Merge, Concatenate, join and more

In [1]:
```
import pandas as pd  # For data manipulation and analysis
import numpy as np  # For numerical computations
import matplotlib.pyplot as plt  # For creating static, animated, and interactive visualizations
import seaborn as sns  # For statistical data visualization based on Matplotlib
import scipy  # For scientific and technical computing (including optimization, integration, and statistics)
```

In [2]:
```
# Creating realistic data for employees
data = {
    'Employee ID': np.arange(1001, 1011),
    'Employee Name': ['Satender Kumar', 'data 1', 'Jane Smith', 'Robert Brown', 'Emily Davis', 'Michael Wilson'
    'Department': ['Data Analyst', 'IT', 'Finance', 'Marketing', 'Sales', 'Operations', 'R&D', 'Support', 'Admi
    'Age': [24, np.random.randint(25, 60), np.random.randint(25, 60), np.random.randint(25, 60), np.random.rand
    'Location': ['London, Canada', 'Toronto', 'London', 'Sydney', 'San Francisco', 'Paris', 'Berlin', 'Tokyo',
    'Salary': np.random.randint(50000, 150000, size=10),
    'Years with Company': np.random.randint(1, 15, size=10),
    'Position': ['Data Analyst', 'Developer', 'Analyst', 'Designer', 'Consultant', 'Engineer', 'Scientist', 'Su
    'Performance Score': np.random.randint(1, 5, size=10),
    'Bonus': np.random.randint(1000, 10000, size=10),
    'Gender': ['Male', 'Male', 'Female', 'Male', 'Female', 'Male', 'Female', 'Male', 'Female', 'Male'],
    'Marital Status': ['Single', 'Single', 'Married', 'Single', 'Single', 'Married', 'Married', 'Single', 'Marr
    'Education': ['Bachelor', 'Master', 'PhD', 'Bachelor', 'Master', 'PhD', 'Bachelor', 'Master', 'Bachelor', '
    'Hire Date': pd.to_datetime(['2019-06-12', '2015-07-23', '2012-09-05', '2018-11-30', '2013-05-19', '2019-02
    'Overtime Hours': np.random.randint(0, 20, size=10),
    'Sick Days Taken': np.random.randint(0, 10, size=10),
    'Vacation Days Taken': np.random.randint(5, 20, size=10),
    'Training Hours': np.random.randint(10, 50, size=10),
    'Certifications': ['Yes', 'No', 'Yes', 'No', 'Yes', 'No', 'Yes', 'Yes', 'No', 'Yes'],
    'Supervisor': ['Anna Smith', 'Brian Adams', 'Clara Jones', 'Daniel Martin', 'Eva Rodriguez', 'Frank Bell',
}

# Creating the DataFrame
df = pd.DataFrame(data)
```

In [4]:
```
# Display the DataFrame
print(df)
```

```
   Employee ID   Employee Name    Department  Age        Location  Salary  \
0         1001  Satender Kumar  Data Analyst   24  London, Canada   62989
1         1002          data 1            IT   46         Toronto   96061
2         1003      Jane Smith       Finance   48          London   60507
3         1004    Robert Brown     Marketing   32          Sydney   71727
4         1005     Emily Davis         Sales   40   San Francisco   81098
5         1006  Michael Wilson    Operations   45           Paris   60924
6         1007    Sarah Taylor           R&D   58          Berlin  116105
7         1008       David Lee       Support   28           Tokyo  138939
8         1009   Laura Johnson         Admin   38           Dubai   93249
9         1010     James White         Legal   46       Singapore  141721

   Years with Company         Position  Performance Score  Bonus  Gender  \
0                  10     Data Analyst                  4   6419    Male
1                   5        Developer                  4   4746    Male
2                   1          Analyst                  1   1447  Female
3                   9         Designer                  3   7196    Male
4                  13       Consultant                  3   2218  Female
5                   6         Engineer                  2   7973    Male
6                  13        Scientist                  4   7565  Female
7                   9    Support Agent                  3   1800    Male
8                   7  Admin Assistant                  4   1189  Female
9                   2           Lawyer                  2   1654    Male

  Marital Status Education  Hire Date  Overtime Hours  Sick Days Taken  \
0         Single  Bachelor 2019-06-12              10                2
1         Single    Master 2015-07-23              15                7
2        Married       PhD 2012-09-05               0                5
3         Single  Bachelor 2018-11-30              18                3
4         Single    Master 2013-05-19               1                7
5        Married       PhD 2019-02-14               0                1
6        Married  Bachelor 2020-08-21               3                0
7         Single    Master 2016-06-03               6                0
8        Married  Bachelor 2014-01-28              15                1
9         Single    Master 2017-03-15               3                7

   Vacation Days Taken  Training Hours Certifications     Supervisor
0                   19              15            Yes     Anna Smith
1                   14              31             No    Brian Adams
2                    7              37            Yes    Clara Jones
3                   11              12             No  Daniel Martin
4                   17              30            Yes  Eva Rodriguez
5                   16              24             No     Frank Bell
6                    7              49            Yes    Grace Moore
7                    6              10            Yes   Hannah Lewis
8                   11              38             No     Ivan Scott
9                   19              40            Yes    Jake Miller
```

