WEEK 6

Question 1: Write a Java program to print the odd numbers from 1 to 99.

Code:

```
public class One {
    public static void main(String[] args) {
        System.out.print("Odd numbers from 1 to 99:  ");
        for (int i = 1; i <= 99; i += 2) {
            System.out.print(i + " ");
        }
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac One.java
PS D:\Uni Material\LAB\sem 3\Week 6> java One
Odd numbers from 1 to 99:  1 3 5 7 9 11 13 15 17 19 21 23 25 27
29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69
71 73 75 77 79 81 83 85 87 89 91 93 95 97 99
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 2: Write a Java program to check whether a number is prime or not.

Code:

```
import java.util.Scanner;
public class Two {
    public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter a number: ");
    int num = sc.nextInt();
    sc.close();
    boolean isPrime = true;
    int numsqrt = (int)Math.sqrt(num);
```

Code:

```
            for(int i = 2; i <= numsqrt; i++){
                if (num % i == 0) {
                    isPrime = false; break;
                }
            }
            if(isPrime)
                System.out.println(num + " is a prime number");
            else
                System.out.println(num + " is not a prime number");
        }
    }
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Two.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Two
Enter a number: 317
317 is a prime number
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 3: Write a Java program to swap the first and last elements of an array.

Code:

```
import java.util.Scanner;
public class Three {
    public static void printArray(int[] arr, int size) {
        for (int i = 0; i < size; i++) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter size of array: ");
        int n = sc.nextInt();
```

Code:

```
if (n <= 0) {
            System.out.println("Invalid size! Array size must be at least 1.");
            sc.close(); return;
        }
        int[] arr = new int[n];
        System.out.print("Enter " + n + " elements: ");
        for (int i = 0; i < n; i++)
            arr[i] = sc.nextInt();
        sc.close();
        System.out.print("Original Array: ");
        printArray(arr, n);
        if (n == 1) {
            System.out.println("Only one element, no swap needed.");
        } else {
            int temp = arr[0];
            arr[0] = arr[n - 1];
            arr[n - 1] = temp;
            System.out.print("Array after swapping: ");
            printArray(arr, n);
        }
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Three.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Three
Enter size of array: 3
Enter 3 elements: 12 96 65
Original Array: 12 96 65
Array after swapping: 65 96 12
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 4: Write a Java program to find the maximum and minimum among array elements.

Code:

```
import java.util.Scanner;
public class Four {
   public static void printArray(int[] arr, int size) {
      for (int i = 0; i < size; i++)
         System.out.print(arr[i] + " ");
      System.out.println();
   }
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter size of array: ");
      int n = sc.nextInt();
      if (n <= 0) {
         System.out.println("Invalid size! Array size must be at least 1.");
         sc.close(); return;
      }
      int[] arr = new int[n];
      System.out.print("Enter " + n + " elements: ");
      for (int i = 0; i < n; i++)
         arr[i] = sc.nextInt();
      System.out.print("Original Array: ");
      printArray(arr, n);
      int max = arr[0], min = arr[0];
      for(int i = 1; i < n; i++){
         max = (arr[i] > max)? arr[i] : max;
         min = (arr[i] < min)? arr[i] : min;
      } sc.close();
      System.out.println("Maximum Element: " + max + "\nMinimum Element: " + min);
   }
}
```

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 to print all prime numbers between 0 to 100.

Code:

```
public class Five {
  public static void main(String[] args) {
    System.out.println("Prime numbers between 0 and 100:");
    for (int num = 2; num <= 100; num++) {
      boolean isPrime = true;
      for (int i = 2; i * i <= num; i++) {
        if (num % i == 0) {
          isPrime = false;
          break;
        }
      }
      if (isPrime) {
        System.out.print(num + " ");
      }
    }
  }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Five.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Five
Prime numbers between 0 and 100:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 6: Write a Java program to implement linear search.

Code:

```
import java.util.Scanner;
public class Six {
    public static void printArray(int[] arr, int size) {
        for (int i = 0; i < size; i++)
            System.out.print(arr[i] + " ");
        System.out.println();
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter size of array: ");
        int n = sc.nextInt();
        if (n <= 0) {
            System.out.println("Invalid size! Array size must be at least 1.");
            sc.close(); return;
        }
        int[] arr = new int[n];
        System.out.print("Enter " + n + " elements: ");
        for (int i = 0; i < n; i++)
            arr[i] = sc.nextInt();
        System.out.print("Original Array: ");
        printArray(arr, n);
        System.out.print("Enter key to search in array: ");
        int key = sc.nextInt();
        boolean flag = false;
        for (int i = 0; i < arr.length; i++) {
            if (arr[i] == key) {
                System.out.println("Element found at position: " + (i + 1));
                flag = true; break;
            }
        } sc.close();
```

Code:

```
        if(!flag)
            System.out.println("Element not present in array.");
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Six.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Six
Enter size of array: 4
Enter 4 elements: 14 57 26 88
Original Array: 14 57 26 88
Enter key to search in array: 26
Element found at position: 3
PS D:\Uni Material\LAB\sem 3\Week 6>
```

