Importing the Dependencies

In [106]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
```

Data Collection & Analysis

In [107]:

```
# loading the data from excel file to a Pandas DataFrame
df = pd.read_excel("BMI_Data.xlsx")
```

In [108]:

```
# first 5 rows of the dataframe
df.head()
```

Out[108]:

	Date	Weight in Pounds	BMI	Cholesterol
0	1993-07-01	201.38	85.35058	251.200000
1	1993-07-02	202.39	85.31267	254.653866
2	1993-07-03	188.84	85.13161	244.942237
3	1993-07-04	184.13	85.16573	236.066544
4	1993-07-05	192.51	85.15533	247.436015

In [109]:

```
# number of rows and columns
df.shape
```

Out[109]:

```
(761, 4)
```

In [110]:

```
# getting some informations about the dataset
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 761 entries, 0 to 760
Data columns (total 4 columns):
 #   Column            Non-Null Count  Dtype         
---  ------            --------------  -----         
 0   Date              761 non-null    datetime64[ns]
 1   Weight in Pounds  761 non-null    float64       
 2   BMI               761 non-null    float64       
 3   Cholesterol       761 non-null    float64       
dtypes: datetime64[ns](1), float64(3)
memory usage: 23.9 KB
```

In [111]:

```
# checking for missing values
df.isnull().sum()
```

Out[111]:

```
Date                0
Weight in Pounds    0
BMI                 0
Cholesterol         0
dtype: int64
```

Data Analysis

In [112]:

```
# statistical Measures of the dataset
df.describe()
```

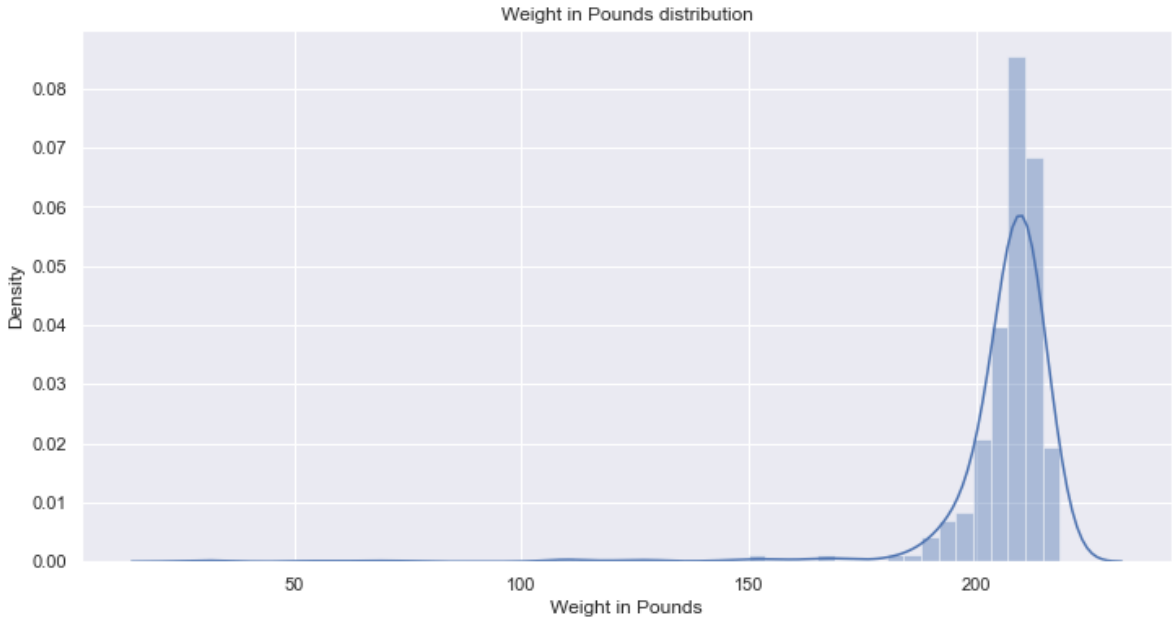
Out[112]:

	Weight in Pounds	BMI	Cholesterol
count	761.000000	761.000000	761.000000
mean	205.539075	86.556922	257.247678
std	17.098299	2.262907	27.467817
min	27.870000	83.716540	0.000000
25%	205.380000	84.979620	248.631520
50%	208.830000	85.875630	264.743919
75%	211.920000	87.566590	272.940000
max	218.360000	98.260000	309.478148

In [113]:

```
plt.figure(figsize=(12,6))
sns.distplot(df['Weight in Pounds'])
plt.title('Weight in Pounds distribution')
plt.show()
```

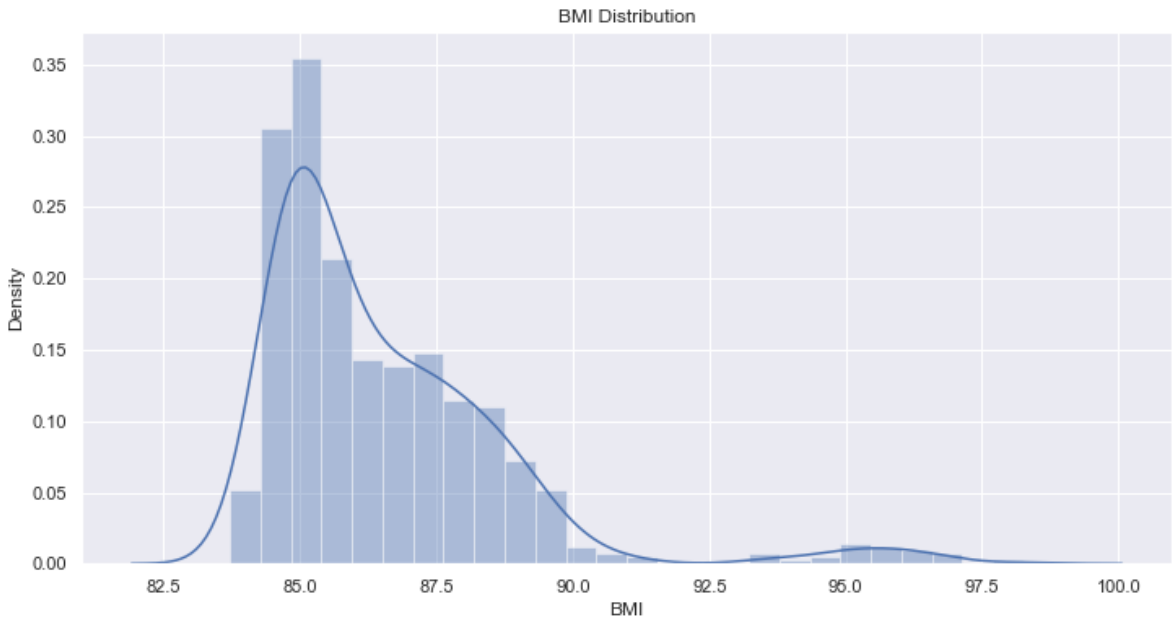
```
C:\Users\kishu\anaconda3\lib\site-packages\seaborn\distributions.py:2619: Fu
tureWarning: `distplot` is a deprecated function and will be removed in a fu
ture version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).
  warnings.warn(msg, FutureWarning)
```



In [114]:

```
plt.figure(figsize=(12,6))
sns.distplot(df['BMI'])
plt.title('BMI Distribution')
plt.show()
```

```
C:\Users\kishu\anaconda3\lib\site-packages\seaborn\distributions.py:2619: Fu
tureWarning: `distplot` is a deprecated function and will be removed in a fu
ture version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).
  warnings.warn(msg, FutureWarning)
```

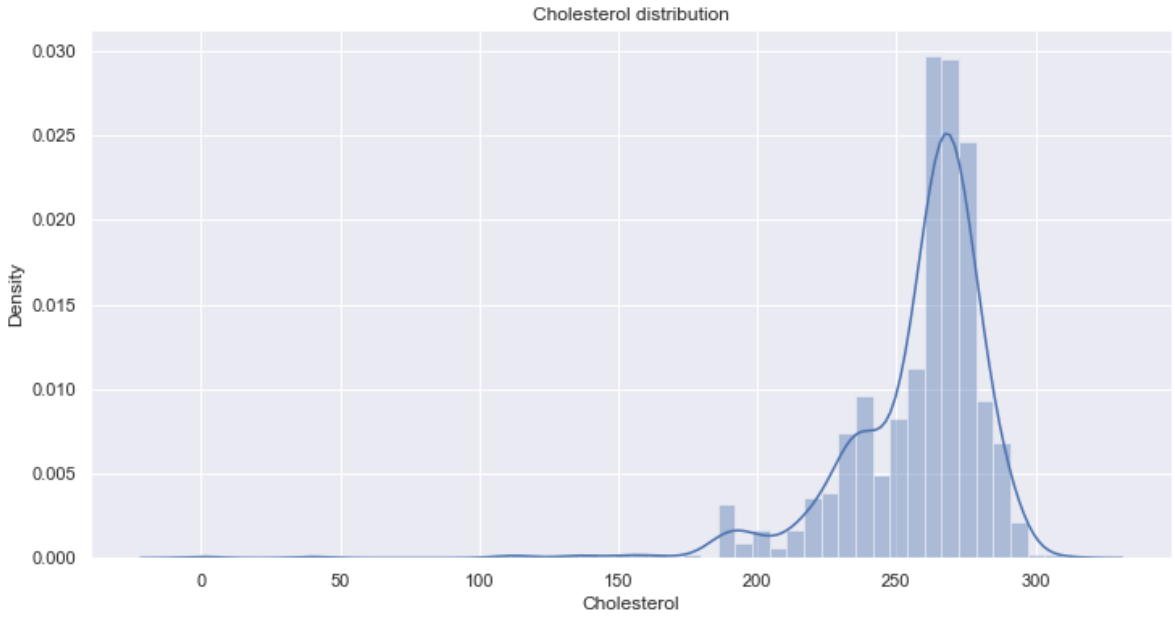


In [115]:

```
# distribution of Cholesterol value

plt.figure(figsize=(12,6))
sns.distplot(df['Cholesterol'])
plt.title('Cholesterol distribution')
plt.show()
```

```
C:\Users\kishu\anaconda3\lib\site-packages\seaborn\distributions.py:2619: Fu
tureWarning: `distplot` is a deprecated function and will be removed in a fu
ture version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).
  warnings.warn(msg, FutureWarning)
```



Splitting the Features and Target

In [116]:

```
X = df.drop(['Cholesterol','Date'],axis=1)
Y = df['Cholesterol']
```

In [117]:

```
print(X)
```

```
     Weight in Pounds       BMI
0              201.38  85.35058
1              202.39  85.31267
2              188.84  85.13161
3              184.13  85.16573
4              192.51  85.15533
..                ...       ...
756            212.23  84.72916
757            212.65  84.69604
758            214.08  84.79000
759            213.87  85.01045
760            214.55  85.24000

[761 rows x 2 columns]
```

In [118]:

```
print(Y)
```

```
0      251.200000
1      254.653866
2      244.942237
3      236.066544
4      247.436015
          ...
756    213.445089
757    212.924841
758    216.699800
759    214.869370
760    214.183178
Name: Cholesterol, Length: 761, dtype: float64
```

Data Standardization

In [119]:

```
scaler = StandardScaler()
scaler.fit(X)

standardized_data = scaler.transform(X)

print(standardized_data)
```

```
[[-0.24340493 -0.53344466]
 [-0.18429588 -0.55020847]
 [-0.97729359 -0.63027322]
 ...
 [ 0.49984753 -0.78133319]
 [ 0.48755753 -0.68385018]
 [ 0.52735372 -0.58234315]]
```

In [120]:

```
x = standardized_data
y = df["Cholesterol"]
```

Splitting the data into Training data & Testing Data

In [121]:

```
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2, random_state=2)
```

In [122]:

```
print(X.shape, X_train.shape, X_test.shape)
```

```
(761, 2) (608, 2) (153, 2)
```

Model Training

In [123]:

```
# loading the Linear Regression model
regressor = LinearRegression()
```

In [124]:

```
regressor.fit(X_train, Y_train)
```

Out[124]:

```
LinearRegression()
```

Model Evaluation

In [125]:

```
# prediction on training data
training_data_prediction =regressor.predict(X_train)
```

In [126]:

```
# R squared value
r2_train = metrics.r2_score(Y_train, training_data_prediction)
print('R squared vale : ', r2_train)
```

```
R squared vale :  0.29310975837433473
```

In [127]:

```
# prediction on test data
test_data_prediction =regressor.predict(X_test)
```

In [128]:

```
# R squared value
r2_test = metrics.r2_score(Y_test, test_data_prediction)
print('R squared vale : ', r2_test)
```

```
R squared vale :  0.4092554759759862
```

Building a Predictive System

In [147]:

```
input_data = (200.97,85.15289)

# changing input_data to a numpy array
input_data_as_numpy_array = np.asarray(input_data)

# reshape the array
input_data_reshaped = input_data_as_numpy_array.reshape(1,-1)

prediction = regressor.predict(input_data_reshaped)
print(prediction)

print('The Cholesterol is ', prediction[0])
```

```
[252.93373491]
The Cholesterol is  252.93373491475722
```