In [6]:
```
df.head()
```

Out[6]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educati
0	1001	Satender Kumar	Data Analyst	24	London, Canada	62989	10	Data Analyst	4	6419	Male	Single	Bache
1	1002	data 1	IT	46	Toronto	96061	5	Developer	4	4746	Male	Single	Mas
2	1003	Jane Smith	Finance	48	London	60507	1	Analyst	1	1447	Female	Married	Pl
3	1004	Robert Brown	Marketing	32	Sydney	71727	9	Designer	3	7196	Male	Single	Bache
4	1005	Emily Davis	Sales	40	San Francisco	81098	13	Consultant	3	2218	Female	Single	Mas

In [10]:
```
df.describe()
```

Out[10]:

	Employee ID	Age	Salary	Years with Company	Performance Score	Bonus	Hire Date	Overtime Hours	Sick Days Taken	Vacation Days Taken	Tr
count	10.00000	10.000000	10.000000	10.000000	10.000000	10.000000	10	10.000000	10.000000	10.000000	10.(
mean	1005.50000	40.500000	92332.000000	7.500000	3.000000	4220.700000	2016-09-28 09:36:00	7.100000	3.300000	12.700000	28.(
min	1001.00000	24.000000	60507.000000	1.000000	1.000000	1189.000000	2012-09-05 00:00:00	0.000000	0.000000	6.000000	10.(
25%	1003.25000	33.500000	65173.500000	5.250000	2.250000	1690.500000	2014-06-12 06:00:00	1.500000	1.000000	8.000000	17.:
50%	1005.50000	42.500000	87173.500000	8.000000	3.000000	3482.000000	2016-10-23 12:00:00	4.500000	2.500000	12.500000	30.:
75%	1007.75000	46.000000	111094.000000	9.750000	4.000000	7001.750000	2019-01-26 00:00:00	13.750000	6.500000	16.750000	37.7
max	1010.00000	58.000000	141721.000000	13.000000	4.000000	7973.000000	2020-08-21 00:00:00	18.000000	7.000000	19.000000	49.(
std	3.02765	10.276727	30916.484542	4.116363	1.054093	2839.564366	NaN	6.871034	2.945807	5.012207	13.(

In [12]:
```
df.isnull()
```

Out[12]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educatio
0	False	False	False	False	False	False	False	False	False	False	False	False	Fals
1	False	False	False	False	False	False	False	False	False	False	False	False	Fals
2	False	False	False	False	False	False	False	False	False	False	False	False	Fals
3	False	False	False	False	False	False	False	False	False	False	False	False	Fals
4	False	False	False	False	False	False	False	False	False	False	False	False	Fals
5	False	False	False	False	False	False	False	False	False	False	False	False	Fals
6	False	False	False	False	False	False	False	False	False	False	False	False	Fals
7	False	False	False	False	False	False	False	False	False	False	False	False	Fals
8	False	False	False	False	False	False	False	False	False	False	False	False	Fals
9	False	False	False	False	False	False	False	False	False	False	False	False	Fals

In [14]:
```
df.notnull()
```

Out[14]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Education
0	True	True	True	True	True	True	True	True	True	True	True	True	True
1	True	True	True	True	True	True	True	True	True	True	True	True	True
2	True	True	True	True	True	True	True	True	True	True	True	True	True
3	True	True	True	True	True	True	True	True	True	True	True	True	True
4	True	True	True	True	True	True	True	True	True	True	True	True	True
5	True	True	True	True	True	True	True	True	True	True	True	True	True
6	True	True	True	True	True	True	True	True	True	True	True	True	True
7	True	True	True	True	True	True	True	True	True	True	True	True	True
8	True	True	True	True	True	True	True	True	True	True	True	True	True
9	True	True	True	True	True	True	True	True	True	True	True	True	True

In [16]:
```
df.count()
```

Out[16]:
```
Employee ID             10
Employee Name           10
Department              10
Age                     10
Location                10
Salary                  10
Years with Company      10
Position                10
Performance Score       10
Bonus                   10
Gender                  10
Marital Status          10
Education               10
Hire Date               10
Overtime Hours          10
Sick Days Taken         10
Vacation Days Taken     10
Training Hours          10
Certifications          10
Supervisor              10
dtype: int64
```

In [19]:
```
df.head(20
       )
```

Out[19]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educat
0	1001	Satender Kumar	Data Analyst	24	London, Canada	62989	10	Data Analyst	4	6419	Male	Single	Bach
1	1002	data 1	IT	46	Toronto	96061	5	Developer	4	4746	Male	Single	Ma
2	1003	Jane Smith	Finance	48	London	60507	1	Analyst	1	1447	Female	Married	
3	1004	Robert Brown	Marketing	32	Sydney	71727	9	Designer	3	7196	Male	Single	Bach
4	1005	Emily Davis	Sales	40	San Francisco	81098	13	Consultant	3	2218	Female	Single	Ma
5	1006	Michael Wilson	Operations	45	Paris	60924	6	Engineer	2	7973	Male	Married	
6	1007	Sarah Taylor	R&D	58	Berlin	116105	13	Scientist	4	7565	Female	Married	Bach
7	1008	David Lee	Support	28	Tokyo	138939	9	Support Agent	3	1800	Male	Single	Ma
8	1009	Laura Johnson	Admin	38	Dubai	93249	7	Admin Assistant	4	1189	Female	Married	Bach
9	1010	James White	Legal	46	Singapore	141721	2	Lawyer	2	1654	Male	Single	Ma