OPTIONAL

Question 7: Write a Java program to print all prime numbers between 0 to 100

Code:

```
public class Seven {
    public static void main(String[] args) {
        System.out.println("Prime numbers between 0 and 100:");
        for (int num = 2; num <= 100; num++) {
            boolean isPrime = true;
            for (int i = 2; i * i <= num; i++) {
                if (num % i == 0) {
                    isPrime = false; break;
                }
            }
            if (isPrime)
                System.out.print(num + " ");
        }
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Seven.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Seven
Prime numbers between 0 and 100:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89
97
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 8: Write a Java program to find the second largest element in an array.

Code:

```
import java.util.Scanner;
public class Eight {
   public static void printArray(int[] arr, int size) {
      for (int i = 0; i < size; i++)
         System.out.print(arr[i] + " ");
      System.out.println();
   }
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter size of array: ");
      int n = sc.nextInt();
      if (n < 2) {
         System.out.println("Array must have at least 2 elements.");
         sc.close(); return;
      }
      int[] arr = new int[n];
      System.out.print("Enter " + n + " elements: ");
      for (int i = 0; i < n; i++)
         arr[i] = sc.nextInt();
      System.out.print("Array: ");
      printArray(arr, n);
```

Code:

```
        int largest = Integer.MIN_VALUE;
        int secondLargest = Integer.MIN_VALUE;
        for (int i = 0; i < n; i++) {
            if (arr[i] > largest) {
                secondLargest = largest;
                largest = arr[i];
            } else if (arr[i] > secondLargest && arr[i] < largest)
                secondLargest = arr[i];
        } sc.close();
        if (secondLargest == Integer.MIN_VALUE) {
            System.out.println("No second largest element!");
        } else {
            System.out.println("Largest Element: " + largest);
            System.out.println("Second largest element: " + secondLargest);
        }
    }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Eight.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Eight
Enter size of array: 5
Enter 5 elements: -5 67 12 86 33
Array: -5 67 12 86 33
Largest Element: 86
Second largest element: 67
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 9: Write a program to implement Fibonacci series up to N terms (0,1,1,2,3,5....).

Code:

```
import java.util.Scanner;
public class Nine {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter number of terms: ");
      int n = sc.nextInt();
      if (n <= 0) {
         System.out.println("Invalid input! n must be >= 1.");
      } else {
         int first = 0, second = 1;
         for (int i = 1; i <= n; i++) {
            int next = first + second;
            System.out.print(first + " ");
            first = second;
            second = next;
         }
      }
      sc.close();
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Nine.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Nine
Enter number of terms: 10
0 1 1 2 3 5 8 13 21 34
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 10: Write a Java program to reverse all elements of an array.

Code:

```
import java.util.Scanner;
public class Ten {
   public static void printArray(int[] arr, int size) {
      for (int i = 0; i < size; i++)
         System.out.print(arr[i] + " ");
      System.out.println();
   }
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter size of array: ");
      int n = sc.nextInt();
      if (n <= 0) {
         System.out.println("Invalid size! Array size must be at least 1.");
         sc.close(); return;
      }
      int[] arr = new int[n];
      System.out.print("Enter " + n + " elements: ");
      for (int i = 0; i < n; i++)
         arr[i] = sc.nextInt();
      System.out.print("Original Array: ");
      printArray(arr, n); sc.close();
      System.out.print("Reversed Array: ");
      for (int i = 0; i < n/2; i++) {
         int temp = arr[i];
         arr[i] = arr[n - 1 - i];
         arr[n - 1 - i] = temp;
      } printArray(arr, n);
   }
}
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> javac Ten.java
PS D:\Uni Material\LAB\sem 3\Week 6> java Ten
Enter size of array: 5
Enter 5 elements: 10 25 78 49 63
Original Array: 10 25 78 49 63
Reversed Array: 63 49 78 25 10
PS D:\Uni Material\LAB\sem 3\Week 6>
```

Question 11: Write a Java program to find the frequency of each character in a given string

Code:

```
import java.util.Scanner;
public class Eleven {
   public static void main(String[] args) {
      Scanner scan = new Scanner(System.in);
      System.out.print("Enter string: ");
      String str = scan.nextLine();
      scan.close();
      int totalUniqueChar = 0;
      int totalChar = 0;
      int[] freq = new int[256];
      for(int i = 0; i < str.length(); i++)
         freq[str.charAt(i)]++;
      for(int i = 0; i < 256; i++){
         if(freq[i] != 0){
            totalUniqueChar++;
            totalChar += freq[i];
            if ( (char)i == ' ')
               System.out.println("Spaces: " + freq[i]);
            else
               System.out.println((char)i + ": " + freq[i]);
         }
      }
```

Code:

```
            System.out.println("Total unique characters: " + totalUniqueChar);
            System.out.println("Total characters: " + totalChar);
        }
    }
```

Output:

```
PS D:\Uni Material\LAB\sem 3\Week 6> java Eleven
Enter string: Try to count me! 1 2 3....GO !!
Spaces: 7
!: 3
.: 4
1: 1
2: 1
3: 1
G: 1
O: 1
T: 1
c: 1
e: 1
m: 1
n: 1
o: 2
r: 1
t: 2
u: 1
y: 1
Total unique characters: 18
Total characters: 31
```