College Roll……Student Name:……

# DSC3171-Lab Assignments – Self Assessment – Day1-n-2
# You need to COMPLETE assignments in 1 hr 45 mins

## NumPy Lab Assignments

1. **Create a NumPy array and display basic info**
   - Task: Create a 1D array of numbers from 0 to 9. Print the shape, size, and data type.
2. **Array operations**
   - Task: Create two arrays of the same size. Perform element-wise addition, subtraction, multiplication, and division.
3. **Slicing and indexing**
   - Task: Create a 2D array (3×3). Print the second row, third column, and a subarray.
4. **Reshape and flatten**
   - Task: Create a 1D array of 12 numbers. Reshape it to 3×4 and then flatten it back.
5. **Matrix multiplication**
   - Task: Create two 2×2 matrices and perform matrix multiplication using `np.dot()`.
6. **Statistical operations**
   - Task: Generate an array of 20 random integers between 1 and 100. Find the mean, median, standard deviation, min, and max.
   - Task: Usage of describe method of Python → Pandas library, used to generate a statistical summary of a DataFrame or Series
7. **Create identity and diagonal matrices**
   - Task: Create a 4×4 identity matrix and a diagonal matrix with values [1, 2, 3, 4].

## Pandas Lab Assignments

8. **Create a DataFrame from a dictionary**
   - Task: Create a DataFrame for 5 students showing Name, Age, and Marks. Display the first and last rows.
9. **DataFrame indexing and slicing**
   - Task: Use `.loc[]` and `.iloc[]` to access specific rows and columns.
10. **Add and delete columns**

- Task: Add a new column "Grade" based on marks. Then delete the "Age" column.

11. **Read from and write to CSV**

- Task: Read data from a CSV file into a DataFrame and write a new filtered DataFrame to another CSV.

12. **Data filtering**

- Task: Filter all students with marks > 75 and display their names and grades.

13. **Groupby and aggregation**

- Task: Create a DataFrame with employee department and salary. Group by department and find average salary.

14. **Handling missing data**

- Task: Create a DataFrame with some missing values. Use `fillna()` and `dropna()` to handle them.

## Matplotlib Lab Assignments

15. **Line plot**

- Task: Plot a simple line graph of `x = [1, 2, 3, 4]` and `y = [2, 4, 6, 8]`. Label axes and title.

16. **Bar chart**

- Task: Plot a bar chart showing sales of 4 products.

17. **Histogram**

- Task: Plot a histogram of 50 random numbers (0–100 range) using NumPy.

18. **Pie chart**

- Task: Create a pie chart for % of time spent on daily activities: sleep, study, work, exercise, and leisure.

- **Scatter plot:** Task: Generate and plot a scatter plot using two arrays of 20 random values.