**Lab Experiment 3**

**Handling Missing Values using Python Pandas**

**Dataset:** Use the dataset scraped in Lab Experiment 1.

**Tasks:**

1. **Data Exploration:**

1.1 Identify and report the presence of missing values in each column of the dataset. Output should be a boolean (True/False).

1.2 If no missing values are found, manually introduce at least 5 NaN values using the NumPy nan function and save the modified dataset.

1.3 Print the count of null and non-null values in each column.

1. **Handling Missing Values using drop:**

2.1 Drop all rows containing any null values.

2.2 Drop all columns containing any null values.

2.3 Drop rows with at least one missing value.

2.4 Drop rows only where all values are missing.

2.5 Drop rows based on different threshold values

2.6 Drop rows only when null values are present in a specific subset of columns.

Print the shape of the dataset after every operation and ensure the same is available in the PDF export

1. **Handling Missing Values using fill:**

3.1 Load the dataset ([Click here to download the dataset](https://drive.google.com/file/d/1jqH1K2kLXfUEUUwFLXssYkNBBeqTMulf/view?usp=sharing))

3.2 Replace all missing values in the dataset with the value "-1".

3.3 Fill the missing values in the **Age** column with the mean age of all employees.

3.4 Fill the missing values in the **Salary** column with the median salary of all employees.

3.5 Replace the missing values in the **State** column with the string **"Unknown"**.

3.6 Use backward fill to handle missing values in the **Joining Date** column. Print the modified dataset.

3.7 Compare the mean salary of the dataset after using forward fill and backward fill for handling missing values in the **Salary** column.

Display/ Print the dataset after every operation and ensure the same is visible in the PDF export.

**Submission Guidelines:**

1. Submit the assignment as a .ipynb (Jupyter Notebook) file or .py script. **Include a .pdf export** of the notebook / script. ( [Click Here](https://www.analyticsvidhya.com/blog/2024/08/ipynb-files-to-pdf/) If you do not know how to export PDF from .ipynb notebook)
2. Include comments in your code to explain your logic and approach.
3. Use Markdown cells for detailed explanations, if necessary, especially for complex code blocks
4. Ensure that all code cells have been executed and the outputs are visible.
5. Do not clear the outputs before submission.
6. Submit the assignment via the designated Google Classroom link.
7. Submit your work before the deadline.
8. Late submissions may incur penalties
9. Avoid Plagiarism; ensure the work you submit is your own