United International University (UIU)

Department of CSE

Trimester: Fall 2021

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

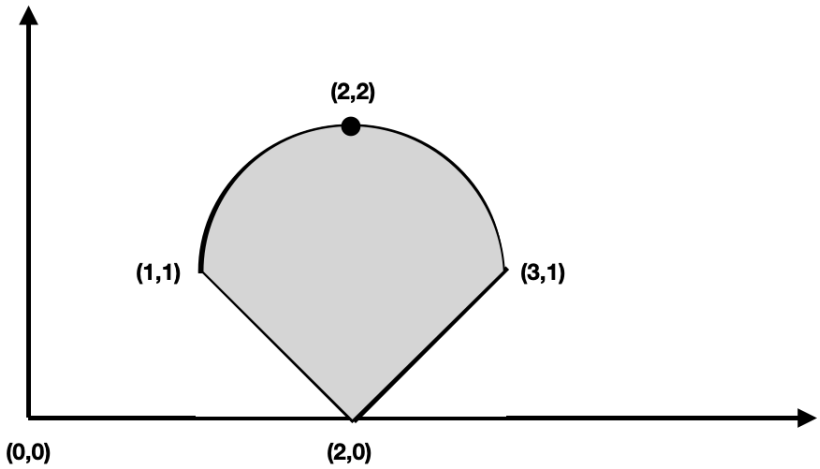
Submission Guideline:

- 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 2

A. **[5 marks]** Use Monte Carlo method to **estimate the area** of the shaded region. Also make a **scatter plot** of your sample points as we did in our lecture.



B. **[5 marks]** Use Monte Carlo integration to **estimate the integral** of a function. Also **calculate the error**.

You have to solve only one of the following integration problems. The problem you need to solve is determined by the last digit of your student ID. For example: if your student ID is *011123456*, you will solve problem-6.

0. $\int_{1}^{2}(3x + 2)lnx\,dx$
1. $\int_{-1}^{2}(3x^2 + 2x)e^x dx$
2. $\int_{0}^{1} e^x 2x dx$
3. $\int_{0}^{3} x^2\left(2x^2 - 1\right)dx$
4. $\int_{-2}^{1} 5x^2 sinx\,dx$
5. $\int_{0}^{1} x^2(3x + 1)dx$
6. $\int_{-1}^{2}\sqrt{17 + 5x}dx$
7. $\int_{0}^{2}\left(3x^3 + x^2 + 5\right)dx$
8. $\int_{1}^{8} x^2\sqrt{x^2 + 3}dx$
9. $\int_{2}^{5} x^3 e^x dx$