United International University (UIU)

Department of CSE

Trimester: Fall 2021

Course Name: | CSI 424 | Simulation & Modeling Laboratory (Section A)

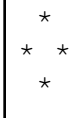
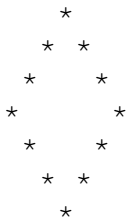
Submission Guideline:

- Please solve the problems in separate files (**One notebook/python file per task**).
- **Download the python files** as instructed in the class. (File -> Download -> Download .py)
- Create a new **folder** and put all your python files inside the folder.
- Rename the folder with your 9 digit student ID.
- Make a ZIP of the folder and **submit the .zip file**.

Please do not copy codes from others/the internet. Each of the offline assignments will be evaluated with a viva. You must be able to explain your code. Also, we will run a copy checker on the submissions. Any plagiarism will be severely penalised.

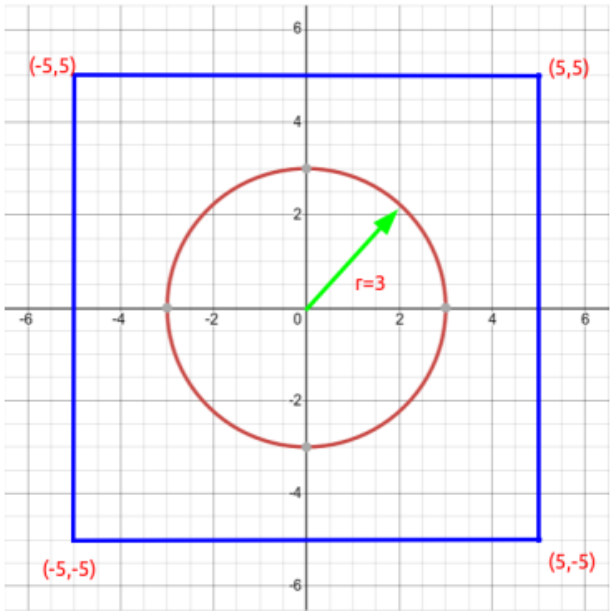
Offline assignment 1

1. **[5 marks]** Take an input n. Print a diamond pattern using the value of n. (Output samples are shown below)

n = 1	n = 2	n = 3	n = 4	n = 5
				

[Observe and compare the values of n with corresponding outputs to understand the pattern.]

2. **[5 marks]** See the figure below. We will estimate the value of π using this figure.



- **Task a)** If we randomly sample a point from the inside of the blue square, what is the probability that the point will be inside the circle? Express this value in terms of π (pi). [You may find this analytically using pen and paper]
- **Task b)** Simulate sampling 1000 data points and use the probability equation found from **Task a** to estimate the value of π.
- **Task c)** Make a scatter plot with your sampled data points. Mark points inside the circle red and outside the circle green.