Pandas and Matplotlib Homework Exercise

Data Frame:

ID	Name	Age	Department	JoiningDate	Salary	Experience	Location
101	John	28	HR	5/21/2019	50000	3	New York
102	Alice	34	IT	3/15/2017	75000	7	San Francisco
103	Bob	25	Finance	11/12/2020	48000	2	Chicago
104	David	42	IT	7/30/2010	95000	12	San Francisco
105	Eva	29	HR	1/25/2018	52000	4	New York
106	Frank	38	Finance	9/17/2012	88000	10	Chicago
107	Grace	31	IT	5/21/2016	72000	6	San Francisco
108	Hannah	27	HR	2/1/2021	49000	2	New York
109	Ian	36	Finance	6/10/2014	83000	8	Chicago
110	Jane	30	IT	8/19/2019	68000	5	San Francisco

Questions:

1. Read the CSV file into a DataFrame.
2. Display the first 5 rows of the DataFrame.
3. Display the last 3 rows of the DataFrame.
4. Get the shape of the DataFrame (rows and columns).
5. Display the column names of the DataFrame.
6. Show the data types of each column.
7. Show the summary statistics of numeric columns (Age, Salary, Experience).
8. Select the Name column.
9. Select multiple columns: Name and Salary.
10. Select the row with index 3.
11. Select the first 5 rows and Name & Department columns.
12. Filter all employees in the IT department.
13. Filter all employees with Salary > 70000.
14. Filter employees who joined after 2018-01-01.

15. Filter employees whose Location is New York and Department is HR.
16. Filter employees with Age between 30 and 40.
17. Sort employees by Salary in descending order.
18. Sort employees by Department and then by Experience ascending.
19. Calculate the average salary of all employees.
20. Calculate the maximum and minimum experience.
21. Find the total salary of employees in each department.
22. Find the average age of employees grouped by Department.
23. Add a new column Bonus which is 10% of Salary.
24. Increase all salaries by 5% and save in a new column NewSalary.
25. Create a column Seniority based on Experience:

- 10 years → "Senior"
- 5–10 years → "Mid"
- <5 years → "Junior"

G. Handling Missing Data (optional, you can add NaN to practice)

26. Check for missing values in the dataset.
27. Fill missing Salary values with the mean salary.
28. Find all employees whose name starts with "J".
29. Count how many employees are in each Location.
30. Save the DataFrame with the new columns Bonus and NewSalary into a new CSV file called practice_data_updated.csv.
31. Create a line plot of Salary vs ID.
32. Create a bar chart of Salary for each employee (Name on x-axis).
33. Create a horizontal bar chart showing Experience of each employee.
34. Add title, x-label, y-label, and grid to the Salary vs ID plot.
35. Change the color of bars to green and add value labels on top of each bar for Salary.
36. Create a bar chart showing average salary per department.
37. Create a pie chart showing the distribution of employees per department.
38. Create a scatter plot of Age vs Salary.

39. Color the scatter points by Department using different colors.

40. Create a scatter plot of Experience vs Salary and add a regression line (trendline).