**Name:**

**Advanced Programming in Java**

**Lab Exercise 12.6.2024**

1. You work for the Jet Propulsion Laboratory. You need to write a program that will take an array containing the digitized representation of a picture of the night sky and locate the stars on it. Each element of the array represents the light hitting that portion of the image when the picture was taken. Intensities range from 0 to 20.

A star is probably located in the area covered by the array element i, j if the following is the case:

(A[i][j] + sum of 4 surrounding intensities) / 5 > 6.0

Ignore possible stars along the edges of the array.

A sample input:

0 3 4 0 0 0 6 8

5 13 6 0 0 0 2 3

2 6 2 7 3 0 10 0

0 0 4 15 4 1 6 0

0 0 7 12 6 9 10 4

5 0 6 10 6 4 8 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

Sample output:

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: \* \* \*

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1. In math and science as you may know, vectors such as force and velocity contain two properties; magnitude and direction. These are commonly represented in one of two forms;

rectangular (x, y) and polar (r∠θ).

1. Write a function that will convert rectangular to polar
2. Write a function that will convert polar to rectangular

Hint: Consider designing classes for this purpose.

1. Write a program that tests your ESP (extrasensory perception). The program should randomly select a color from the following list of words:

Red, Green, Blue, Orange, and Yellow

* To select a word, the program should generate a random number from 0 to 4 with 0 being Red, 1 being Green, 2 being Blue and so forth.
* The program should then ask the user to enter the color the computer has selected.
* The program should repeat the last 2 steps 10 time.
* The program should then display the number of times the user correctly guessed the correct color.

1. Number reversal

Part 1

This one is a technical interview favorite. For a given input number, return the number in reverse. So, an input of 3956 should return 6593.

Part 2

Reverse a decimal number. The decimal point should stay in the same place. So, the number 193.56 should output 653.91.