In [21]:
```
# Creating realistic data for a second set of employees
data1 = {
    'Employee ID': np.arange(1011, 1021),
    'Employee Name': ['Satender Kumar', 'data 1', 'Chris Evans', 'Natalie Portman', 'Tom Holland', 'Emma Watson
    'Department': ['Data Analyst', 'HR', 'IT', 'Marketing', 'Finance', 'Sales', 'R&D', 'Operations', 'Legal', '
    'Age': [24, np.random.randint(25, 60), np.random.randint(25, 60), np.random.randint(25, 60), np.random.randi
    'Location': ['London, Canada', 'Los Angeles', 'New York', 'Chicago', 'Houston', 'Phoenix', 'Philadelphia',
    'Salary': np.random.randint(60000, 160000, size=10),
    'Years with Company': np.random.randint(1, 20, size=10),
    'Position': ['Data Analyst', 'HR Manager', 'IT Specialist', 'Marketing Coordinator', 'Financial Analyst', '
    'Performance Score': np.random.randint(1, 5, size=10),
    'Bonus': np.random.randint(2000, 12000, size=10),
    'Gender': ['Male', 'Male', 'Female', 'Female', 'Male', 'Female', 'Male', 'Female', 'Male', 'Male'],
    'Marital Status': ['Single', 'Married', 'Single', 'Single', 'Married', 'Single', 'Single', 'Married', 'Sing
    'Education': ['Master', 'Bachelor', 'Master', 'PhD', 'Bachelor', 'Master', 'PhD', 'Bachelor', 'Master', 'Phl
    'Hire Date': pd.to_datetime(['2018-07-15', '2014-03-22', '2011-10-12', '2017-04-17', '2015-09-23', '2016-11
    'Overtime Hours': np.random.randint(0, 25, size=10),
    'Sick Days Taken': np.random.randint(0, 8, size=10),
    'Vacation Days Taken': np.random.randint(7, 22, size=10),
    'Training Hours': np.random.randint(15, 55, size=10),
    'Certifications': ['Yes', 'Yes', 'No', 'Yes', 'No', 'Yes', 'No', 'Yes', 'Yes', 'No'],
    'Supervisor': ['John Smith', 'Michael Johnson', 'Patricia Williams', 'Linda Brown', 'Barbara Jones', 'Eliza
}

# Creating the second DataFrame
df1 = pd.DataFrame(data1)
```

In [23]:
```
# Display the DataFrame
print(df1)
```

```
   Employee ID       Employee Name    Department  Age        Location  Salary  \
0         1011      Satender Kumar  Data Analyst   24  London, Canada   75719
1         1012              data 1            HR   40     Los Angeles   96413
2         1013         Chris Evans            IT   37        New York   74042
3         1014     Natalie Portman     Marketing   49         Chicago  108467
4         1015         Tom Holland       Finance   27         Houston   65822
5         1016         Emma Watson         Sales   56         Phoenix  114854
6         1017    Daniel Radcliffe           R&D   33    Philadelphia  117933
7         1018  Scarlett Johansson    Operations   41     San Antonio   87342
8         1019   Robert Downey Jr.         Legal   51       San Diego   72775
9         1020        Mark Ruffalo       Support   42          Dallas  142745

   Years with Company              Position  Performance Score  Bonus  \
0                  12          Data Analyst                  2   3187
1                  12            HR Manager                  1  10993
2                  14         IT Specialist                  4  10834
3                  11  Marketing Coordinator                  4   2760
4                  12      Financial Analyst                  2   6263
5                   5          Sales Manager                  3  10287
6                  17     Research Scientist                  3   8290
7                   8     Operations Manager                  3  10047
8                   6          Legal Advisor                  2   6510
9                  10     Support Specialist                  1   5533

   Gender Marital Status Education  Hire Date  Overtime Hours  \
0    Male         Single    Master 2018-07-15              17
1    Male        Married  Bachelor 2014-03-22               8
2  Female         Single    Master 2011-10-12              12
3  Female         Single       PhD 2017-04-17              10
4    Male        Married  Bachelor 2015-09-23              13
5  Female         Single    Master 2016-11-01              15
6    Male         Single       PhD 2019-05-11               8
7  Female        Married  Bachelor 2020-07-08              15
8    Male         Single    Master 2013-08-19               7
9    Male        Married       PhD 2012-01-09               2

   Sick Days Taken  Vacation Days Taken  Training Hours Certifications  \
0                5                   12             21            Yes
1                3                   18             41            Yes
2                4                    8             22             No
3                7                   20             42            Yes
4                6                   11             35             No
5                0                   20             35            Yes
6                1                   15             48             No
7                7                    9             50            Yes
8                7                   20             35            Yes
9                4                   17             15             No

         Supervisor
0        John Smith
1   Michael Johnson
2  Patricia Williams
3       Linda Brown
4     Barbara Jones
5   Elizabeth Garcia
6    Susan Martinez
7  Jessica Hernandez
8       Sarah Lopez
9      Karen Wilson
```

In [25]:
```
df1.head()
```

Out[25]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educa
0	1011	Satender Kumar	Data Analyst	24	London, Canada	75719	12	Data Analyst	2	3187	Male	Single	Ma
1	1012	data 1	HR	40	Los Angeles	96413	12	HR Manager	1	10993	Male	Married	Bach
2	1013	Chris Evans	IT	37	New York	74042	14	IT Specialist	4	10834	Female	Single	Ma
3	1014	Natalie Portman	Marketing	49	Chicago	108467	11	Marketing Coordinator	4	2760	Female	Single	I
4	1015	Tom Holland	Finance	27	Houston	65822	12	Financial Analyst	2	6263	Male	Married	Bach

In [27]:
```
df.describe()
```

Out[27]:

	Employee ID	Age	Salary	Years with Company	Performance Score	Bonus	Hire Date	Overtime Hours	Sick Days Taken	Vacation Days Taken	T
count	10.00000	10.000000	10.000000	10.000000	10.000000	10.000000	10	10.000000	10.000000	10.000000	10.
mean	1005.50000	40.500000	92332.000000	7.500000	3.000000	4220.700000	2016-09-28 09:36:00	7.100000	3.300000	12.700000	28.
min	1001.00000	24.000000	60507.000000	1.000000	1.000000	1189.000000	2012-09-05 00:00:00	0.000000	0.000000	6.000000	10.
25%	1003.25000	33.500000	65173.500000	5.250000	2.250000	1690.500000	2014-06-12 06:00:00	1.500000	1.000000	8.000000	17.
50%	1005.50000	42.500000	87173.500000	8.000000	3.000000	3482.000000	2016-10-23 12:00:00	4.500000	2.500000	12.500000	30.
75%	1007.75000	46.000000	111094.000000	9.750000	4.000000	7001.750000	2019-01-26 00:00:00	13.750000	6.500000	16.750000	37.
max	1010.00000	58.000000	141721.000000	13.000000	4.000000	7973.000000	2020-08-21 00:00:00	18.000000	7.000000	19.000000	49.
std	3.02765	10.276727	30916.484542	4.116363	1.054093	2839.564366	NaN	6.871034	2.945807	5.012207	13.

In [28]:
```
df1.notnull()
```

Out[28]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Education
0	True	True	True	True	True	True	True	True	True	True	True	True	True
1	True	True	True	True	True	True	True	True	True	True	True	True	True
2	True	True	True	True	True	True	True	True	True	True	True	True	True
3	True	True	True	True	True	True	True	True	True	True	True	True	True
4	True	True	True	True	True	True	True	True	True	True	True	True	True
5	True	True	True	True	True	True	True	True	True	True	True	True	True
6	True	True	True	True	True	True	True	True	True	True	True	True	True
7	True	True	True	True	True	True	True	True	True	True	True	True	True
8	True	True	True	True	True	True	True	True	True	True	True	True	True
9	True	True	True	True	True	True	True	True	True	True	True	True	True

In [29]:
```
df1.isnull()
```

Out[29]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educatio
0	False	False	False	False	False	False	False	False	False	False	False	False	Fals
1	False	False	False	False	False	False	False	False	False	False	False	False	Fals
2	False	False	False	False	False	False	False	False	False	False	False	False	Fals
3	False	False	False	False	False	False	False	False	False	False	False	False	Fals
4	False	False	False	False	False	False	False	False	False	False	False	False	Fals
5	False	False	False	False	False	False	False	False	False	False	False	False	Fals
6	False	False	False	False	False	False	False	False	False	False	False	False	Fals
7	False	False	False	False	False	False	False	False	False	False	False	False	Fals
8	False	False	False	False	False	False	False	False	False	False	False	False	Fals
9	False	False	False	False	False	False	False	False	False	False	False	False	Fals

In [30]:
```
df1.count()
```

Out[30]:
```
Employee ID            10
Employee Name          10
Department             10
Age                    10
Location               10
Salary                 10
Years with Company     10
Position               10
Performance Score      10
Bonus                  10
Gender                 10
Marital Status         10
Education              10
Hire Date              10
Overtime Hours         10
Sick Days Taken        10
Vacation Days Taken    10
Training Hours         10
Certifications         10
Supervisor             10
dtype: int64
```

In [ ]:
```
df1.sum()
```

In [33]:
```
print(df1)
```

```
   Employee ID       Employee Name    Department  Age        Location  Salary  \
0         1011      Satender Kumar  Data Analyst   24  London, Canada   75719
1         1012              data 1            HR   40     Los Angeles   96413
2         1013         Chris Evans            IT   37        New York   74042
3         1014     Natalie Portman     Marketing   49         Chicago  108467
4         1015         Tom Holland       Finance   27         Houston   65822
5         1016         Emma Watson         Sales   56         Phoenix  114854
6         1017    Daniel Radcliffe           R&D   33    Philadelphia  117933
7         1018  Scarlett Johansson    Operations   41     San Antonio   87342
8         1019   Robert Downey Jr.         Legal   51       San Diego   72775
9         1020        Mark Ruffalo       Support   42          Dallas  142745

   Years with Company              Position  Performance Score  Bonus  \
0                  12          Data Analyst                  2   3187
1                  12            HR Manager                  1  10993
2                  14         IT Specialist                  4  10834
3                  11  Marketing Coordinator                  4   2760
4                  12     Financial Analyst                  2   6263
5                   5         Sales Manager                  3  10287
6                  17     Research Scientist                  3   8290
7                   8     Operations Manager                  3  10047
8                   6          Legal Advisor                  2   6510
9                  10     Support Specialist                  1   5533

   Gender Marital Status Education  Hire Date  Overtime Hours  \
0    Male         Single    Master 2018-07-15              17
1    Male        Married  Bachelor 2014-03-22               8
2  Female         Single    Master 2011-10-12              12
3  Female         Single       PhD 2017-04-17              10
4    Male        Married  Bachelor 2015-09-23              13
5  Female         Single    Master 2016-11-01              15
6    Male         Single       PhD 2019-05-11               8
7  Female        Married  Bachelor 2020-07-08              15
8    Male         Single    Master 2013-08-19               7
9    Male        Married       PhD 2012-01-09               2

   Sick Days Taken  Vacation Days Taken  Training Hours Certifications  \
0                5                   12              21            Yes
1                3                   18              41            Yes
2                4                    8              22             No
3                7                   20              42            Yes
4                6                   11              35             No
5                0                   20              35            Yes
6                1                   15              48             No
7                7                    9              50            Yes
8                7                   20              35            Yes
9                4                   17              15             No

         Supervisor
0        John Smith
1   Michael Johnson
2  Patricia Williams
3       Linda Brown
4     Barbara Jones
5   Elizabeth Garcia
6    Susan Martinez
7  Jessica Hernandez
8       Sarah Lopez
9      Karen Wilson
```

In [36]:

```python
import pandas as pd

# Assuming df and df1 are your DataFrames from the previous examples

# Merging the two DataFrames on the 'Employee ID' column
merged_df = pd.merge(df, df1, on='Employee ID', suffixes=('_df', '_df1'))

# Display the merged DataFrame
print(merged_df)
```

```
Empty DataFrame
Columns: [Employee ID, Employee Name_df, Department_df, Age_df, Location_df, Salary_df, Years with Company_df, Position_df, Performance Score_df, Bonus_df, Gender_df, Marital Status_df, Education_df, Hire Date_df, Overtime Hours_df, Sick Days Taken_df, Vacation Days Taken_df, Training Hours_df, Certifications_df, Supervisor_df, Employee Name_df1, Department_df1, Age_df1, Location_df1, Salary_df1, Years with Company_df1, Position_df1, Performance Score_df1, Bonus_df1, Gender_df1, Marital Status_df1, Education_df1, Hire Date_df1, Overtime Hours_df1, Sick Days Taken_df1, Vacation Days Taken_df1, Training Hours_df1, Certifications_df1, Supervisor_df1]
Index: []

[0 rows x 39 columns]
```

In [39]:

```python
merged_df = pd.merge(df, df1, on='Employee ID', suffixes=('_df', '_df1'), how='outer')
print(merged_df)
```

	Employee ID	Employee Name_df	Department_df	Age_df	Location_df
0	1001	Satender Kumar	Data Analyst	24.0	London, Canada
1	1002	data 1	IT	46.0	Toronto
2	1003	Jane Smith	Finance	48.0	London
3	1004	Robert Brown	Marketing	32.0	Sydney
4	1005	Emily Davis	Sales	40.0	San Francisco
5	1006	Michael Wilson	Operations	45.0	Paris
6	1007	Sarah Taylor	R&D	58.0	Berlin
7	1008	David Lee	Support	28.0	Tokyo
8	1009	Laura Johnson	Admin	38.0	Dubai
9	1010	James White	Legal	46.0	Singapore
10	1011	NaN	NaN	NaN	NaN
11	1012	NaN	NaN	NaN	NaN
12	1013	NaN	NaN	NaN	NaN
13	1014	NaN	NaN	NaN	NaN
14	1015	NaN	NaN	NaN	NaN
15	1016	NaN	NaN	NaN	NaN
16	1017	NaN	NaN	NaN	NaN
17	1018	NaN	NaN	NaN	NaN
18	1019	NaN	NaN	NaN	NaN
19	1020	NaN	NaN	NaN	NaN

	Salary_df	Years with Company_df	Position_df	Performance Score_df
0	62989.0	10.0	Data Analyst	4.0
1	96061.0	5.0	Developer	4.0
2	60507.0	1.0	Analyst	1.0
3	71727.0	9.0	Designer	3.0
4	81098.0	13.0	Consultant	3.0
5	60924.0	6.0	Engineer	2.0
6	116105.0	13.0	Scientist	4.0
7	138939.0	9.0	Support Agent	3.0
8	93249.0	7.0	Admin Assistant	4.0
9	141721.0	2.0	Lawyer	2.0
10	NaN	NaN	NaN	NaN
11	NaN	NaN	NaN	NaN
12	NaN	NaN	NaN	NaN
13	NaN	NaN	NaN	NaN
14	NaN	NaN	NaN	NaN
15	NaN	NaN	NaN	NaN
16	NaN	NaN	NaN	NaN
17	NaN	NaN	NaN	NaN
18	NaN	NaN	NaN	NaN
19	NaN	NaN	NaN	NaN

	Bonus_df	...	Gender_df1	Marital Status_df1	Education_df1	Hire Date_df1
0	6419.0	...	NaN	NaN	NaN	NaT
1	4746.0	...	NaN	NaN	NaN	NaT
2	1447.0	...	NaN	NaN	NaN	NaT
3	7196.0	...	NaN	NaN	NaN	NaT
4	2218.0	...	NaN	NaN	NaN	NaT
5	7973.0	...	NaN	NaN	NaN	NaT
6	7565.0	...	NaN	NaN	NaN	NaT
7	1800.0	...	NaN	NaN	NaN	NaT
8	1189.0	...	NaN	NaN	NaN	NaT
9	1654.0	...	NaN	NaN	NaN	NaT
10	NaN	...	Male	Single	Master	2018-07-15
11	NaN	...	Male	Married	Bachelor	2014-03-22
12	NaN	...	Female	Single	Master	2011-10-12
13	NaN	...	Female	Single	PhD	2017-04-17
14	NaN	...	Male	Married	Bachelor	2015-09-23
15	NaN	...	Female	Single	Master	2016-11-01
16	NaN	...	Male	Single	PhD	2019-05-11
17	NaN	...	Female	Married	Bachelor	2020-07-08
18	NaN	...	Male	Single	Master	2013-08-19
19	NaN	...	Male	Married	PhD	2012-01-09

	Overtime Hours_df1	Sick Days Taken_df1	Vacation Days Taken_df1
0	NaN	NaN	NaN
1	NaN	NaN	NaN
2	NaN	NaN	NaN
3	NaN	NaN	NaN
4	NaN	NaN	NaN
5	NaN	NaN	NaN
6	NaN	NaN	NaN
7	NaN	NaN	NaN
8	NaN	NaN	NaN
9	NaN	NaN	NaN
10	17.0	5.0	12.0
11	8.0	3.0	18.0
12	12.0	4.0	8.0
13	10.0	7.0	20.0
14	13.0	6.0	11.0
15	15.0	0.0	20.0

```
16                8.0                 1.0                    15.0
17               15.0                 7.0                     9.0
18                7.0                 7.0                    20.0
19                2.0                 4.0                    17.0

    Training Hours_df1 Certifications_df1     Supervisor_df1
0                  NaN                 NaN                NaN
1                  NaN                 NaN                NaN
2                  NaN                 NaN                NaN
3                  NaN                 NaN                NaN
4                  NaN                 NaN                NaN
5                  NaN                 NaN                NaN
6                  NaN                 NaN                NaN
7                  NaN                 NaN                NaN
8                  NaN                 NaN                NaN
9                  NaN                 NaN                NaN
10                21.0                 Yes         John Smith
11                41.0                 Yes    Michael Johnson
12                22.0                  No  Patricia Williams
13                42.0                 Yes        Linda Brown
14                35.0                  No      Barbara Jones
15                35.0                 Yes   Elizabeth Garcia
16                48.0                  No     Susan Martinez
17                50.0                 Yes  Jessica Hernandez
18                35.0                 Yes        Sarah Lopez
19                15.0                  No       Karen Wilson

[20 rows x 39 columns]
```

In [43]:
```
print(df['Employee ID'])
print(df1['Employee ID'])
```

```
0    1001
1    1002
2    1003
3    1004
4    1005
5    1006
6    1007
7    1008
8    1009
9    1010
Name: Employee ID, dtype: int32
0    1011
1    1012
2    1013
3    1014
4    1015
5    1016
6    1017
7    1018
8    1019
9    1020
Name: Employee ID, dtype: int32
```

In [45]:
```
df
```

Out[45]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Educat
0	1001	Satender Kumar	Data Analyst	24	London, Canada	62989	10	Data Analyst	4	6419	Male	Single	Bach
1	1002	data 1	IT	46	Toronto	96061	5	Developer	4	4746	Male	Single	Ma
2	1003	Jane Smith	Finance	48	London	60507	1	Analyst	1	1447	Female	Married	
3	1004	Robert Brown	Marketing	32	Sydney	71727	9	Designer	3	7196	Male	Single	Bach
4	1005	Emily Davis	Sales	40	San Francisco	81098	13	Consultant	3	2218	Female	Single	Ma
5	1006	Michael Wilson	Operations	45	Paris	60924	6	Engineer	2	7973	Male	Married	
6	1007	Sarah Taylor	R&D	58	Berlin	116105	13	Scientist	4	7565	Female	Married	Bach
7	1008	David Lee	Support	28	Tokyo	138939	9	Support Agent	3	1800	Male	Single	Ma
8	1009	Laura Johnson	Admin	38	Dubai	93249	7	Admin Assistant	4	1189	Female	Married	Bach
9	1010	James White	Legal	46	Singapore	141721	2	Lawyer	2	1654	Male	Single	Ma

In [46]:
```
df1
```

Out[46]:

	Employee ID	Employee Name	Department	Age	Location	Salary	Years with Company	Position	Performance Score	Bonus	Gender	Marital Status	Edu
0	1011	Satender Kumar	Data Analyst	24	London, Canada	75719	12	Data Analyst	2	3187	Male	Single	
1	1012	data 1	HR	40	Los Angeles	96413	12	HR Manager	1	10993	Male	Married	Ba
2	1013	Chris Evans	IT	37	New York	74042	14	IT Specialist	4	10834	Female	Single	
3	1014	Natalie Portman	Marketing	49	Chicago	108467	11	Marketing Coordinator	4	2760	Female	Single	
4	1015	Tom Holland	Finance	27	Houston	65822	12	Financial Analyst	2	6263	Male	Married	Ba
5	1016	Emma Watson	Sales	56	Phoenix	114854	5	Sales Manager	3	10287	Female	Single	
6	1017	Daniel Radcliffe	R&D	33	Philadelphia	117933	17	Research Scientist	3	8290	Male	Single	
7	1018	Scarlett Johansson	Operations	41	San Antonio	87342	8	Operations Manager	3	10047	Female	Married	Ba
8	1019	Robert Downey Jr.	Legal	51	San Diego	72775	6	Legal Advisor	2	6510	Male	Single	
9	1020	Mark Ruffalo	Support	42	Dallas	142745	10	Support Specialist	1	5533	Male	Married	

In [50]:
```
print(pd.concat([df,df1]))
```

```
   Employee ID       Employee Name    Department  Age        Location  Salary  \
0         1001      Satender Kumar  Data Analyst   24  London, Canada   62989
1         1002              data 1            IT   46         Toronto   96061
2         1003          Jane Smith       Finance   48          London   60507
3         1004        Robert Brown     Marketing   32          Sydney   71727
4         1005         Emily Davis         Sales   40   San Francisco   81098
5         1006      Michael Wilson    Operations   45           Paris   60924
6         1007        Sarah Taylor           R&D   58          Berlin  116105
7         1008           David Lee       Support   28           Tokyo  138939
8         1009       Laura Johnson         Admin   38           Dubai   93249
9         1010         James White         Legal   46       Singapore  141721
0         1011      Satender Kumar  Data Analyst   24  London, Canada   75719
1         1012              data 1            HR   40     Los Angeles   96413
2         1013         Chris Evans            IT   37        New York   74042
3         1014     Natalie Portman     Marketing   49         Chicago  108467
4         1015         Tom Holland       Finance   27         Houston   65822
5         1016         Emma Watson         Sales   56         Phoenix  114854
```

