print an error and exit the program
b. Create an integer array for even and odd numbers with `size = number / 2 + 1`
c. Create index variables for odd and even numbers and initialize them to zero
d. Using a for loop, iterate from 1 to the number, and in each iteration of the loop, save the odd or even number into the corresponding array
e. Finally, print the odd and even numbers array using the odd and even index

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class OddEven {
   public static void main(String[] args) {
      Scanner myobj = new Scanner(System.in);//declare scanner object
      // Get a positive integer from the user.
      System.out.print("Enter a positive integer: ");
      int number = myobj.nextInt();
      // Create arrays for odd and even numbers and size is set for both
      int arraySize = number / 2 + 1;
      int[] evenNumbers = new int[arraySize];
      int[] oddNumbers = new int[arraySize];
      // Index counters for even and odd array
      int evenIndex = 0;
      int oddIndex = 0;
      // Loop from 1 to the entered number .
      for (int i = 1; i <= number; i++) {
         if (i % 2 == 0) {
            // If the number is even, store it in the evenNumbers array.
            evenNumbers[evenIndex] = i;
            evenIndex++;  // Move the even index forward.
         } else {
            // If the number is odd, store it in the oddNumbers array.
            oddNumbers[oddIndex] = i;
            oddIndex++;   // Move the odd index forward.
         }
      }
      // Print the odd numbers array.
      System.out.print("Odd numbers: ");
      for (int i = 0; i < oddIndex; i++) {
         System.out.print(oddNumbers[i] + " ");
      }
```

```
        System.out.println();  // New line after printing odd numbers.
        // Print the even numbers array.
        System.out.print("Even numbers: ");
        for (int i = 0; i < evenIndex; i++) {
            System.out.print(evenNumbers[i] + " ");
        }
        System.out.println();  // New line after printing even numbers.
    }
}
```

Output Verification:




8. Create a program to find the factors of a number taken as user input, store the factors in an array, and display the factors

**Hint =>**

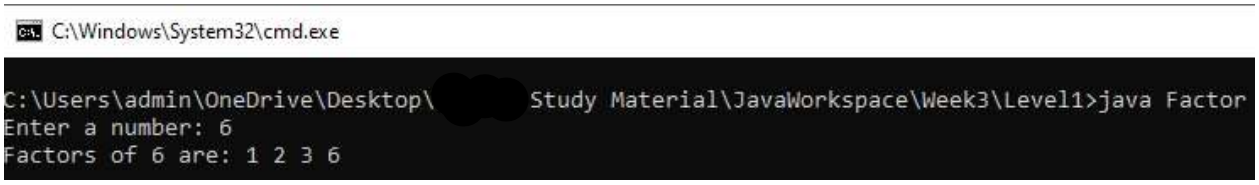
a. Take the input for a number
b. Find the factors of the number and save them in an array. For this create integer variable maxFactor and initialize to 10, factors array of size maxFactor and index variable to reflect the index of the array.
c. To find factors loop through the numbers from 1 to the number, find the factors, and add them to the array element by incrementing the index. If the index is equal to maxIndex, then need factors array to store more elements
d. To store more elements, reset the maxIndex to twice its size, use the temp array to store the elements from the factors array, and eventually assign the factors array to the temp array
e. Finally, Display the factors of the number

Ans) Code:

```
import java.util.Scanner;

public class Factor{

    public static void main(String[] args) {

        // Set up scanner to get user input

        Scanner myobj = new Scanner(System.in);

        System.out.print("Enter a number: ");

        int number = myobj.nextInt();

