In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sb
from sklearn.preprocessing import StandardScaler, MinMaxScaler
from sklearn.preprocessing import LabelEncoder, OneHotEncoder
```

In [3]:
```
# Load the dataset
df = pd.read_csv("Employee.csv")
```

In [5]:
```
df.head(10)
```

Out[5]:

	Company	Age	Salary	Place	Country	Gender
0	TCS	20.0	NaN	Chennai	India	0
1	Infosys	30.0	NaN	Mumbai	India	0
2	TCS	35.0	2300.0	Calcutta	India	0
3	Infosys	40.0	3000.0	Delhi	India	0
4	TCS	23.0	4000.0	Mumbai	India	0
5	Infosys	NaN	5000.0	Calcutta	India	0
6	TCS	NaN	6000.0	Chennai	India	1
7	Infosys	23.0	7000.0	Mumbai	India	1
8	TCS	34.0	8000.0	Calcutta	India	1
9	CTS	45.0	9000.0	Delhi	India	0

In [7]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 148 entries, 0 to 147
Data columns (total 6 columns):
 #   Column   Non-Null Count  Dtype  
---  ------   --------------  -----  
 0   Company  140 non-null    object 
 1   Age      130 non-null    float64
 2   Salary   124 non-null    float64
 3   Place    134 non-null    object 
 4   Country  148 non-null    object 
 5   Gender   148 non-null    int64  
dtypes: float64(2), int64(1), object(3)
memory usage: 7.1+ KB
```

In [9]:
```
# 1. Data Exploration
```

In [11]:
```
unique_values = {col: df[col].unique() for col in df.columns}
unique_counts = {col: df[col].nunique() for col in df.columns}
```

In [13]:
```
unique_values
unique_counts
```

Out[13]:
```
{'Company': 6, 'Age': 29, 'Salary': 40, 'Place': 11, 'Country': 1, 'Gender': 2}
```

In [15]:
```
unique_table = pd.DataFrame({
    'Column': unique_values.keys(),
    'Unique Values': [', '.join(map(str, unique_values[col])) for col in unique_
    'Count of Unique Values': unique_counts.values()
})
```

In [17]:
```
unique_table
```

Out[17]:

	Column	Unique Values	Count of Unique Values
0	Company	TCS, Infosys, CTS, nan, Tata Consultancy Servi...	6
1	Age	20.0, 30.0, 35.0, 40.0, 23.0, nan, 34.0, 45.0,...	29
2	Salary	nan, 2300.0, 3000.0, 4000.0, 5000.0, 6000.0, 7...	40
3	Place	Chennai, Mumbai, Calcutta, Delhi, Podicherry, ...	11
4	Country	India	1
5	Gender	0, 1	2

In [19]:
```
df.describe()
```

Out[19]:

	Age	Salary	Gender
count	130.000000	124.000000	148.000000
mean	30.484615	5312.467742	0.222973
std	11.096640	2573.764683	0.417654
min	0.000000	1089.000000	0.000000
25%	22.000000	3030.000000	0.000000
50%	32.500000	5000.000000	0.000000
75%	37.750000	8000.000000	0.000000
max	54.000000	9876.000000	1.000000

In [21]:
```
# 2. Data Cleaning
```

In [23]:
```
df.isnull().sum()
```

Out[23]:
```
Company     8
Age        18
Salary     24
Place      14
Country     0
Gender      0
dtype: int64
```

In [25]:
```
df['Age'] = df['Age'].replace(0, np.nan)
```

In [29]:
```
df['Salary']=df['Salary'].fillna(df['Salary'].median())
df['Age']=df['Age'].fillna(df['Age'].median())
```

In [31]:
```
df.isnull().sum()
```

Out[31]:
```
Company     8
Age         0
Salary      0
Place      14
Country     0
Gender      0
dtype: int64
```

In [ ]:

In [33]:
```
Company_mode = df['Company'].mode()
Place_mode = df['Place'].mode()
```

In [35]:
```
print("Company mode", "\n", Company_mode, "\n")
print("Place mode", "\n", Place_mode)
```

```
Company mode 
 0    TCS
Name: Company, dtype: object 

Place mode 
 0    Mumbai
Name: Place, dtype: object
```

In [41]:
```
df['Company'] = df['Company'].astype(str)
df['Place'] = df['Place'].astype(str)
```

In [43]:
```
df['Company'] = df['Company'].fillna(Company_mode)
df['Place'] = df['Place'].fillna(Place_mode)
```

In [45]:
```
df.isnull().sum()
```

Out[45]:
```
Company    0
Age        0
Salary     0
Place      0
Country    0
Gender     0
dtype: int64
```

