In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as mplt
from sklearn.preprocessing import StandardScaler, MinMaxScaler
```

In [2]:
```
df = pd.read_csv("college_student_placement_dataset.csv")
```

In [3]:
```
print(df)
```

```
     College_ID   IQ  Prev_Sem_Result  CGPA  Academic_Performance  \
0       CLG0030  107             6.61  6.28                     8
1       CLG0061   97             5.52  5.37                     8
2       CLG0036  109             5.36  5.83                     9
3       CLG0055  122             5.47  5.75                     6
4       CLG0004   96             7.91  7.69                     7
...         ...  ...              ...   ...                   ...
9995    CLG0021  119             8.41  8.29                     4
9996    CLG0098   70             9.25  9.34                     7
9997    CLG0066   89             6.08  6.25                     3
9998    CLG0045  107             8.77  8.92                     3
9999    CLG0060  109             9.41  9.77                     8

     Internship_Experience  Extra_Curricular_Score  Communication_Skills  \
0                       No                       8                     8
1                       No                       7                     8
2                       No                       3                     1
3                      Yes                       1                     6
4                       No                       8                    10
...                    ...                     ...                   ...
9995                    No                       1                     8
9996                    No                       0                     7
9997                   Yes                       3                     9
9998                    No                       7                     5
9999                    No                       3                     5

      Projects_Completed Placement
0                      4        No
1                      0        No
2                      1        No
3                      1        No
4                      2        No
...                  ...       ...
9995                   0       Yes
9996                   2        No
9997                   5        No
9998                   1        No
9999                   5        No

[10000 rows x 10 columns]
```

In [4]:
```
df.head()
```

Out[4]:

	College_ID	IQ	Prev_Sem_Result	CGPA	Academic_Performance	Internship_Experience	Extra_Curricular_Score	Communication_S
0	CLG0030	107	6.61	6.28	8	No	8	
1	CLG0061	97	5.52	5.37	8	No	7	
2	CLG0036	109	5.36	5.83	9	No	3	
3	CLG0055	122	5.47	5.75	6	Yes	1	
4	CLG0004	96	7.91	7.69	7	No	8	

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10000 entries, 0 to 9999
Data columns (total 10 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   College_ID              10000 non-null  object 
 1   IQ                      10000 non-null  int64  
 2   Prev_Sem_Result         10000 non-null  float64
 3   CGPA                    10000 non-null  float64
 4   Academic_Performance    10000 non-null  int64  
 5   Internship_Experience   10000 non-null  object 
 6   Extra_Curricular_Score  10000 non-null  int64  
 7   Communication_Skills    10000 non-null  int64  
 8   Projects_Completed      10000 non-null  int64  
 9   Placement               10000 non-null  object 
dtypes: float64(2), int64(5), object(3)
memory usage: 781.4+ KB
```

In [6]:
```
df.isnull().sum()
```

Out[6]:
```
College_ID              0
IQ                      0
Prev_Sem_Result         0
CGPA                    0
Academic_Performance    0
Internship_Experience   0
Extra_Curricular_Score  0
Communication_Skills    0
Projects_Completed      0
Placement               0
dtype: int64
```

In [7]:
```
X = df[['Academic_Performance']]
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```

In [8]:
```
print("Original Academic Performance Scores :- \n",df['Academic_Performance'])
print("\n\n")
print("Academic Performance Scores after Scaling(normalization) :- \n", X_scaled)
```

```
Original Academic Performance Scores :-
 0       8
1       8
2       9
3       6
4       7
       ..
9995    4
9996    7
9997    3
9998    3
9999    8
Name: Academic_Performance, Length: 10000, dtype: int64



Academic Performance Scores after Scaling(normalization) :-
 [[ 0.85392098]
 [ 0.85392098]
 [ 1.20194877]
 ...
 [-0.88621796]
 [-0.88621796]
 [ 0.85392098]]
```

In [9]:
```
df['Academic_Performance'] = X_scaled
```

In [10]:
```
print(df['Academic_Performance'])
```

```
0       0.853921
1       0.853921
2       1.201949
3       0.157865
4       0.505893
          ...
9995   -0.538190
9996    0.505893
9997   -0.886218
9998   -0.886218
9999    0.853921
Name: Academic_Performance, Length: 10000, dtype: float64
```

In [11]:
```
X2 = df[['IQ']]
scaler = MinMaxScaler()
X2_scaled = scaler.fit_transform(X2)
```

In [12]:
```
print("Original IQ Scores :- \n",df['IQ'])
print("\n\n")
print("IQ Scores after Scaling(normalization) :- \n", X2_scaled)
```

```
Original IQ Scores :-
 0       107
1         97
2        109
3        122
4         96
        ...
9995     119
9996      70
9997      89
9998     107
9999     109
Name: IQ, Length: 10000, dtype: int64



IQ Scores after Scaling(normalization) :-
 [[0.56410256]
 [0.47863248]
 [0.58119658]
 ...
 [0.41025641]
 [0.56410256]
 [0.58119658]]
```

In [13]:
```
df['IQ'] = X2_scaled
print(df['IQ'])
```

```
0       0.564103
1       0.478632
2       0.581197
3       0.692308
4       0.470085
          ...
9995    0.666667
9996    0.247863
9997    0.410256
9998    0.564103
9999    0.581197
Name: IQ, Length: 10000, dtype: float64
```

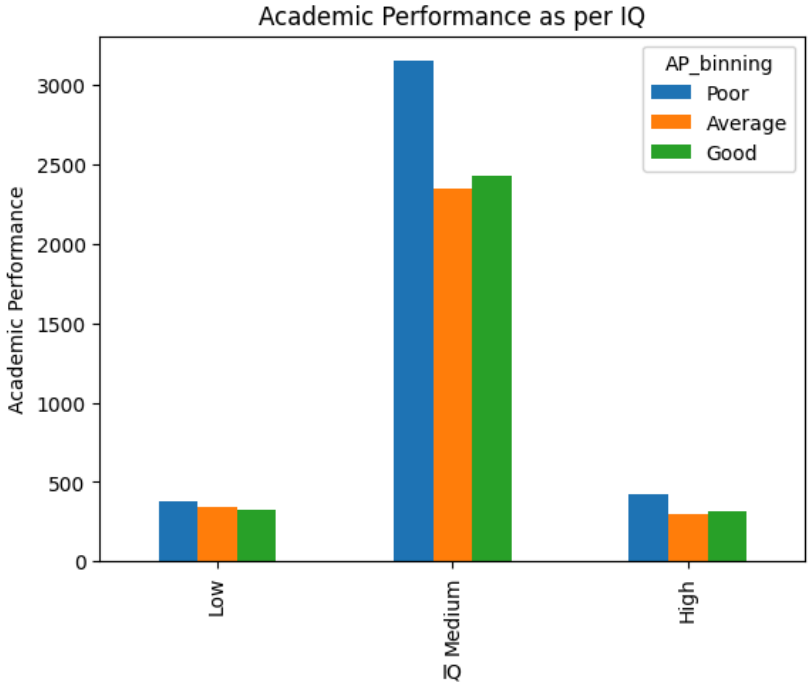
In [14]:
```
df['IQ_binning'] = pd.cut(df['IQ'], bins=3, labels=['Low', 'Medium', 'High'])

df['AP_binning'] = pd.cut(df['Academic_Performance'], bins=3, labels=['Poor', 'Average', 'Good'])
```

In [15]:
```
pivot = pd.crosstab(df['IQ_binning'], df['AP_binning'])
print(pivot)
```

```
AP_binning  Poor  Average  Good
IQ_binning
Low          374      346   320
Medium      3152     2349  2425
High         427      296   311
```

In [16]:
```
pivot.plot(kind='bar')
mplt.title('Academic Performance as per IQ')
mplt.xlabel('IQ')
mplt.ylabel('Academic Performance')
```

Out[16]:
```
Text(0, 0.5, 'Academic Performance')
```



In [17]:
```
print("Mean of IQ = ", df['IQ'].mean())
print("Median of IQ = ", df['IQ'].median())
print("Mode of IQ = ", df['IQ'].mode()[0])
```

```
Mean of IQ =  0.49975897435897443
Median of IQ =  0.4957264957264958
Mode of IQ =  0.4957264957264958
```

In [18]:
```
SD_IQ = df['IQ'].std()
print("Standard Deviation of IQ :- \n", SD_IQ)
```

```
Standard Deviation of IQ :-
 0.12865898705943707
```

In [19]:
```
sns.regplot(x='IQ', y = 'Academic_Performance', data=df, line_kws={"color": "red"})

mplt.title("Regression Line: IQ vs Academic Performance")
mplt.xlabel("IQ")
mplt.ylabel("Academic Performance")
mplt.show()
```