        // Initialize the initial capacity (maxFactor) for storing factors

        int maxFactor = 10;
```

```
        int[] factors = new int[maxFactor];
        int index = 0;  // No of factors stored
        // Loop from 1 to the number to check for factors
        for (int i = 1; i <= number; i++) {
            if (number % i == 0) { // If i is a factor of number
                // If the factors array is full, double its size
                if (index == maxFactor) {
                    int newSize = maxFactor * 2;
                    int[] temp = new int[newSize];
                    // Copy the existing factors to the new array
                    for (int j = 0; j < factors.length; j++) {
                        temp[j] = factors[j];
                    }
                    factors = temp;     // Assign the new array to factors
                    maxFactor = newSize;  // Update maxFactor to reflect the new size
                }
                // Save the factor into the array
                factors[index] = i;
                index++;  // Move to the next array index
            }
        }
        // Display the factors of the number
        System.out.print("Factors of " + number + " are: ");
        for (int i = 0; i < index; i++) {
            System.out.print(factors[i] + " ");
        }
        System.out.println();
    }
}
```

Output Verification:




9. Working with Multi-Dimensional Arrays. Write a Java program to create a 2D Array and Copy the 2D Array into a single dimension array

**Hint =>**

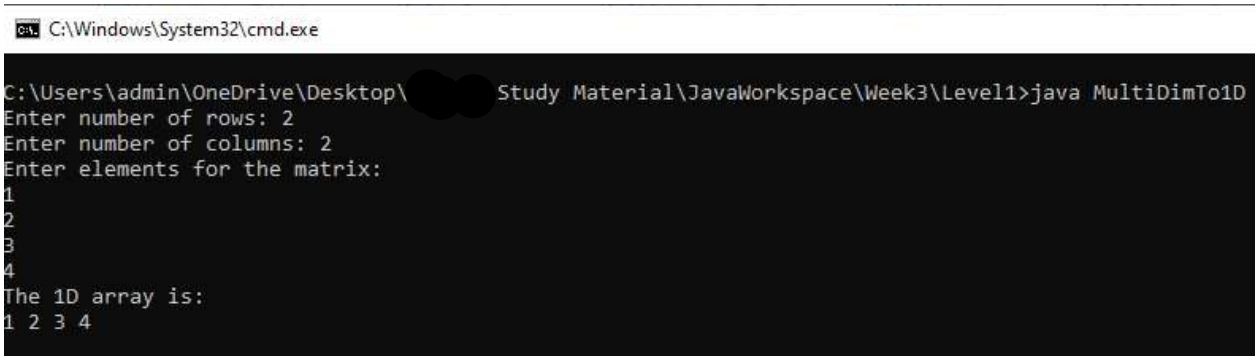
a. Take user input for rows and columns, create a 2D array (Matrix), and take the user input
b. Copy the elements of the matrix to a 1D array. For this create a 1D array of size rows*columns as in `int[] array = new int[rows * columns];`
c. Define the index variable and Loop through the 2D array. Copy every element of the 2D array into the 1D array and increment the index
d. Note: For looping through the 2D array, you will need Nested for loop, Outer for loop for rows, and the inner for loops to access each element

Ans) Code:

```
//import java utility scanner
import java.util.Scanner;
//declare class
public class MultiDimTo1D {
    public static void main(String[] args) {
        Scanner myobj = new Scanner(System.in);
        // Get the number of rows from the user
        System.out.print("Enter number of rows: ");
        int rows = myobj.nextInt();
        // Get the number of columns from the user
        System.out.print("Enter number of columns: ");
        int columns = myobj.nextInt();
        // Create a 2D array (matrix) with the specified rows and columns
        int[][] matrix = new int[rows][columns];
        // Prompt the user to enter the elements for the matrix
        System.out.println("Enter elements for the matrix:");
        for (int i = 0; i < rows; i++) {            // Loop over each row
            for (int j = 0; j < columns; j++) {       // Loop over each column in the row
```

```
            matrix[i][j] = myobj.nextInt();      // Save user input into the matrix
        }
    }
    // Create a 1D array to hold all the elements from the 2D array
    int[] array = new int[rows * columns];
    int index = 0;  // This index helps track the position in the 1D array
    // Copy each element from the 2D array to the 1D array
    for (int i = 0; i < rows; i++) {            // Loop over rows
        for (int j = 0; j < columns; j++) {       // Loop over columns
            array[index] = matrix[i][j];          // Copy current element
            index++;                             // Move to the next index
        }
    }
    // Print the elements of the 1D array
    System.out.println("The 1D array is:");
    for (int i = 0; i < array.length; i++) {
        System.out.print(array[i] + " ");
    }
    System.out.println();
  }
}
```

Output Verification:



10. Write a program FizzBuzz, take a number as user input and if it is a positive integer loop from 0 to the number and save the number, but for multiples of 3 save "Fizz" instead of the number, for multiples of 5 save "Buzz", and for multiples of both save "FizzBuzz". Finally, print the array results for each index position in the format Position 1 = 1, …, Position 3 = Fizz,...

**Hint =>**

a. Create a String Array to save the results and
b. Finally, loop again to show the results of the array based on the index position

Ans) Code:

```
//import java utility java

import java.util.Scanner;

//declare class

public class FizzBuzz {

    public static void main(String[] args) {

        Scanner myobj = new Scanner(System.in);//declare scanner object

        // prompt user for input

        System.out.print("Enter a positive integer: ");

        int number = myobj.nextInt();

        // Create a String array to store the FizzBuzz results.

        String[] results = new String[number];

        // Loop from 1 to the number.

        for (int i = 1; i <= number; i++) {

            // Check if the number is a multiple of both 3 and 5.

            if (i % 3 == 0 && i % 5 == 0) {

                results[i - 1] = "FizzBuzz";

            }

            // Check if the number is a multiple of 3.

            else if (i % 3 == 0) {

                results[i - 1] = "Fizz";

            }

            // Check if the number is a multiple of 5.

            else if (i % 5 == 0) {

                results[i - 1] = "Buzz";

            }
```

```
            // Otherwise, store the number as a string.
            else {
                results[i - 1] = String.valueOf(i);
            }
        }
        // Loop through the array and display the results.
        for (int i = 0; i < results.length; i++) {
            System.out.println("Position " + (i + 1) + " = " + results[i]);//print output
        }
    }
}
```

Output Verification: