WEEK 5

Question 1: Write a Java program to insert 10, 20, 30 ....in an array and display them.

Code:

```
import java.util.Scanner;
public class One {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter the size of array: ");
      int size = scan.nextInt();
      int[] array = new int[size];
      System.out.print("Enter elements (space - separated): ");
      for (int i = 0; i < size; i++)
         array[i] = scan.nextInt();
      System.out.print("Array: ");
      for (int i = 0; i < size; i++)
         System.out.print(array[i] + " ");
      scan.close();
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac One.java
PS D:\Uni Material\LAB\sem 3\Week 5> java One
Enter the size of array: 5
Enter elments (space - separated): 12 03 -69 34 57
Array: 12 3 -69 34 57
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 2: Write a Java program to calculate the sum of all the array elements.

Code:

```
import java.util.Scanner;
public class Two {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter the size of array: ");
      int size = scan.nextInt();
      int[] array = new int[size];
      System.out.print("Enter elements (space - separated): ");
      for (int i = 0; i < size; i++)
         array[i] = scan.nextInt();
      int sum = 0;
      System.out.print("Array: ");
      for (int i = 0; i < size; i++){
         sum += array[i];
         System.out.print(array[i] + " ");
      }
      System.out.println("\nSum of all elements: " + sum);
      scan.close();
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Two.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Two
Enter the size of array: 5
Enter elements (space - separated): 89 14 22 67 35
Array: 89 14 22 67 35
Sum of all elements: 227
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 3: Write a java program to print the following pattern.

```
1
12
123
1234
12345
```

Code:

```
import java.util.Scanner;
public class Three {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter the number of rows (n): ");
        int n = scan.nextInt();
        scan.close();
        for(int i = 1; i <= n; i++){
            for(int j = 1; j <= i; j++)
                System.out.print(j + " ");
            System.out.println();
        }
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Three.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Three
Enter the number of rows (n): 5
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 4: Write a java program to find the sum of following series where n is input by the user. 1+1/2+1/3+1/4+.....+1/n.

Code:

```
import java.util.Scanner;
public class Four {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter the number of terms (n): ");
      int n = scan.nextInt();
      scan.close();
      double sum = 0.0;
      for(int i = 1; i <= n; i++)
         sum += 1.0/i;
      System.out.printf("Sum of series: %.4f", sum);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Four.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Four
Enter the number of terms (n): 89
Sum of series: 5.0715
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 5: Write a Java program and compute the sum of the digits of an integer.

Code:

```
import java.util.Scanner;
public class Five {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter an integer: ");
      int num = scan.nextInt();
      scan.close();
      int sum = 0, temp = num;
      while (temp > 0) {
         sum += temp % 10;
         temp /= 10;
      }
      System.out.println("Sum of digits of " + num + " = " + sum);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Five.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Five
Enter an integer: 3658
Sum of digits of 3658 = 22
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 6: Write a Java program to calculate the factorial of a number.

Code:

```
import java.util.Scanner;
public class Six {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int n = scan.nextInt();
      scan.close();
      long fact = 1;
      for (int i = 1; i <= n; i++)
         fact *= i;
      System.out.println("Factorial of " + n + " = " + fact);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Six.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Six
Enter a number: 17
Factorial of 17 = 355687428096000
PS D:\Uni Material\LAB\sem 3\Week 5>
```

OPTIONAL

Question 7: Write a Java program to find the largest element in a given integer array

Code:

```
import java.util.Scanner;
public class Seven {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter the size of array: ");
      int size = scan.nextInt();
      int[] array = new int[size];
      System.out.print("Enter elments (space - separated): ");
      for (int i = 0; i < size; i++)
         array[i] = scan.nextInt();
      scan.close();
      int largest = array[0];
      System.out.print("Array: ");
      for (int i = 0; i < size; i++) {
         System.out.print(array[i] + " ");
         largest = ( array[i] > largest) ? array[i] : largest;
      }
      System.out.println("\nLargest element: " + largest);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Seven.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Seven
Enter the size of array: 5
Enter elments (space - separated): -96 52 34 71 06
Array: -96 52 34 71 6
Largest element: 71
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 8: Write a Java program to reverse the digits of a given integer.