In [47]:
```
df.duplicated().sum()
```

Out[47]:
```
4
```

In [49]:
```
data = df.drop_duplicates()
```

In [53]:
```
data.duplicated().sum()
```

Out[53]:
```
0
```

In [55]:
```
data['Gender'] = data['Gender'].map({0: 'M', 1: 'F'})
```

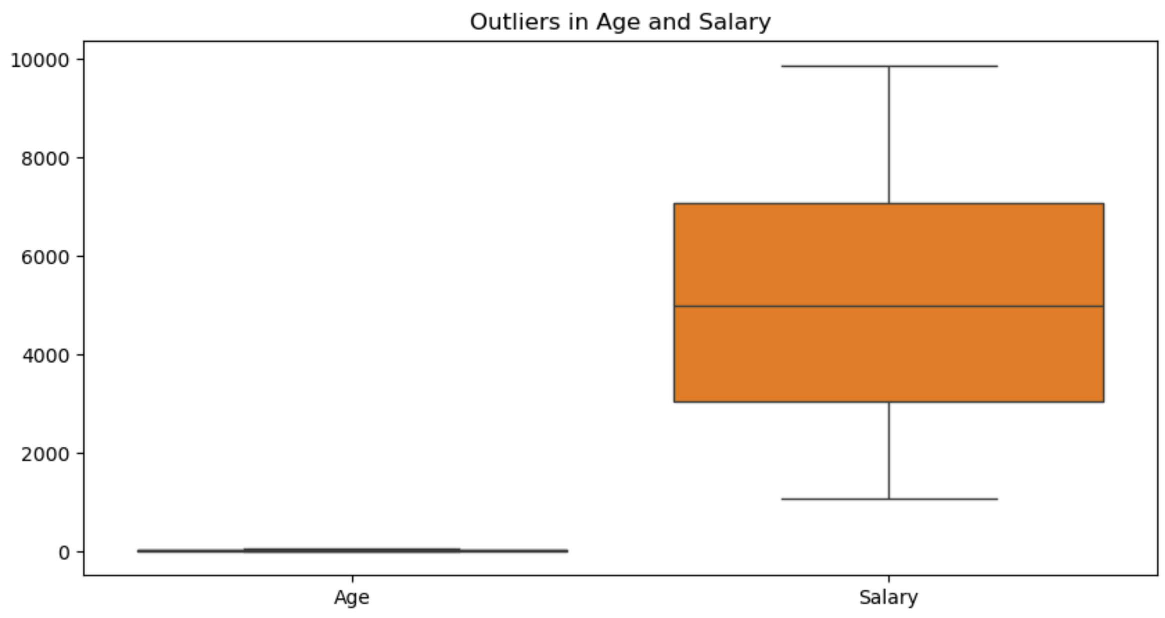
```
C:\Users\vayal\AppData\Local\Temp\ipykernel_21308\2415818966.py:1: SettingWithCop
yWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  data['Gender'] = data['Gender'].map({0: 'M', 1: 'F'})
```

In [57]:
```
data.head(5)
```

Out[57]:

	Company	Age	Salary	Place	Country	Gender
0	TCS	20.0	5000.0	Chennai	India	M
1	Infosys	30.0	5000.0	Mumbai	India	M
2	TCS	35.0	2300.0	Calcutta	India	M
3	Infosys	40.0	3000.0	Delhi	India	M
4	TCS	23.0	4000.0	Mumbai	India	M

In [59]:
```
# Detect outliers using boxplots
plt.figure(figsize=(10, 5))
sb.boxplot(data=data[['Age', 'Salary']])
plt.title('Outliers in Age and Salary')
plt.show()
```



