Problem 06(a): Java program to convert temperature from Fahrenheit to Celsius degree.

Code:

```
2
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
9         float temp;
10        System.out.print("Enter the temperature in Fahrenheit:-");
11        Scanner input = new Scanner(System.in);
12        temp=input.nextFloat();
13
14        temp=((temp-32)*5)/9;
15        System.out.print("Celsius temp is "+temp);
16
17          }
18    }
19
```

Output:

```
Enter the temperature in Fahrenheit:-212
Celsius temp is 100.0
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

Problem 06(b)-1: Write a program to test a year if it is leap year or not.

Code:

```
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
9         int year;
10        System.out.print("enter the Year:-");
11        Scanner input=new Scanner(System.in);
12        year=input.nextInt();
13
14        if(year%100==0 && year%400==0 || year%100!=0 && year%4==0)
15        {
16        System.out.print("Leap year");
17        }
18        else
19        {
20        System.out.print("Not Leap year");
21         }
22    }
23  }
```

Output:

```
enter the Year:-2021
Not Leap year
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 06(b)-2:Write a java program to calculate the sum of $1^2+3^2+5^2+\ldots$ (up to n terms)

Code:

```
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
9         int n, sum=0;
10        System.out.print("enter the number of terms:-");
11        Scanner input=new Scanner(System.in);
12        n=input.nextInt();
13
14        for (int i=1; i<=n; i++){
15        int oddnum= 2*i -1;
16        System.out.print(oddnum+"^2+");
17        sum=sum + oddnum * oddnum; }
18
19        System.out.println();
20        System.out.print("sum of the series:-"+sum);
21    }
22  }
23
```

Output:

```
enter the number of terms:-10
1^2+3^2+5^2+7^2+9^2+11^2+13^2+15^2+17^2+19^2+
sum of the series:-1330
------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------
```

Problem 06(b)-3: Write a java program to calculate the sum of 1−2+3−4+5−6+… (up to n terms)

Code:

```
package javaproject;

import java.util.Scanner;
public class Test {

  public static void main(String[] args){
      int n, sum=0;
      System.out.print("enter the number of terms:-");
      Scanner input=new Scanner(System.in);
      n=input.nextInt();

      for (int i=1; i<=n; i++){
          if(i%2==0){
          System.out.print("-" + i);
          sum=sum-i; //subtract even numbers
          }
          else {
                if (i > 1) {
                    System.out.print("+"); // Add '+' before odd numbers (except 1)
                        }
                System.out.print(i); // Print odd numbers
                sum=sum+ i; // Add odd numbers
            }
       }

      System.out.println();
      System.out.print("sum of the series:-"+sum);
  }
}
```

Output:

```
enter the number of terms:-10
1-2+3-4+5-6+7-8+9-10
sum of the series:-5
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 06(b)-4: Write a program to find the factorial of a number.

Code:

```
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
9         int number;
10        System.out.print("enter  any positive number:-");
11        Scanner input=new Scanner(System.in);
12        number =input.nextInt();
13
14        int fact=1;
15        for (int i=number; i>=1; i--){
16
17        fact=fact*i;
18        }
19        System.out.print("factorial of "+number +" is "+fact);
20    }
21  }
22
```

Output:

```
enter  any positive number:-6
factorial of 6 is 720
------------------------------------------------
BUILD SUCCESS
------------------------------------------------
```

Problem 06(b)-5: Write a program to find the power for a given base and exponent.

Code:

```
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
          Scanner input = new Scanner(System.in);
10
11                                          /*Math.pow(base, exponent) is a
12                                        method in Java's Math class that
13                                        calculates the power of a number.*/
14          double base;
15          System.out.print("Enter base: ");
16          base = input.nextDouble();
17
18          int exponent;
19          System.out.print("Enter exponent: ");
20          exponent = input.nextInt();
21
22          System.out.println("Result: " + Math.pow(base, exponent));
23
24        input.close();
25    }
26  }
```

Output:

```
Enter base: 2
Enter exponent: 5
Result: 32.0
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 06(b)-6: Write a program to find the Bangla season form a given month using if/switch.

