comprehensive report of ABC employees

November 17, 2024

[1]:

```
#Initialising libraries
import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
import seaborn as sns
from scipy import stats
import random
```

[2]:

```
#Reading the file
df=pd.read_csv("myexcel.csv.csv")
df
```

[2]:

```
              Name            Team  Number Position  Age  Height  Weight  \
0    Avery Bradley  Boston Celtics       0       PG   25  06-Feb     180
1      Jae Crowder  Boston Celtics      99       SF   25  06-Jun     235
2     John Holland  Boston Celtics      30       SG   27  06-May     205
3      R.J. Hunter  Boston Celtics      28       SG   22  06-May     185
4    Jonas Jerebko  Boston Celtics       8       PF   29  06-Oct     231
..              …             …     …      …  …     …     …
453   Shelvin Mack       Utah Jazz       8       PG   26  06-Mar     203
454      Raul Neto       Utah Jazz      25       PG   24  06-Jan     179
455   Tibor Pleiss       Utah Jazz      21        C   26  07-Mar     256
456    Jeff Withey       Utah Jazz      24        C   26     7-0     231
457       Priyanka       Utah Jazz      34        C   25  07-Mar     231

               College     Salary
0                Texas  7730337.0
1            Marquette  6796117.0
2    Boston University        NaN
3        Georgia State  1148640.0
4                  NaN  5000000.0
..                 …        …
453             Butler  2433333.0
454                NaN   900000.0
455                NaN  2900000.0
456             Kansas   947276.0
457             Kansas   947276.0
```

```
[458 rows x 9 columns]
```

[3]:

```
#  In the 'Height' column, the data was incorrectly entered as months and dates,␣
 ↪so it was replaced with random numbers
df["Height"]=[random.randint(150,180) for _ in range(len(df))]
```

[4]:

```
df
```

[4]:

```
              Name            Team  Number Position  Age  Height  Weight  \
0    Avery Bradley  Boston Celtics       0       PG   25     172     180
1      Jae Crowder  Boston Celtics      99       SF   25     162     235
2     John Holland  Boston Celtics      30       SG   27     161     205
3      R.J. Hunter  Boston Celtics      28       SG   22     178     185
4    Jonas Jerebko  Boston Celtics       8       PF   29     166     231
..             …             …     …       …   …     …     …
453   Shelvin Mack       Utah Jazz       8       PG   26     164     203
454      Raul Neto       Utah Jazz      25       PG   24     168     179
455   Tibor Pleiss       Utah Jazz      21        C   26     165     256
456    Jeff Withey       Utah Jazz      24        C   26     156     231
457       Priyanka       Utah Jazz      34        C   25     169     231

               College     Salary
0                Texas  7730337.0
1            Marquette  6796117.0
2    Boston University        NaN
3        Georgia State  1148640.0
4                  NaN  5000000.0
..                 …        …
453             Butler  2433333.0
454                NaN   900000.0
455                NaN  2900000.0
456             Kansas   947276.0
457             Kansas   947276.0

[458 rows x 9 columns]
```

[5]:

```
df.isnull().sum()
```

[5]:

```
Name          0
Team          0
Number        0
Position      0
Age           0
Height        0
Weight        0
College      84
```

```
Salary      11
dtype: int64
```

[6]:
```
# Since some college names are missing, replace them with "Others"
df["College"]=df["College"].fillna("Others")
df.head()
```

[6]:
```
           Name            Team  Number Position  Age  Height  Weight  \
0  Avery Bradley  Boston Celtics       0       PG   25     172     180
1    Jae Crowder  Boston Celtics      99       SF   25     162     235
2   John Holland  Boston Celtics      30       SG   27     161     205
3    R.J. Hunter  Boston Celtics      28       SG   22     178     185
4  Jonas Jerebko  Boston Celtics       8       PF   29     166     231

             College     Salary
0              Texas  7730337.0
1          Marquette  6796117.0
2  Boston University        NaN
3      Georgia State  1148640.0
4             Others  5000000.0
```

[7]:
```
# Since salary details are missing replace that with mean value
df["Salary"] = df["Salary"].fillna(df["Salary"].mean())
df.head()
```

[7]:
```
           Name            Team  Number Position  Age  Height  Weight  \
0  Avery Bradley  Boston Celtics       0       PG   25     172     180
1    Jae Crowder  Boston Celtics      99       SF   25     162     235
2   John Holland  Boston Celtics      30       SG   27     161     205
3    R.J. Hunter  Boston Celtics      28       SG   22     178     185
4  Jonas Jerebko  Boston Celtics       8       PF   29     166     231

             College        Salary
0              Texas  7.730337e+06
1          Marquette  6.796117e+06
2  Boston University  4.833970e+06
3      Georgia State  1.148640e+06
4             Others  5.000000e+06
```

[8]:
```
#distribution of employees across each team
Count=df.groupby("Team").size()
Count
```

[8]:
```
Team
Atlanta Hawks             15
Boston Celtics            15
Brooklyn Nets             15
```

```
Charlotte Hornets         15
Chicago Bulls             15
Cleveland Cavaliers       15
Dallas Mavericks          15
Denver Nuggets            15
Detroit Pistons           15
Golden State Warriors     15
Houston Rockets           15
Indiana Pacers            15
Los Angeles Clippers      15
Los Angeles Lakers        15
Memphis Grizzlies         18
Miami Heat                15
Milwaukee Bucks           16
Minnesota Timberwolves    14
New Orleans Pelicans      19
New York Knicks           16
Oklahoma City Thunder     15
Orlando Magic             14
Philadelphia 76ers        15
Phoenix Suns              15
Portland Trail Blazers    15
Sacramento Kings          15
San Antonio Spurs         15
Toronto Raptors           15
Utah Jazz                 16
Washington Wizards        15
dtype: int64
```

[9]:

```
# Percentage split relative to the total number of employees.
Percentage=(Count*100)/len(df)
Percentage
```

[9]:

```
Team
Atlanta Hawks             3.275109
Boston Celtics            3.275109
Brooklyn Nets             3.275109
Charlotte Hornets         3.275109
Chicago Bulls             3.275109
Cleveland Cavaliers       3.275109
Dallas Mavericks          3.275109
Denver Nuggets            3.275109
Detroit Pistons           3.275109
Golden State Warriors     3.275109
Houston Rockets           3.275109
Indiana Pacers            3.275109
Los Angeles Clippers      3.275109
Los Angeles Lakers        3.275109
Memphis Grizzlies         3.930131
Miami Heat                3.275109
Milwaukee Bucks           3.493450
Minnesota Timberwolves    3.056769
New Orleans Pelicans      4.148472
New York Knicks           3.493450
Oklahoma City Thunder     3.275109
Orlando Magic             3.056769
Philadelphia 76ers        3.275109
Phoenix Suns              3.275109
Portland Trail Blazers    3.275109
Sacramento Kings          3.275109
San Antonio Spurs         3.275109
Toronto Raptors           3.275109
Utah Jazz                 3.493450
Washington Wizards        3.275109
dtype: float64
```

[10]:

```
# To validate the correctness of the data.
Percentage.sum()
```

[10]:

```
100.00000000000003
```

[11]:

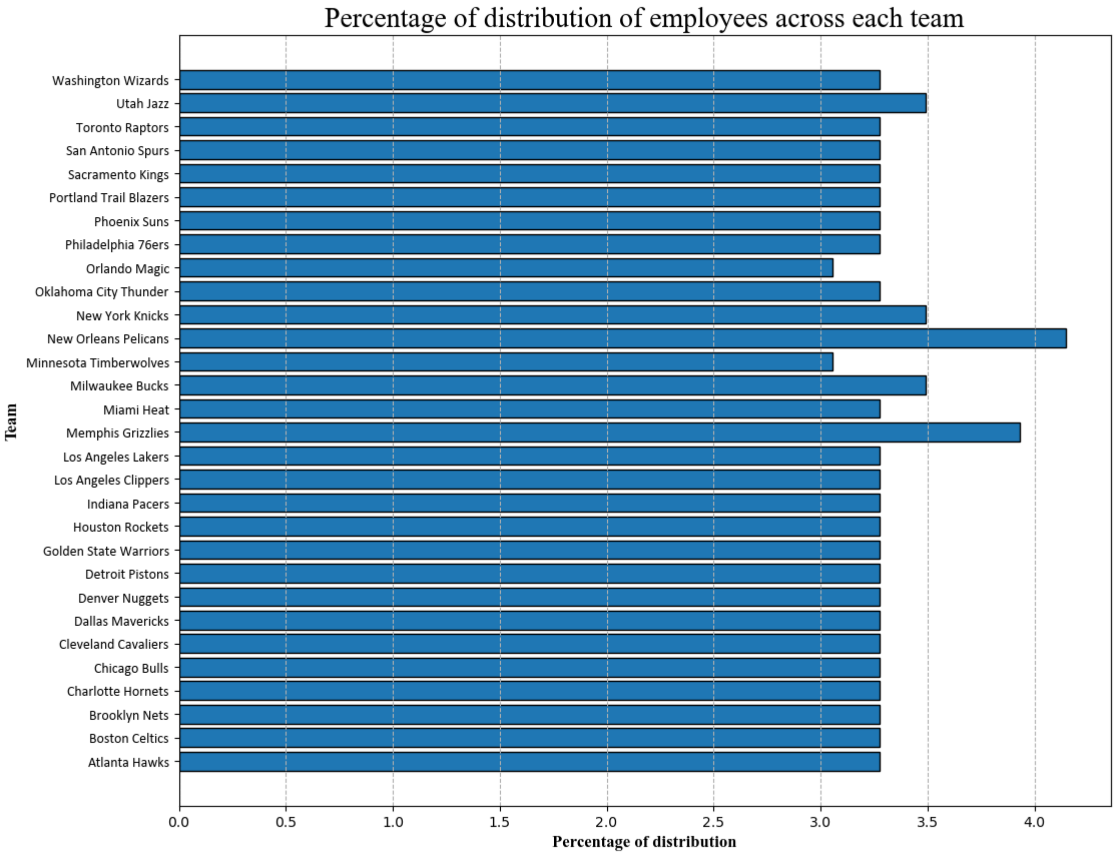
```
#Create a data frame with team name and percentage
Team_distribution=pd.DataFrame({"Team":Percentage.index, "Percentage":
 ↪Percentage.values})
Team_distribution
```

[11]:

```
                      Team  Percentage
0            Atlanta Hawks    3.275109
1           Boston Celtics    3.275109
2            Brooklyn Nets    3.275109
3        Charlotte Hornets    3.275109
4            Chicago Bulls    3.275109
5      Cleveland Cavaliers    3.275109
6         Dallas Mavericks    3.275109
7           Denver Nuggets    3.275109
8          Detroit Pistons    3.275109
9    Golden State Warriors    3.275109
10         Houston Rockets    3.275109
11          Indiana Pacers    3.275109
12    Los Angeles Clippers    3.275109
13      Los Angeles Lakers    3.275109
14       Memphis Grizzlies    3.930131
15              Miami Heat    3.275109
16         Milwaukee Bucks    3.493450
```

```
17  Minnesota Timberwolves    3.056769
18    New Orleans Pelicans    4.148472
19         New York Knicks    3.493450
20   Oklahoma City Thunder    3.275109
21           Orlando Magic    3.056769
22      Philadelphia 76ers    3.275109
23            Phoenix Suns    3.275109
24  Portland Trail Blazers    3.275109
25        Sacramento Kings    3.275109
26       San Antonio Spurs    3.275109
27         Toronto Raptors    3.275109
28               Utah Jazz    3.493450
29      Washington Wizards    3.275109
```

[12]:
```
# Graphical Representation: Percentage split
plt.figure(figsize=(12,10))
plt.
 ↪barh(Team_distribution["Team"],Team_distribution["Percentage"],edgecolor='black',capsize=5)
plt.grid( axis="x",linestyle='--')
plt.xlabel("Percentage of distribution",fontdict={'fontname': 'Times New␣
 ↪Roman', 'fontsize': 12},fontweight='bold')
plt.ylabel("Team",fontdict={'fontname': 'Times New Roman', 'fontsize':␣
 ↪12},fontweight='bold')
plt.yticks(fontname='Calibri', fontsize=10)
plt.title("Percentage of distribution of employees across each␣
 ↪team",fontdict={'fontname': 'Times New Roman', 'fontsize': 20})
plt.show()
```



```
[13]: # Segregate employees based on their positions within the company
      position = df.groupby("Position").size()
      position1=pd.DataFrame({"Position":position.index,"Number of employees":
        ↪position.values})
      position1
```

```
[13]:   Position  Number of employees
      0        C                   79
      1       PF                  100
      2       PG                   92
      3       SF                   85
      4       SG                  102
```

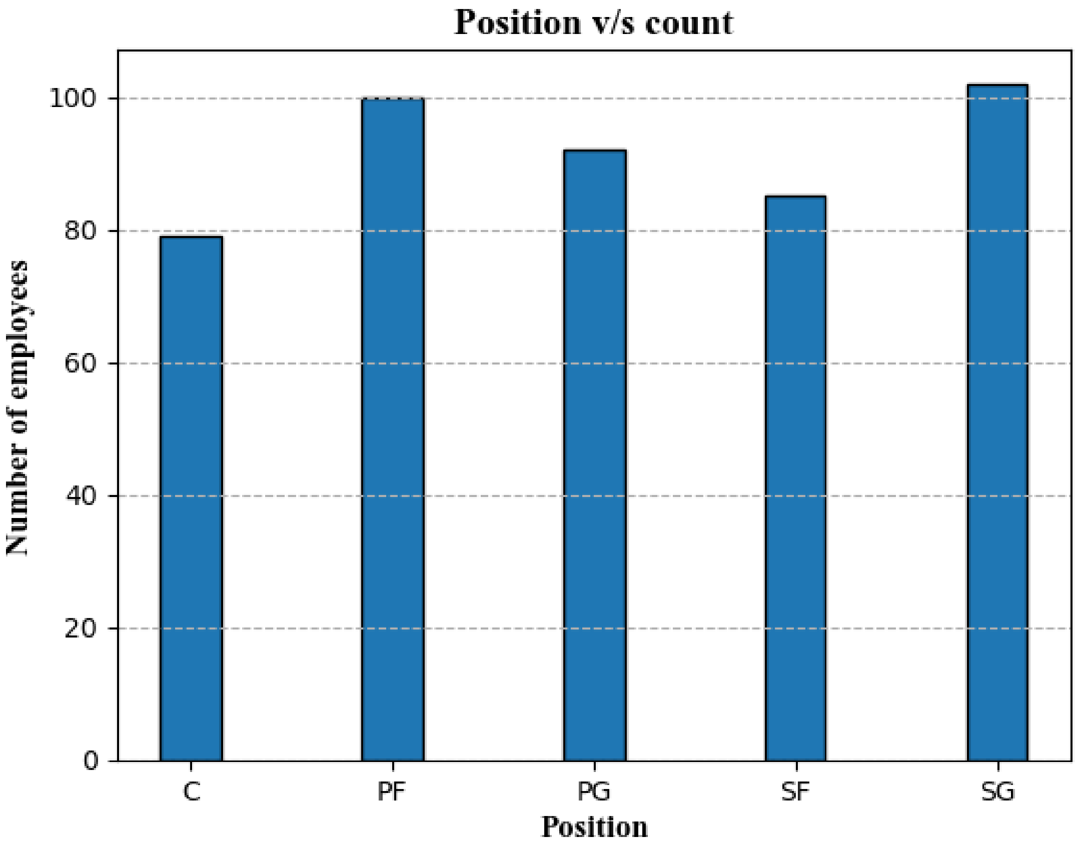
```
[14]: position_by_salary = df.groupby("Position")["Salary"].mean()
      position_by_salary1=pd.DataFrame({"Position":position_by_salary.index,"Average␣
        ↪salary":position_by_salary.values})
      position_by_salary1
```

```
[14]:   Position  Average salary
      0        C    5.903511e+06
```

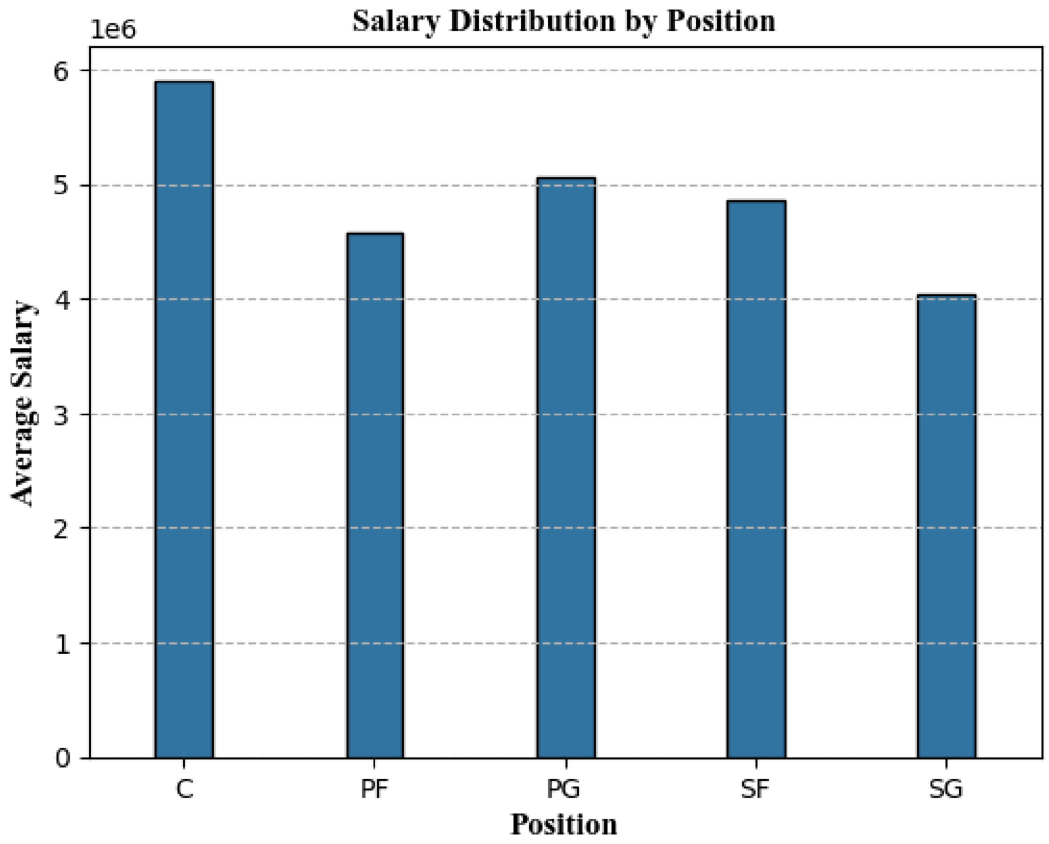
```
1        PF    4.570628e+06
2        PG    5.067227e+06
3        SF    4.857117e+06
4        SG    4.034100e+06
```

[35]:

```
#Graphical representation of number of employees based on their positions␣
  ↪within the company
plt.bar(position1["Position"],position1["Number of employees"],width=.
  ↪3,edgecolor="black")
plt.grid( axis="y",linestyle='--')
plt.xlabel("Position",fontdict={"fontname":"Times New Roman","fontsize":␣
  ↪12},fontweight="bold")
plt.ylabel("Number of employees",fontdict={"fontname":"Times New␣
  ↪Roman","fontsize": 12},fontweight="bold")
plt.title("Position v/s count",fontdict={"fontname":"Times New␣
  ↪Roman","fontsize": 14},fontweight="bold")
plt.show()
```



[16]:
```
sns.barplot(x="Position", y="Average salary", data=position_by_salary1,width=.
 ↪3,edgecolor="black")
plt.grid( axis="y",linestyle='--')
plt.title('Salary Distribution by Position',fontdict={"fontname":"Times New␣
 ↪Roman","fontsize": 12},fontweight="bold")
plt.xlabel('Position',fontdict={"fontname":"Times New Roman","fontsize":␣
 ↪12},fontweight="bold")
plt.ylabel('Average Salary',fontdict={"fontname":"Times New Roman","fontsize":␣
 ↪12},fontweight="bold")
plt.show()
```



[17]:
```
# Identify the predominant age group among employees.
bins=[15,20,25,30,35,40,45]
labels=["15-20","21-25","26-30","31-35","36-40","41-45"]
df["Age group"]=pd.cut(df["Age"],bins=bins,labels=labels,right=False)
print(df.head())
```

```
             Name            Team  Number Position  Age  Height  Weight  \
0  Avery Bradley  Boston Celtics       0       PG   25     172     180
1    Jae Crowder  Boston Celtics      99       SF   25     162     235
```

```
2   John Holland  Boston Celtics      30       SG   27      161      205
3    R.J. Hunter  Boston Celtics      28       SG   22      178      185
4  Jonas Jerebko  Boston Celtics       8       PF   29      166      231

             College        Salary Age group
0              Texas  7.730337e+06     26-30
1          Marquette  6.796117e+06     26-30
2  Boston University  4.833970e+06     26-30
3      Georgia State  1.148640e+06     21-25
4             Others  5.000000e+06     26-30
```

[18]:

```
age_group=df.groupby(df["Age group"]).size().sort_values(ascending=False)
age_group
```

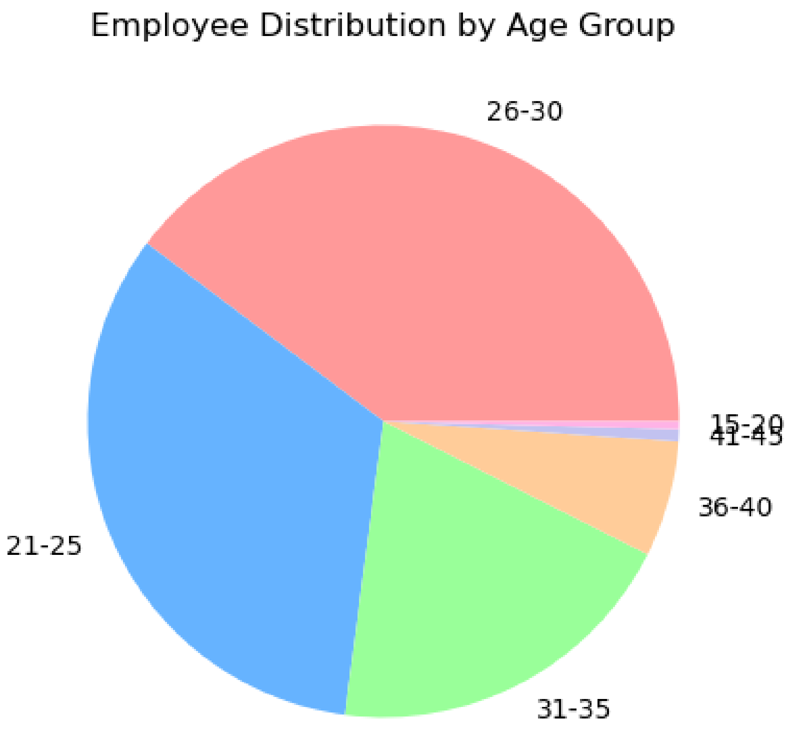
```
C:\Users\Shani\AppData\Local\Temp\ipykernel_14876\954326409.py:1: FutureWarning:
The default of observed=False is deprecated and will be changed to True in a
future version of pandas. Pass observed=False to retain current behavior or
observed=True to adopt the future default and silence this warning.
  age_group=df.groupby(df["Age group"]).size().sort_values(ascending=False)
```

[18]:

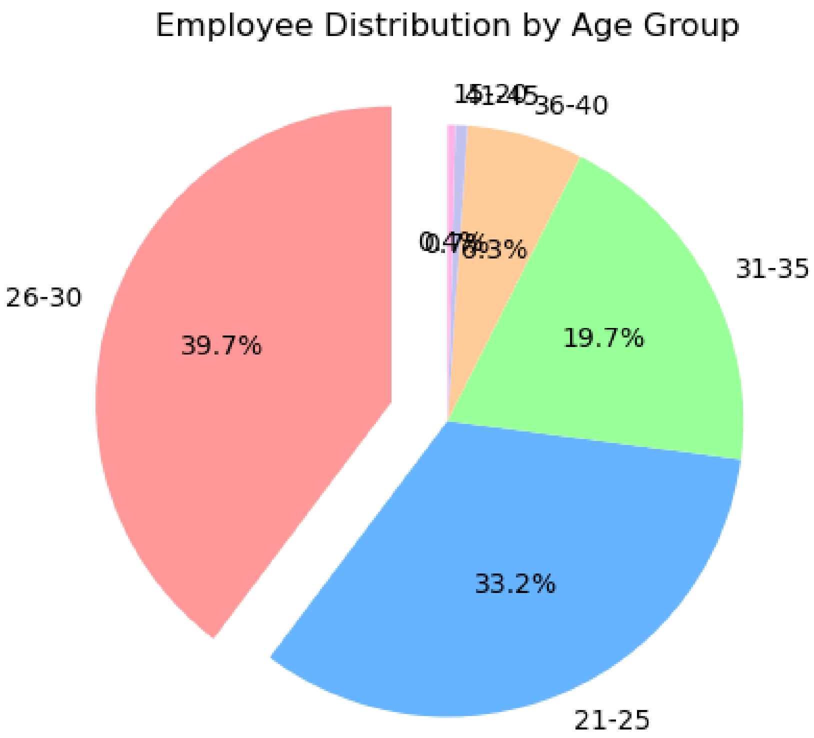
```
Age group
26-30    182
21-25    152
31-35     90
36-40     29
41-45      3
15-20      2
dtype: int64
```

[19]:

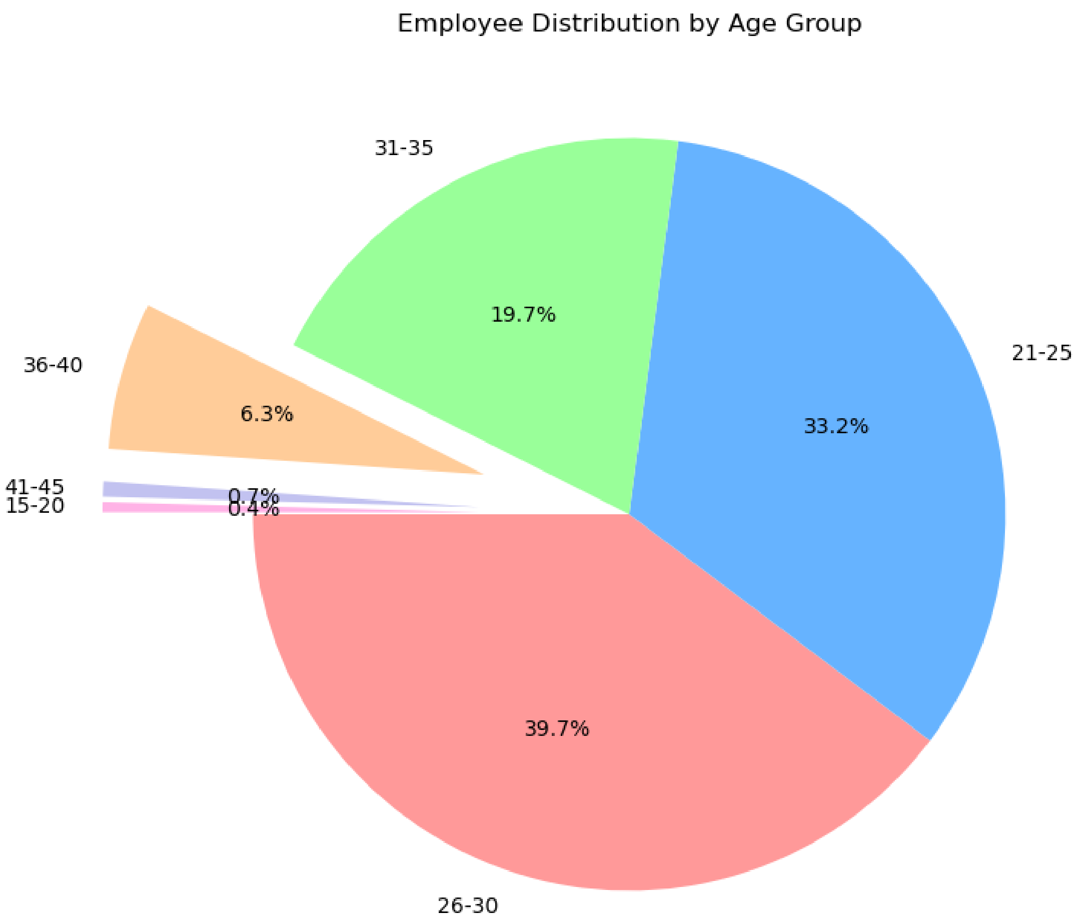
```
# To represnt  age group
colors = ['#ff9999', '#66b3ff', '#99ff99', '#ffcc99', '#c2c2f0', '#ffb3e6',␣
 ↪'#c4e17f']
plt.figure(figsize=(5,5))
plt.pie(age_group.values,labels=age_group.index,colors=colors)
plt.title('Employee Distribution by Age Group')
plt.show()
```



[20]:
```
# To highlight the predominant age group
colors = ['#ff9999', '#66b3ff', '#99ff99', '#ffcc99', '#c2c2f0', '#ffb3e6',␣
 ↪'#c4e17f']
max_value = age_group.values.argmax()
explode=[0.2 if i==max_value else 0 for i in range(len(age_group))]
plt.figure(figsize=(5,5))
plt.pie(age_group.values,labels=age_group.
 ↪index,colors=colors,explode=explode,autopct="%1.1f%%",startangle=90)
plt.title('Employee Distribution by Age Group')
plt.show()
```



[21]:
```python
# To highlight age group with minimum number of employee
colors = ['#ff9999', '#66b3ff', '#99ff99', '#ffcc99', '#c2c2f0', '#ffb3e6', '#c4e17f']
max_value = np.argsort(age_group.values)[:3]
explode=[0.4 if i in max_value else 0 for i in range(len(age_group))]
plt.figure(figsize=(8,8))
plt.pie(age_group.values,labels=age_group.index,colors=colors,explode=explode,autopct="%1.1f%%",startangle=180)
plt.title('Employee Distribution by Age Group')
plt.show()
```



```
[22]: # which team and position have the highest salary expenditure
      salary_expenditure=df.groupby(["Team","Position"])["Salary"].sum()
      salary_expenditure
```

```
[22]: Team                Position
      Atlanta Hawks       C           22756250.0
                          PF          23952268.0
                          PG           9763400.0
                          SF           6000000.0
                          SG          10431032.0
                                         …
      Washington Wizards  C           24490429.0
                          PF          11300000.0
                          PG          18022415.0
                          SF          11158800.0
                          SG          11356992.0
```

```
Name: Salary, Length: 149, dtype: float64
```

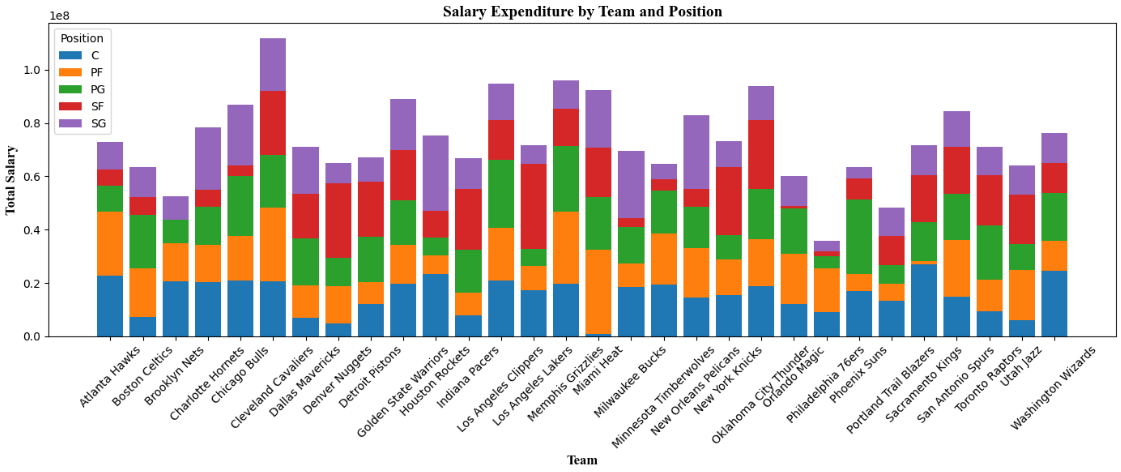
[23]:

```
print(f" Team with highest salary:{salary_expenditure.idxmax()[0]}")
print(f" Position with highest salary: {salary_expenditure.idxmax()[1]}")
print(f" Highest salary:{salary_expenditure.max()}")
```

```
Team with highest salary:Los Angeles Lakers
Position with highest salary: SF
Highest salary:31866445.0
```

[30]:

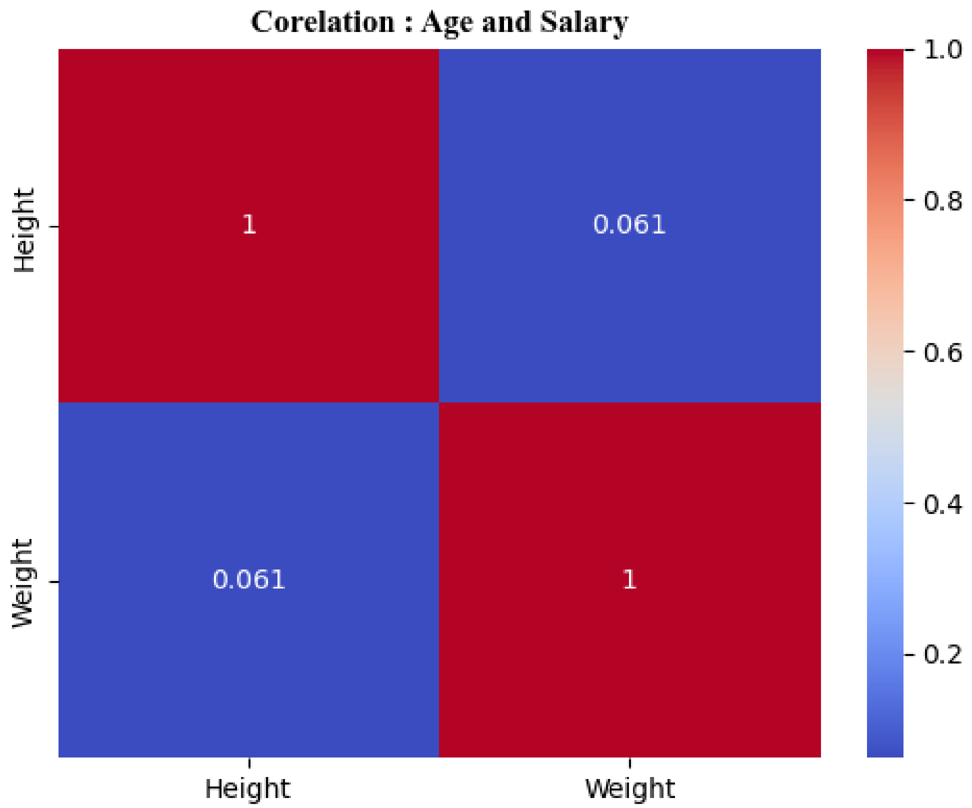
```
# Pictorial representation
salary_expenditure_df = salary_expenditure.reset_index()           # Reset index␣
 ↪to turn Series into DataFrame



salary_expenditure_pivot = salary_expenditure_df.pivot_table(
    index='Team',
    columns='Position',
    values='Salary',
    aggfunc='sum',
    fill_value=0
)

teams = salary_expenditure_pivot.index
positions = salary_expenditure_pivot.columns
bottoms = [0] * len(teams)

plt.figure(figsize=(14, 6))

for position in positions:
    plt.bar(teams, salary_expenditure_pivot[position], bottom=bottoms,␣
 ↪label=position)
    bottoms += salary_expenditure_pivot[position]  # Update bottom for stacking

plt.title('Salary Expenditure by Team and Position',fontdict={"fontname":"Times␣
 ↪New Roman","fontsize": 14},fontweight="bold")
plt.xlabel('Team',fontdict={"fontname":"Times New Roman","fontsize":␣
 ↪12},fontweight="bold")
plt.ylabel('Total Salary',fontdict={"fontname":"Times New Roman","fontsize":␣
 ↪12},fontweight="bold")
plt.legend(title='Position')
plt.xticks(rotation=45)  # Rotate team names for readability
plt.tight_layout()
plt.show()
```



[33]:
```
#correlation between age and salary

corelation=df[["Age","Salary"]].corr()
corelation
```

[33]:
```
             Age   Salary
Age      1.00000  0.21117
Salary   0.21117  1.00000
```

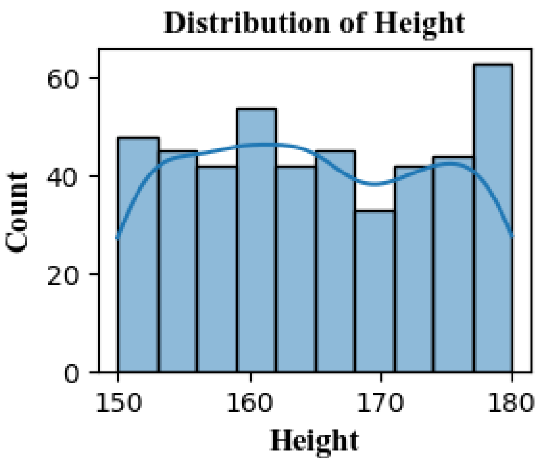
[43]:
```
sns.heatmap(corelation,annot=True,cmap="coolwarm")
plt.title("Corelation : Age and Salary",fontdict={"fontname":"Times New␣
  ↪Roman","fontsize": 12},fontweight="bold")
plt.show()
```



[ ]:
```
# Weak Correlation: The relationship is present but not strong enough to be␣
  ↪considered significant.
```

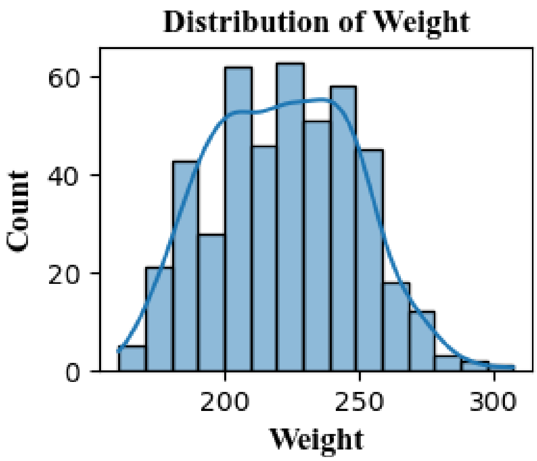
[39]:
```
plt.subplot(2, 2, 1)
sns.histplot(data=df, x="Height", kde=True)
plt.xlabel('Height',fontdict={"fontname":"Times New Roman","fontsize":␣
  ↪12},fontweight="bold")
plt.ylabel('Count',fontdict={"fontname":"Times New Roman","fontsize":␣
  ↪12},fontweight="bold")
plt.title('Distribution of Height',fontdict={"fontname":"Times New␣
  ↪Roman","fontsize": 12},fontweight="bold")
```

[39]:
```
Text(0.5, 1.0, 'Distribution of Height')
```



```
[40]: plt.subplot(2, 2, 1)
      sns.histplot(data=df, x="Weight", kde=True)
      plt.xlabel('Weight',fontdict={"fontname":"Times New Roman","fontsize":␣
       ↪12},fontweight="bold")
      plt.ylabel('Count',fontdict={"fontname":"Times New Roman","fontsize":␣
       ↪12},fontweight="bold")
      plt.title('Distribution of Weight',fontdict={"fontname":"Times New␣
       ↪Roman","fontsize": 12},fontweight="bold")
```

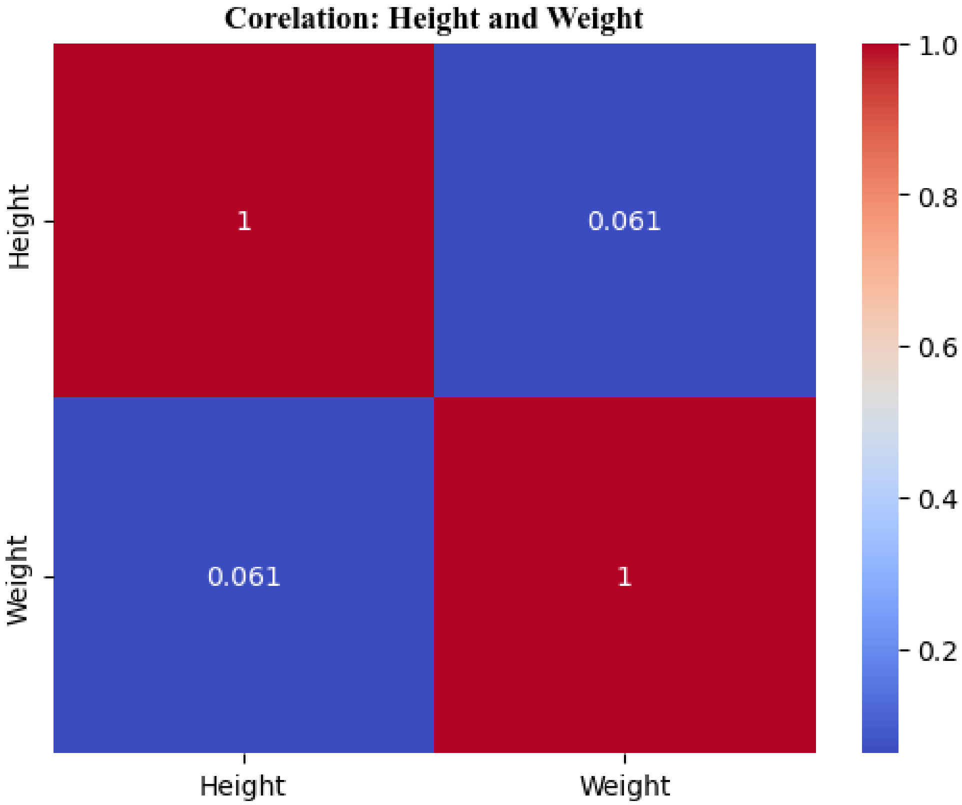
```
[40]: Text(0.5, 1.0, 'Distribution of Weight')
```



```
[41]: corelation=df[["Height","Weight"]].corr()
      corelation
```

```
[41]:          Height    Weight
      Height  1.00000  0.06146
      Weight  0.06146  1.00000
```

```
[44]: sns.heatmap(corelation,annot=True,cmap="coolwarm")
      plt.title("Corelation: Height and Weight",fontdict={"fontname":"Times New␣
       ↪Roman","fontsize": 12},fontweight="bold")
      plt.show()
```

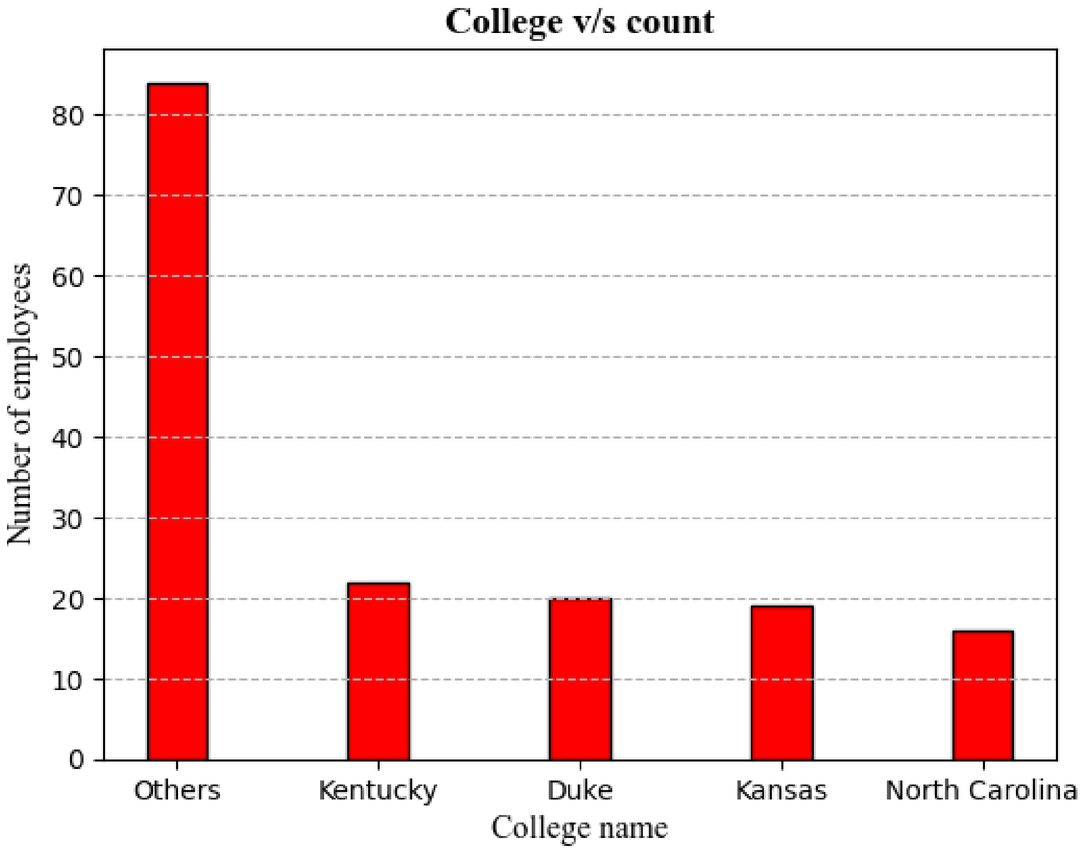


```
[49]: #distribution of employees across each team
      Count_college=df.groupby("College").size().sort_values(ascending=False)
      Count_five=(Count_college[0:5])
      Count_five
```

```
[49]: College
      Others            84
      Kentucky          22
      Duke              20
      Kansas            19
      North Carolina    16
      dtype: int64
```

[54]:

```
#Graphical representation of number of employees based on their College
plt.bar(Count_five.index,Count_five.values,width=.3,color="r",edgecolor="black")
plt.grid( axis="y",linestyle='--')
plt.xlabel("College name",fontdict={"fontname":"Times New Roman","fontsize":␣
 ↪12})
plt.ylabel("Number of employees",fontdict={"fontname":"Times New␣
 ↪Roman","fontsize": 12})
plt.title("College v/s count",fontdict={"fontname":"Times New Roman","fontsize":
 ↪ 14},fontweight="bold")
plt.show()
```



[ ]:

```
```