In [61]:
```
# 3. Data Analysis
```

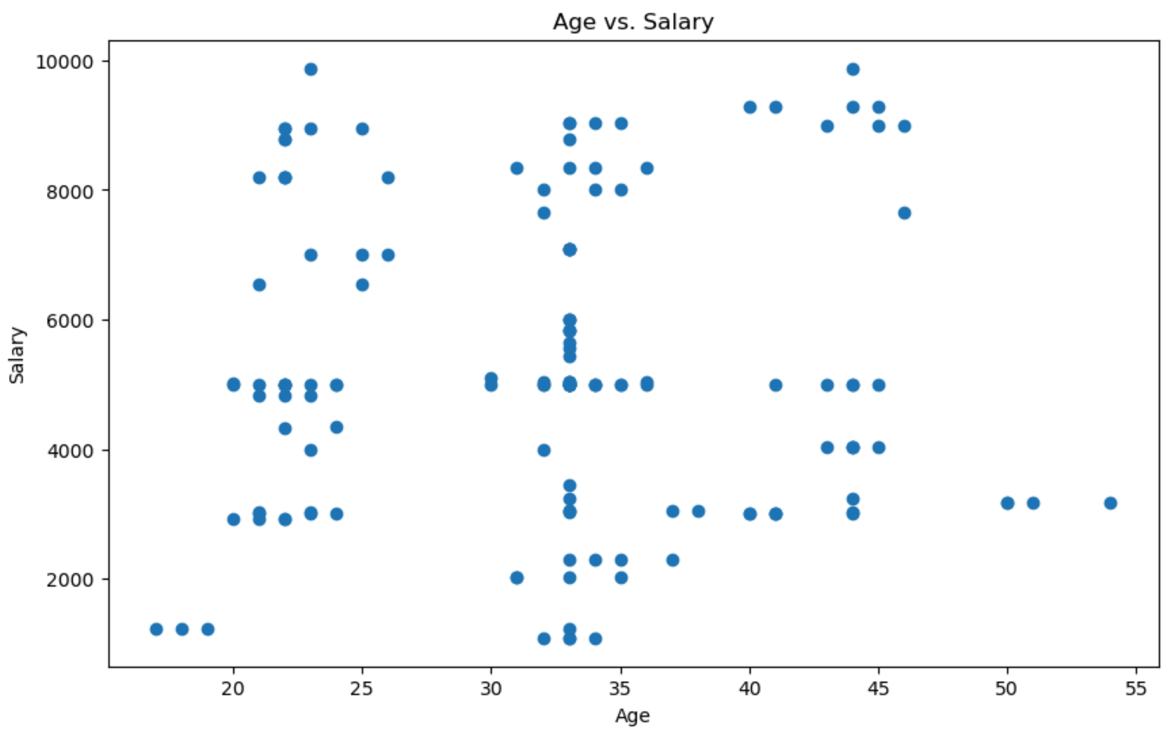
In [63]:
```
# Filter data where age > 40 and salary < 5000
filtered_data = data[(data['Age'] > 40) & (data['Salary'] < 5000)]
filtered_data
```

Out[63]:

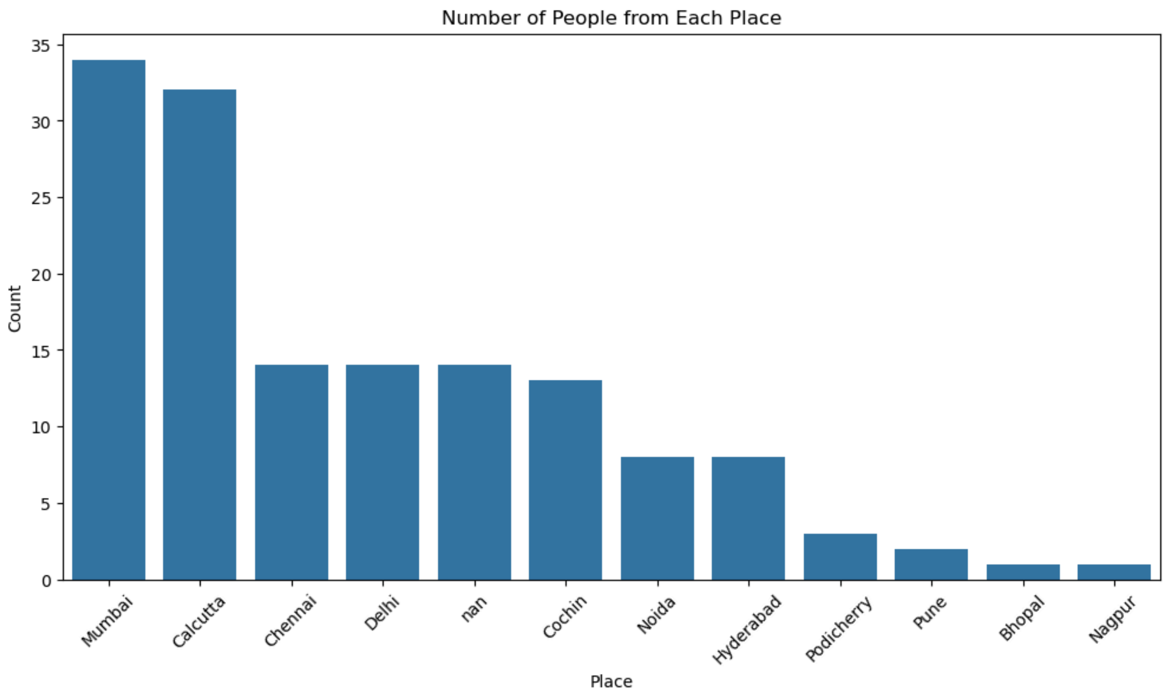
	Company	Age	Salary	Place	Country	Gender
21	Infosys	50.0	3184.0	Delhi	India	M
32	Infosys	45.0	4034.0	Calcutta	India	M
39	Infosys	41.0	3000.0	Mumbai	India	M
50	Infosys	41.0	3000.0	Chennai	India	M
57	Infosys	51.0	3184.0	Hyderabad	India	M
68	Infosys	43.0	4034.0	Mumbai	India	M
75	Infosys	44.0	3000.0	Cochin	India	M
86	Infosys	41.0	3000.0	Delhi	India	M
93	Infosys	54.0	3184.0	Mumbai	India	M
104	Infosys	44.0	4034.0	Delhi	India	M
122	Infosys	44.0	3234.0	Mumbai	India	M
129	Infosys	50.0	3184.0	Calcutta	India	M
138	CTS	44.0	3033.0	Cochin	India	M
140	Infosys	44.0	4034.0	Hyderabad	India	M
145	Infosys	44.0	4034.0	Delhi	India	F