Code:

```
8   public static void main(String[] args){
9       int month;
10      Scanner input = new Scanner(System.in);
11      System.out.print("Enter month number (1-12): ");
12      month = input.nextInt();
13
14       String season;
15       switch (month) {
16           case 3: case 4:
17               season = "Spring (Bashanta)";
18               break;
19           case 5: case 6:
20               season = "Summer (Grishmo)";
21               break;
22           case 7: case 8:
23               season = "Monsoon (Barsha)";
24               break;
25           case 9: case 10:
26               season = "Autumn (Shorot)";
27               break;
28           case 11: case 12:
29               season = "Late Autumn (Hemonto)";
30               break;
31           case 1: case 2:
32               season = "Winter (Sheet)";
33               break;
34           default:
35               season = "Invalid month!";
36       }
37
38       System.out.println("Bangla season: " + season);
39  }
40 }
```

Output:

```
Enter month number (1-12): 1
Bangla season: Winter (Sheet)
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 06(b)-7: Write a program to find the largest number in a list of Array.

Code:

```
3   package javaproject;
4
5   import java.util.Scanner;
6   public class Test {
7
8     public static void main(String[] args){
9         int n;
10        Scanner input = new Scanner(System.in);
11        System.out.print("Enter the number of elements: ");
12        n = input.nextInt();
13
14          int[] numbers = new int[n];
15          System.out.println("Enter the numbers: ");
16          for (int i = 0; i < n; i++) {
17              numbers[i] = input.nextInt();
18          }
19
20          int max = numbers[0];
21          for (int i = 1; i < n; i++) {
22              if (numbers[i] > max) {
23                  max = numbers[i];
24              }
25          }
26
27          System.out.println("The largest number is: " + max);
28    }
29  }
```

Output:

```
Enter the number of elements: 9
Enter the numbers:
21 51 40 98 44 85 75 66 97
The largest number is: 98
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Problem 06(b)-8: Write a program to sort some number in ascending order.

Code:

```
3   package javaproject;
4
5   import java.util.Arrays;//allows to use various methods for working with arrays
6   import java.util.Scanner;
7
8   public class Test {
9
10      public static void main(String[] args) {
11          int n;
12          Scanner input = new Scanner(System.in);
13          System.out.print("Enter the number of elements: ");
14          n = input.nextInt();
15
16          int[] numbers = new int[n];
17          System.out.println("Enter " + n + " numbers:");
18          for (int i = 0; i < n; i++) {
19              numbers[i] = input.nextInt();
20          }
21
22          Arrays.sort(numbers);//Arrays.sort() sorts the array in ascending order.
23
24          System.out.println("Sorted numbers: " + Arrays.toString(numbers));
25          //Arrays.toString() printing the contents of an array.
26
27          }
28
29  }
```

Output:

```
Enter the number of elements: 5
Enter 5 numbers:
45 89 65 35 14
Sorted numbers: [14, 35, 45, 65, 89]
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Extra: Write a java program to sort some number in descending order.

Code:

```java
package javaproject;

import java.util.Arrays;//allows to use various methods for working with arra
import java.util.Collections;/*allows sorting an array
in descending order when used with Arrays.sort().*/
import java.util.Scanner;
public class Test {

    public static void main(String[] args) {
        int n;
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        n = input.nextInt();

        Integer[] numbers = new Integer[n];
        //Collections.reverseOrder() works with Integer[]
        System.out.println("Enter " + n + " numbers:");
        for (int i = 0; i < n; i++) {
            numbers[i] = input.nextInt();
        }

        Arrays.sort(numbers, Collections.reverseOrder());
        //Sorting in descending order
        System.out.println("Sorted numbers: " + Arrays.toString(numbers));
        //Arrays.toString() printing the contents of an array.
        }
    }
```

Output:

```
Enter the number of elements: 5
Enter 5 numbers:
85 47 96 36 54
Sorted numbers: [96, 85, 54, 47, 36]
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

Thank you