

# The Image Cartoonifier SoC'23

## Week 1 Assignment



### PART I (Warm-up) :

Q1: Write a Python function that takes an array of integers as an argument and returns a new array containing only the odd numbers in the original array.

Q2: Create a class called Dog with attributes name and breed. Add a method called bark that prints a message with the dog's name and a barking sound.

Q3. Write a Python program that creates a numpy array of 100 random integers between 0 and 100, and prints any 2 measures of central tendency and 2 measures of spread of the array.



### PART II (Mandatory) :

Q1. Create a class which defines an `__init__` function that initializes the class attribute `array`. Define another function `get_array` which takes inputs for the length of the array and inputs all the elements, and returns its corresponding sorted array.

Q2.

A. Create a 2D array of size 4\*4 using list and perform the following operations:

1. extract the diagonal elements from the array
2. Find the trace of the Matrix
3. Find the max and min element of each row in that matrix

(Hint: convert that 2D list to Numpy Array to make the problem simple)

B. Create another 2D numpy array with shape (4, 5) where each element of the array is a random float between 0 and 1, inclusive, using numpy's uniform distribution function. Print the resulting numpy array.

C. Multiply the numpy arrays created in Part A and Part B element-wise, and print the resulting numpy array.

Q3. Write a program that reads in the [CSV file](#) containing data on stock prices (including date, open price, high price, low price, closing price, and volume) and creates a pandas dataframe with the data. Then, use numpy to calculate the average closing price for each month and print the results.



### PART III (OPTIONAL):

For the same stock market data that we've used above, calculate the rolling average of the closing price for each day over a 30-day period, and add a new column to the dataframe containing these rolling averages. Finally, print the dates and closing prices for the days on which the rolling average exceeded the closing price by more than 5%, sorted by date in ascending order.

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