In [30]:
```
from sklearn import datasets
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import matplotlib as mpl
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
import warnings
warnings.filterwarnings('ignore')
```

In [9]:
```
df=pd.read_csv("C:/Users/91969/Downloads/train.csv")
df.head(5)
```

Out[9]:

	Battery_Power	Clock_Speed	FC	Int_Memory	Mobile_D	Mobile_W	Cores	PC	Pixel_H
0	842	2.2	1	7	0.6	188	2	2	20
1	1021	0.5	0	53	0.7	136	3	6	905
2	563	0.5	2	41	0.9	145	5	6	1263
3	615	2.5	0	10	0.8	131	6	9	1216
4	1821	1.2	13	44	0.6	141	2	14	1208

5 rows × 21 columns

In [10]:
```
df.shape
```

Out[10]:
```
(2000, 21)
```

In [11]:
```
df.info
```

Out[11]:
```
<bound method DataFrame.info of       Battery_Power  Clock_Speed  FC  Int_
Memory  Mobile_D  Mobile_W  Cores  \
0               842          2.2   1           7       0.6       188
2
1              1021          0.5   0          53       0.7       136
3
2               563          0.5   2          41       0.9       145
5
3               615          2.5   0          10       0.8       131
6
4              1821          1.2  13          44       0.6       141
2
...             ...          ...  ..         ...       ...       ...
...
1995            794          0.5   0           2       0.8       106
6
1996           1965          2.6   0          39       0.2       187
4
1997           1911          0.9   1          36       0.7       108
8
1998           1512          0.9   4          46       0.1       145
5
1999            510          2.0   5          45       0.9       168
6

      PC  Pixel_H  Pixel_W  ...  Screen_H  Screen_W  Talk_Time  Four_G  \
0      2       20      756  ...         9         7         19       0
1      6      905     1988  ...        17         3          7       1
2      6     1263     1716  ...        11         2          9       1
3      9     1216     1786  ...        16         8         11       0
4     14     1208     1212  ...         8         2         15       1
...   ..      ...      ...  ...       ...       ...        ...     ...
1995  14     1222     1890  ...        13         4         19       1
1996   3      915     1965  ...        11        10         16       0
1997   3      868     1632  ...         9         1          5       1
1998   5      336      670  ...        18        10         19       1
1999  16      483      754  ...        19         4          2       1

      Three_G  Touch_Screen  Dual_SIM  Bluetooth  WiFi  Price_Range
0           0             0         0          0     1            1
1           1             1         1          1     0            2
2           1             1         1          1     0            2
3           1             0         0          1     0            2
4           1             1         0          1     0            1
...       ...           ...       ...        ...   ...          ...
1995        1             1         1          1     0            0
1996        1             1         1          1     1            2
1997        1             1         1          0     0            3
1998        1             1         0          0     1            0
1999        1             1         1          1     1            3

[2000 rows x 21 columns]>
```

In [12]:
```
df.describe(include='all')
```

Out[12]:

_Power	Clock_Speed	FC	Int_Memory	Mobile_D	Mobile_W	Cores	
.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.
.518500	1.522250	4.309500	32.046500	0.501750	140.249000	4.520500	9.
.418206	0.816004	4.341444	18.145715	0.288416	35.399655	2.287837	6.
.000000	0.500000	0.000000	2.000000	0.100000	80.000000	1.000000	0.
.750000	0.700000	1.000000	16.000000	0.200000	109.000000	3.000000	5.
.000000	1.500000	3.000000	32.000000	0.500000	141.000000	4.000000	10.
.250000	2.200000	7.000000	48.000000	0.800000	170.000000	7.000000	15.
.000000	3.000000	19.000000	64.000000	1.000000	200.000000	8.000000	20.

lumns

In [13]:
```
df.isnull().sum()
```

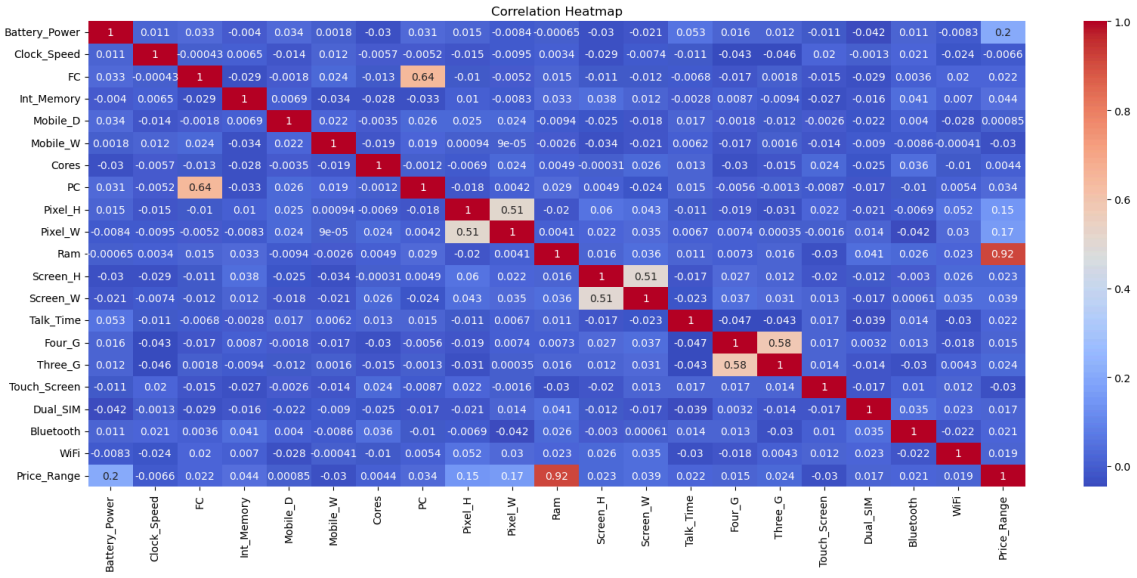
Out[13]:
```
Battery_Power    0
Clock_Speed      0
FC               0
Int_Memory       0
Mobile_D         0
Mobile_W         0
Cores            0
PC               0
Pixel_H          0
Pixel_W          0
Ram              0
Screen_H         0
Screen_W         0
Talk_Time        0
Four_G           0
Three_G          0
Touch_Screen     0
Dual_SIM         0
Bluetooth        0
WiFi             0
Price_Range      0
dtype: int64
```

We can see that there are no missing values in the dataset and all the variables are numerical variables.

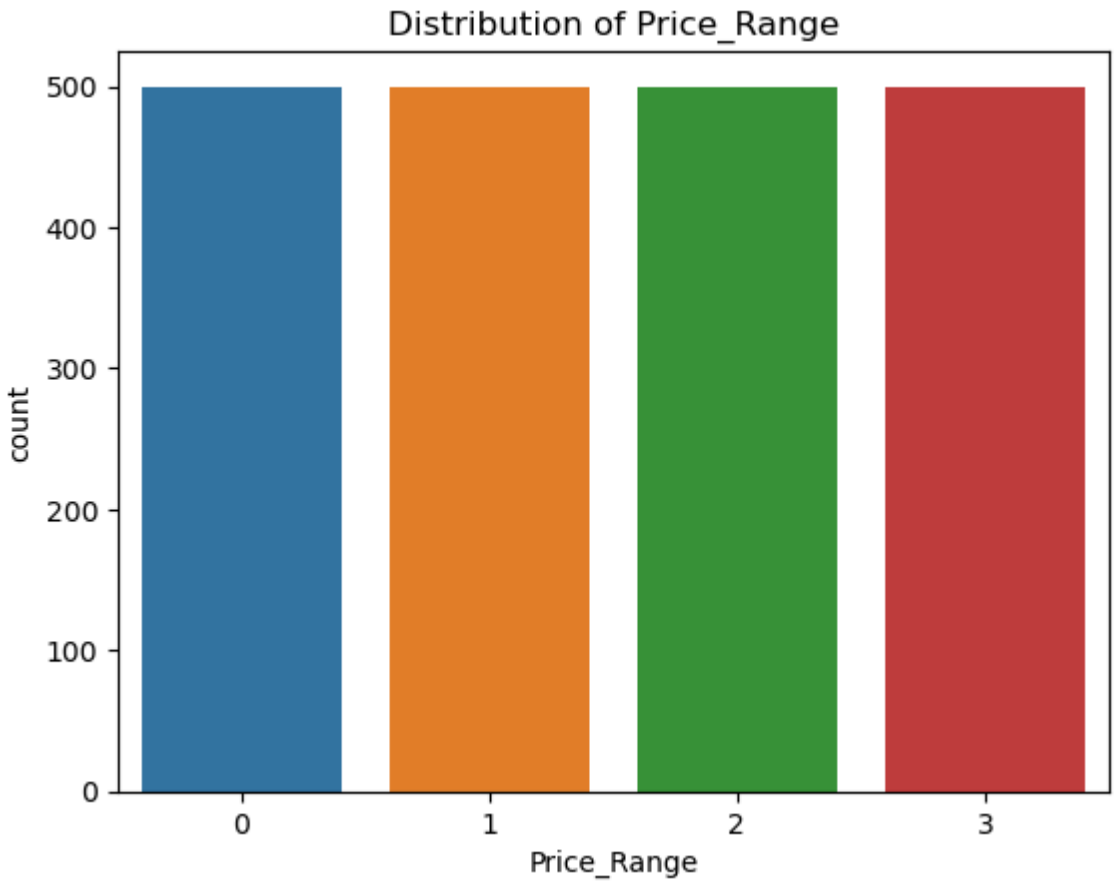
In [14]:
```
df.drop_duplicates(inplace=True)
df.shape
```

Out[14]:
```
(2000, 21)
```

In [15]:
```
#correaltion
plt.figure(figsize=(20, 8))
sns.heatmap(df.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap')
plt.show()
```



In [16]:
```
sns.countplot(x='Price_Range', data=df)
plt.title('Distribution of Price_Range')
plt.show()
```



Splitting the Dataset

In [17]:
```
X = df.drop('Price_Range', axis=1)
y = df['Price_Range']
```

In [18]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, ra
```

Feature Scaling

In [19]:
```
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)
```

Logistic Regression

In [20]:
```
logmodel = LogisticRegression()
```

In [31]:
```
logmodel.fit(X_train, y_train)
```

Out[31]:
```
LogisticRegression()
```

In [24]:
```
predictions = logmodel.predict(_test)
```

In [25]:
```
from sklearn.metrics import classification_report
print(classification_report(y_test, predictions))
```

```
              precision    recall  f1-score   support

           0       0.82      0.75      0.79       105
           1       0.52      0.51      0.51        91
           2       0.48      0.50      0.49        92
           3       0.69      0.73      0.71       112

    accuracy                           0.63       400
   macro avg       0.63      0.62      0.62       400
weighted avg       0.64      0.63      0.63       400
```

SVM MOdel

In [16]:
```
svm_model = SVC()
svm_model.fit(X_train_scaled, y_train)
```

Out[16]:
```
SVC()
```

In [17]:
```
#creating SVM classifiers with different values of C
C_values=[0.1, 1 , 100, 1000]
for C in C_values:
    svm_model = SVC(kernel= 'linear', C=C)
    svm_model.fit(X_train, y_train)
    y_pred = svm_model.predict(X_test)
    accuracy = accuracy_score(y_test, y_pred)
    print(f"Accuracy with C={C}: {accuracy}")
```

```
Accuracy with C=0.1: 0.975
Accuracy with C=1: 0.97
Accuracy with C=100: 0.9725
Accuracy with C=1000: 0.9725
```

Naive Bayes

In [20]:
```
from sklearn.naive_bayes import GaussianNB

model = GaussianNB()

model.fit(X_train, y_train)

from sklearn.metrics import (
    accuracy_score,
    confusion_matrix,
    ConfusionMatrixDisplay,
    f1_score,
    classification_report,
)

y_pred = model.predict(X_test)

accuray = accuracy_score(y_pred, y_test)
f1 = f1_score(y_pred, y_test, average="weighted")

print("Accuracy:", accuray)
print("F1 Score:", f1)
```

```
Accuracy: 0.7975
F1 Score: 0.7955784167716806
```