1. ***Information:*** *The great Circle Distance is the distance between two points on the surface of a sphere. Let (x1, y1) and (x2, y2) to be the geographical latitude and longitude of two points. The great circle distance between two points can be calculated using the following formula:*

$$distance = radius\ x\ arccos(sin(x_1)\ x\ sin(x_2) + cos(x_1)\ x\ cos(x_2)\ x\ cos(y_1 - y_2))$$

Task - 1: *Write a program that prompts the user to enter the latitude and longitude of two points on the earth in degrees (Take them as double values) and display its great circle distance.*

Information: *The average earth radius is 6371.01 km.*

Note: *You need to convert the degrees into radians using the* ***Math.toRadians()*** *method since the Java trigonometric methods use radians.*

Test: *You can test your program with following values*

Enter Point 1 (latitude and longitude) in degrees: ***39,55 -116,25***

Enter Point 2 (latitude and longitude) in degrees: ***41,5 87,37***

Expected Output: *Your program's output should be with given values:*

The distance between the two points is ***10691.79183231593*** *km*

2. ***Task:*** *Write a program that prompts the user to enter a letter grade* ***A, B, C, D,*** *or* ***F****. and display its corresponding numeric value* ***4, 3, 2, 1,*** *or* ***0****. If the character given by user is not a letter print an error message. If the character given by user is a lowercase letter, make it uppercase.*
Note: *You can use* ***charAt(0)*** *method to get the char from the String you have read.*

Test *You can test your program with following values*
Enter a letter: ***2***
Expected Output*: Invalid Entry*

Enter a Letter: ***e***

Expected Output: *Invalid Entry*

Enter a Letter: ***d***

Expected Output: *Numeric value for grade* ***D*** *is* ***1***

Enter a letter: ***F***

Expected Output: *Numeric value for grade* ***F*** *is* ***0***

3. ***Task:*** *Write a program that prompts the user to enter two characters and displays the major and status represented in the character. The first character indicates the major and the second is number character 1, 2, 3, 4 which indicates whether a student is a freshman, sophomore, junior, or senior.*
M: Mathematics
C: Computer Science
I: Information Technology

   Test: *You can test your program with the following values:*

   Enter two characters: ***M1***

   Expected Output: *Mathematics Freshman*

   Enter two characters: ***T3***

   Expected Output: *Invalid input*

   Enter two characters: C6

   Expected Output: *Invalid input*

   Enter two characters: C4

   Expected Output: *Computer Science Senior*

4. ***Task-1:*** *Write a program that prompts user to enter two names and check if entered names are the same or not.*
   Test: *You can test your program with the following values:*

   Enter first name: ***John***
   Enter second name: ***John***
   Expected Output: *names are the same*

   Enter first name: ***James***
   Enter second name: ***Martin***
   Expected Output: *names are different*

   Task-2: *Print the length of names.*

   Expected Output: *James has* ***5*** *letters*
   Expected Output: *Martin has* ***6*** *letters*

   Task-3: *Print the last letters of each name*

   Expected Output: *s*
   Expected Output: *n*

5. ***Task:*** *Write a program that prompts user to enter two strings and reports whether the second string is a substring of the first string.*

   Test:

   Enter string s1: ***ABCD***

   Enter string s2: ***BC***

   Expected Output: *BC is substring of ABCD*

6. **Task:** Write a program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of input values. Your program ends with the input **0**. Display the average as a floating-point number.

7. **Task:** Write a program that reads a number from user and displays the following table on console (for n = 4):

a	a^2	a^3
1	1	1
2	4	8
3	9	27
4	16	64

8. π can be computed using the following formula:

$$\pi = 4\,x\,(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \cdots)$$

Task: Write a program that prompts user to enter a number to determine the sensitivity of pi calculation. As the input received from user increases, your calculated pi value should get closer to pi.