6	1017	Daniel Radcliffe	R&D	33	Philadelphia	117933	
7	1018	Scarlett Johansson	Operations	41	San Antonio	87342	
8	1019	Robert Downey Jr.	Legal	51	San Diego	72775	
9	1020	Mark Ruffalo	Support	42	Dallas	142745	

	Years with Company	Position	Performance Score	Bonus	\
0	10	Data Analyst	4	6419	
1	5	Developer	4	4746	
2	1	Analyst	1	1447	
3	9	Designer	3	7196	
4	13	Consultant	3	2218	
5	6	Engineer	2	7973	
6	13	Scientist	4	7565	
7	9	Support Agent	3	1800	
8	7	Admin Assistant	4	1189	
9	2	Lawyer	2	1654	
0	12	Data Analyst	2	3187	
1	12	HR Manager	1	10993	
2	14	IT Specialist	4	10834	
3	11	Marketing Coordinator	4	2760	
4	12	Financial Analyst	2	6263	
5	5	Sales Manager	3	10287	
6	17	Research Scientist	3	8290	
7	8	Operations Manager	3	10047	
8	6	Legal Advisor	2	6510	
9	10	Support Specialist	1	5533	

	Gender	Marital Status	Education	Hire Date	Overtime Hours	\
0	Male	Single	Bachelor	2019-06-12	10	
1	Male	Single	Master	2015-07-23	15	
2	Female	Married	PhD	2012-09-05	0	
3	Male	Single	Bachelor	2018-11-30	18	
4	Female	Single	Master	2013-05-19	1	
5	Male	Married	PhD	2019-02-14	0	
6	Female	Married	Bachelor	2020-08-21	3	
7	Male	Single	Master	2016-06-03	6	
8	Female	Married	Bachelor	2014-01-28	15	
9	Male	Single	Master	2017-03-15	3	
0	Male	Single	Master	2018-07-15	17	
1	Male	Married	Bachelor	2014-03-22	8	
2	Female	Single	Master	2011-10-12	12	
3	Female	Single	PhD	2017-04-17	10	
4	Male	Married	Bachelor	2015-09-23	13	
5	Female	Single	Master	2016-11-01	15	
6	Male	Single	PhD	2019-05-11	8	
7	Female	Married	Bachelor	2020-07-08	15	
8	Male	Single	Master	2013-08-19	7	
9	Male	Married	PhD	2012-01-09	2	

	Sick Days Taken	Vacation Days Taken	Training Hours	Certifications	\
0	2	19	15	Yes	
1	7	14	31	No	
2	5	7	37	Yes	
3	3	11	12	No	
4	7	17	30	Yes	
5	1	16	24	No	
6	0	7	49	Yes	
7	0	6	10	Yes	
8	1	11	38	No	
9	7	19	40	Yes	
0	5	12	21	Yes	
1	3	18	41	Yes	
2	4	8	22	No	
3	7	20	42	Yes	
4	6	11	35	No	
5	0	20	35	Yes	
6	1	15	48	No	
7	7	9	50	Yes	
8	7	20	35	Yes	
9	4	17	15	No	

	Supervisor
0	Anna Smith
1	Brian Adams
2	Clara Jones
3	Daniel Martin
4	Eva Rodriguez
5	Frank Bell
6	Grace Moore
7	Hannah Lewis
8	Ivan Scott
9	Jake Miller
0	John Smith

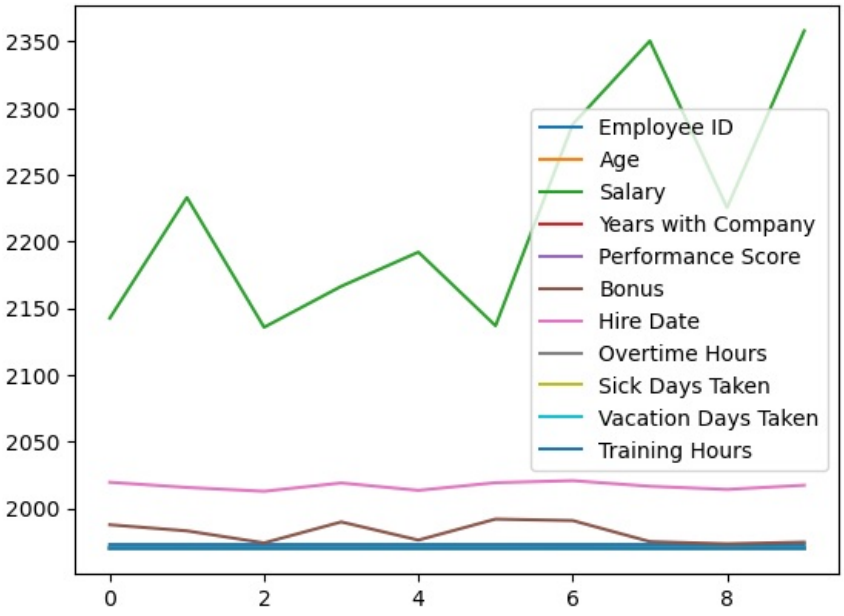
```
1    Michael Johnson
2  Patricia Williams
3        Linda Brown
4      Barbara Jones
5   Elizabeth Garcia
6     Susan Martinez
7  Jessica Hernandez
8        Sarah Lopez
9       Karen Wilson
```

In [52]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10 entries, 0 to 9
Data columns (total 20 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   Employee ID          10 non-null     int32
 1   Employee Name        10 non-null     object
 2   Department           10 non-null     object
 3   Age                  10 non-null     int64
 4   Location             10 non-null     object
 5   Salary               10 non-null     int32
 6   Years with Company   10 non-null     int32
 7   Position             10 non-null     object
 8   Performance Score    10 non-null     int32
 9   Bonus                10 non-null     int32
 10  Gender               10 non-null     object
 11  Marital Status       10 non-null     object
 12  Education            10 non-null     object
 13  Hire Date            10 non-null     datetime64[ns]
 14  Overtime Hours       10 non-null     int32
 15  Sick Days Taken      10 non-null     int32
 16  Vacation Days Taken  10 non-null     int32
 17  Training Hours       10 non-null     int32
 18  Certifications       10 non-null     object
 19  Supervisor           10 non-null     object
dtypes: datetime64[ns](1), int32(9), int64(1), object(9)
memory usage: 1.3+ KB
```

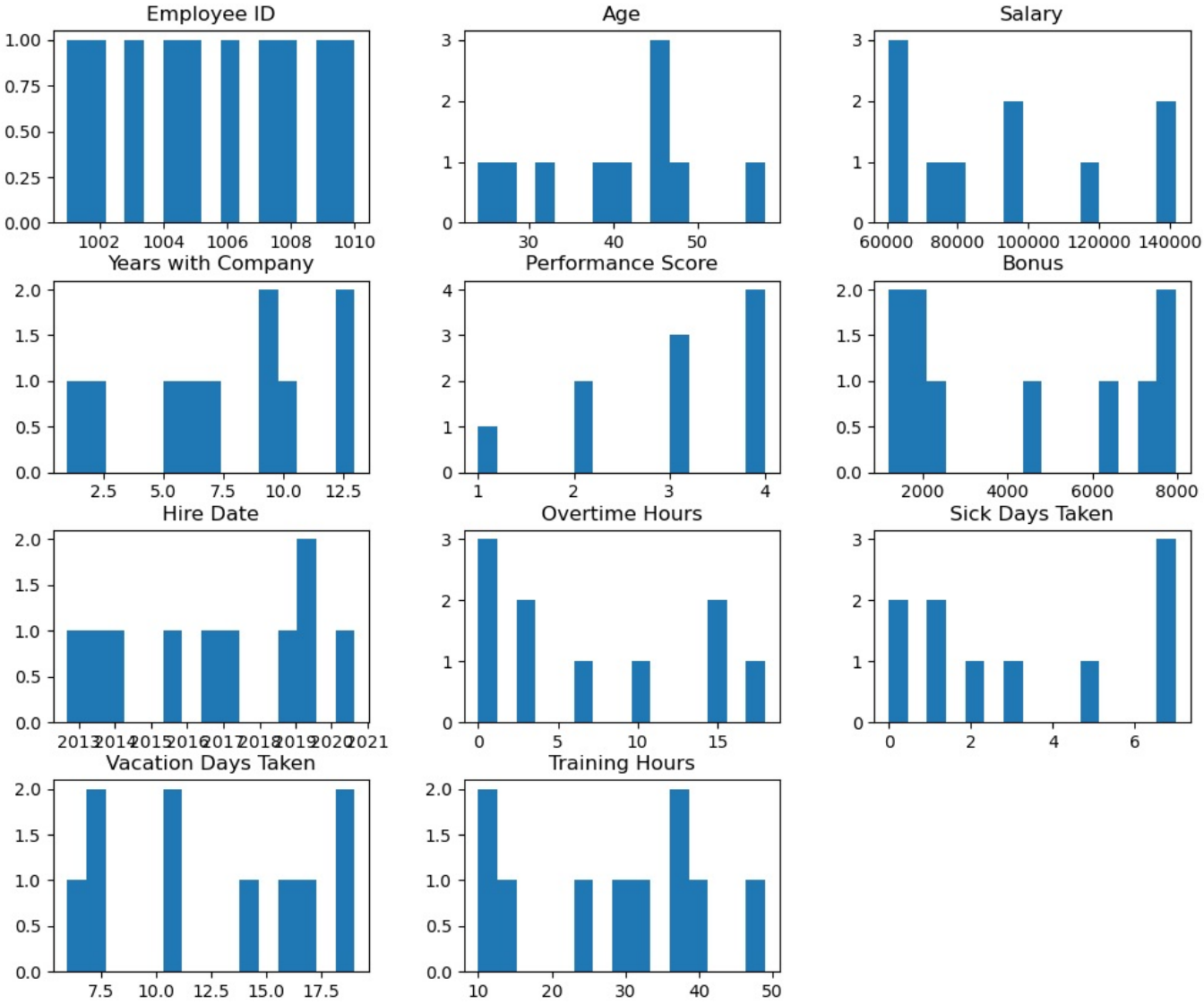
In [55]:
```
df.plot()
```

Out[55]: <Axes: >



In [57]:
```
df.hist(figsize=(12, 10), bins=15, grid=False)

# Display the plots
plt.show()
```



In [ ]:

Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js