Code:

```
import java.util.Scanner;
public class Eight {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter an integer: ");
      int num = scan.nextInt();
      scan.close();
      int reversed = 0, temp = num;
      while (temp > 0) {
         reversed = reversed * 10 + (temp % 10);
         temp /= 10;
      }
      System.out.println("Reversed number: " + reversed);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Eight.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Eight
Enter an integer: 996587
Reversed number: 785699
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 9: Write a Java program to check if a given number is a palindrome or not

Code:

```
import java.util.Scanner;
public class Nine {
   public static void main(String[] args) {
      System.out.print("Enter an integer: ");
      Scanner scan = new Scanner(System.in);
      int num = scan.nextInt();
      scan.close();
      int reversed = 0, temp = num;
      while (temp != 0) {
         reversed = reversed * 10 + (temp % 10);
         temp /= 10;
      }
      if (num == reversed)
         System.out.println(num + " is a palindrome.");
      else
         System.out.println(num + " is not a palindrome.");
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Nine.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Nine
Enter an integer: 856685
856685 is not a palindrome.
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 10: Write a Java program to convert a decimal number into Hexadecimal number and vice-versa.

Code:

```
import java.util.InputMismatchException;
import java.util.Scanner;
public class Ten {
   public static void main(String[] args) {
      System.out.println("Select one operation: ");
      System.out.println("1. Decimal to Hexadecimal");
      System.out.println("2. Hexadecimal to Decimal");
      System.out.print("Enter your choice (1-2): ");
      Scanner sc = new Scanner(System.in);
      int choice;
      try {
         choice = sc.nextInt();
      } catch (InputMismatchException e) {
         System.out.println("Invalid choice! Please enter 1 or 2.");
         return;
      }
      switch (choice) {
         case 1 -> {
            System.out.print("\nEnter the number (decimal): ");
            long num;
            try {
               num = sc.nextLong();
            } catch (InputMismatchException e) {
               System.out.println("Invalid decimal number! Please enter an integer.");
               return;
            }
            boolean isNegative = num < 0;
            num = Math.abs(num);
            String hexStr = "";
```

Code:

```
if (num == 0)
    hexStr = "0";
else {
    while (num > 0) {
        hexStr = switch ((int)(num % 16)) {
            case 10 -> "A" + hexStr;
            case 11 -> "B" + hexStr;
            case 12 -> "C" + hexStr;
            case 13 -> "D" + hexStr;
            case 14 -> "E" + hexStr;
            case 15 -> "F" + hexStr;
            default -> (num % 16) + hexStr;
        };
        num /= 16;
    }
}
if (isNegative) hexStr = "-" + hexStr;
System.out.println("Hexadecimal: " + hexStr);
}
case 2 -> {
System.out.print("\nEnter the number (hexadecimal): ");
String hex = sc.next();
if (hex.isEmpty()) {
    System.out.println("Empty input! Please enter a valid hexadecimal number.");
    return;
}
boolean isNegative = hex.startsWith("-");
if (isNegative) {
    hex = hex.substring(1);
    if (hex.isEmpty()) {
        System.out.println("Invalid input! '-' is not a number.");
        return;
    }
}
```

Code:

```
long decimal = 0;
            int power = 0;
            hex = hex.toUpperCase();
            for (int i = hex.length() - 1; i >= 0; i--) {
               char c = hex.charAt(i);
               int value;
               if (c >= '0' && c <= '9')
                  value = c - '0';
               else if (c >= 'A' && c <= 'F')
                  value = c - 'A' + 10;
               else {
                  System.out.println("Invalid character '" + c + "' in hexadecimal input!");
                  return;
               }
               decimal += value * Math.pow(16, power);
               power++;
            }
            if (isNegative) decimal = -decimal;
            System.out.println("Decimal: " + decimal);
         }

         default -> System.out.println("Invalid choice! Please run again.");
      }
      sc.close();
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 5> javac Ten.java
PS D:\Uni Material\LAB\sem 3\Week 5> java Ten
Select one operation:
1. Decimal to Hexadecimal
2. Hexadecimal to Decimal
Enter your choice (1-2): 2
Enter the number (hexadecimal): CD091
Decimal: 839825
PS D:\Uni Material\LAB\sem 3\Week 5>
```

Question 11: Write a java program to print the following pattern:

```
  *
 **
***
 **
  *
```

Code:

```
import java.util.Scanner;
public class Eleven {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter number of total number of rows (must be odd): ");
        int h = sc.nextInt();
        if ( h%2 == 0 ){
            System.out.println("Total number of rows must be odd!");
            sc.close(); return;
        }
        int mid = (h + 1) / 2;
        for (int i = 1; i <= h; i++) {
            int stars = (i <= mid) ? i : h - i + 1;
            int spaces = mid - stars;
            for (int j = 1; j <= spaces; j++)
                System.out.print(" ");
            for (int j = 1; j <= stars; j++)
                System.out.print("*");
            System.out.println();
        }
        sc.close();
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 7> cd "d:\Uni Material\LAB\sem 3\Week
5\" ; if ($?) { javac Eleven.java } ; if ($?) { java Eleven }
Enter number of total number of rows (must be odd): 5
  *
 **
***
 **
  *
PS D:\Uni Material\LAB\sem 3\Week 5>
```