In [65]:

```python
# Plotting age vs. salary
plt.figure(figsize=(10, 6))
plt.scatter(data['Age'], data['Salary'])
plt.title("Age vs. Salary")
plt.xlabel("Age")
plt.ylabel("Salary")
plt.show()
```



In [67]:
```
# Count number of people from each place and visualize
place_count = data['Place'].value_counts()
plt.figure(figsize=(12, 6))
sb.barplot(x=place_count.index, y=place_count.values)
plt.title("Number of People from Each Place")
plt.xlabel("Place")
plt.ylabel("Count")
plt.xticks(rotation=45)
plt.show()
```



In [69]:
```
# 4. Data Encoding
```

In [71]:
```
# Label encoding for binary categorical features
le = LabelEncoder()
```

In [73]:
```
data['Gender_Encoded'] = le.fit_transform(data['Gender'])
data['Company_Encoded'] = le.fit_transform(data['Company'])
data['Place_Encoded'] = le.fit_transform(data['Place'])
```

```
C:\Users\vayal\AppData\Local\Temp\ipykernel_21308\1966329664.py:1: SettingWithCop
yWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  data['Gender_Encoded'] = le.fit_transform(data['Gender'])
C:\Users\vayal\AppData\Local\Temp\ipykernel_21308\1966329664.py:2: SettingWithCop
yWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  data['Company_Encoded'] = le.fit_transform(data['Company'])
C:\Users\vayal\AppData\Local\Temp\ipykernel_21308\1966329664.py:3: SettingWithCop
yWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  data['Place_Encoded'] = le.fit_transform(data['Place'])
```

In [75]:
```
data.head(10)
```

Out[75]:

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Enco
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	
3	Infosys	40.0	3000.0	Delhi	India	M	1	
4	TCS	23.0	4000.0	Mumbai	India	M	1	
5	Infosys	33.0	5000.0	Calcutta	India	M	1	
6	TCS	33.0	6000.0	Chennai	India	F	0	
7	Infosys	23.0	7000.0	Mumbai	India	F	0	
8	TCS	34.0	8000.0	Calcutta	India	F	0	
9	CTS	45.0	9000.0	Delhi	India	M	1	

In [77]:
```
# One-hot encoding for multi-category features
oh = pd.get_dummies(data['Gender_Encoded'],prefix = 'Gender')
data = pd.concat([data,oh],axis=1)
```

In [79]:
```
data.head(3)
```

Out[79]:

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Encod
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	

In [81]:
```
oh1 = pd.get_dummies(data['Company_Encoded'],prefix = 'Company')
data = pd.concat([data,oh1],axis=1)
```

In [83]:
```
data.head(3)
```

Out[83]:

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Encod
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	

In [85]:
```
oh2 = pd.get_dummies(data['Place_Encoded'],prefix = 'Place')
data = pd.concat([data,oh2],axis=1)
```

In [87]:
```
data.head(3)
```

Out[87]:

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Encod
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	

3 rows × 30 columns

In [89]:
```
# 5. Feature Scaling:
```

In [91]:
```
# Apply StandardScaler
scaler = StandardScaler()
```

In [93]:
```
data[['Age_Std', 'Salary_Std']] = scaler.fit_transform(data[['Age', 'Salary']])
```

In [95]:
```
data.head(3)
```

Out[95]:

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Encod
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	

3 rows × 32 columns

In [97]:
```
# Apply MinMaxScaler
min_max_scaler = MinMaxScaler()
```

In [99]:
```
data[['Age_M', 'Salary_M']] = min_max_scaler.fit_transform(data[['Age', 'Salary'
```

In [101…
```
data.head(3)
```

Out[101…

	Company	Age	Salary	Place	Country	Gender	Gender_Encoded	Company_Encod
0	TCS	20.0	5000.0	Chennai	India	M	1	
1	Infosys	30.0	5000.0	Mumbai	India	M	1	
2	TCS	35.0	2300.0	Calcutta	India	M	1	

3 rows × 34 columns

In [103…
```
# Save cleaned and processed data to a new CSV file
data.to_csv('Processed_Employee_Data.csv')
```

In [ ]: