Problem statement

Data collection

Importing libraries

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Importing dataset

In [2]:

```
data=pd.read_csv(r"C:\Users\user\Downloads\4_drug200 - 4_drug200.csv")
data
```

Out[2]:

	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	drugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	drugY
...	...	...	...	...	...	...
195	56	F	LOW	HIGH	11.567	drugC
196	16	M	LOW	HIGH	12.006	drugC
197	52	M	NORMAL	HIGH	9.894	drugX
198	23	M	NORMAL	NORMAL	14.020	drugX
199	40	F	LOW	NORMAL	11.349	drugX

200 rows × 6 columns

head

In [3]:

```
# to display first 8 dataset values
da=data.head(8)
da
```

Out[3]:

	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	drugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	drugY
5	22	F	NORMAL	HIGH	8.607	drugX
6	49	F	NORMAL	HIGH	16.275	drugY
7	41	M	LOW	HIGH	11.037	drugC

info

In [4]:

```
# to identify missing values
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 6 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   Age          200 non-null    int64  
 1   Sex          200 non-null    object 
 2   BP           200 non-null    object 
 3   Cholesterol  200 non-null    object 
 4   Na_to_K      200 non-null    float64
 5   Drug         200 non-null    object 
dtypes: float64(1), int64(1), object(4)
memory usage: 9.5+ KB
```

describe

In [5]:

```
# to display summary of the dataset
data.describe()
```

Out[5]:

	Age	Na_to_K
count	200.000000	200.000000
mean	44.315000	16.084485
std	16.544315	7.223956
min	15.000000	6.269000
25%	31.000000	10.445500
50%	45.000000	13.936500
75%	58.000000	19.380000

	Age	Na_to_K
max	74.000000	38.247000

columns

In [6]:

```
# to display headings of the dataset
data.columns
```

Out[6]:

```
Index(['Age', 'Sex', 'BP', 'Cholesterol', 'Na_to_K', 'Drug'], dtype='object')
```

In [7]:

```
a=data.dropna(axis=1)
a
```

Out[7]:

	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	drugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	drugY
...	...	...	...	...	...	...
195	56	F	LOW	HIGH	11.567	drugC
196	16	M	LOW	HIGH	12.006	drugC
197	52	M	NORMAL	HIGH	9.894	drugX
198	23	M	NORMAL	NORMAL	14.020	drugX
199	40	F	LOW	NORMAL	11.349	drugX

200 rows × 6 columns

In [8]:

```
a.columns
```

Out[8]:

```
Index(['Age', 'Sex', 'BP', 'Cholesterol', 'Na_to_K', 'Drug'], dtype='object')
```

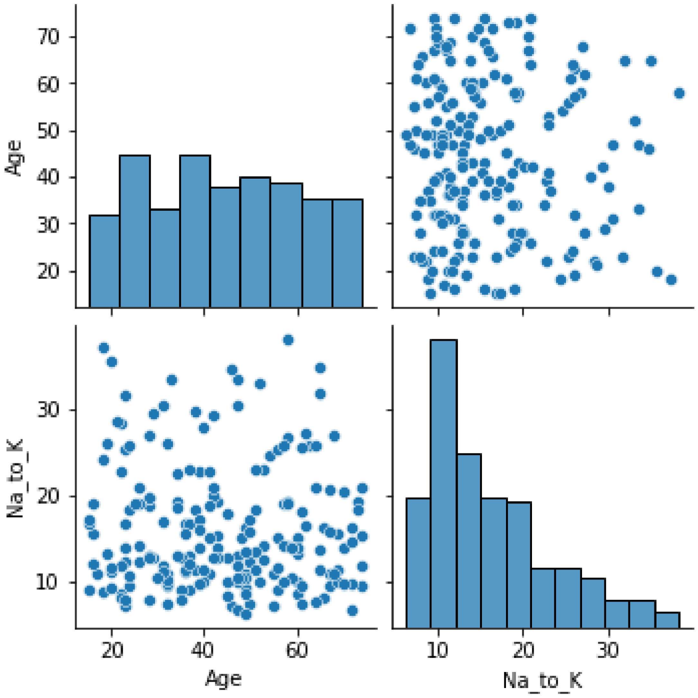
EDA and Visualization

In [9]:

```
sns.pairplot(a)
```

Out[9]:

```
<seaborn.axisgrid.PairGrid at 0x2200e901e20>
```



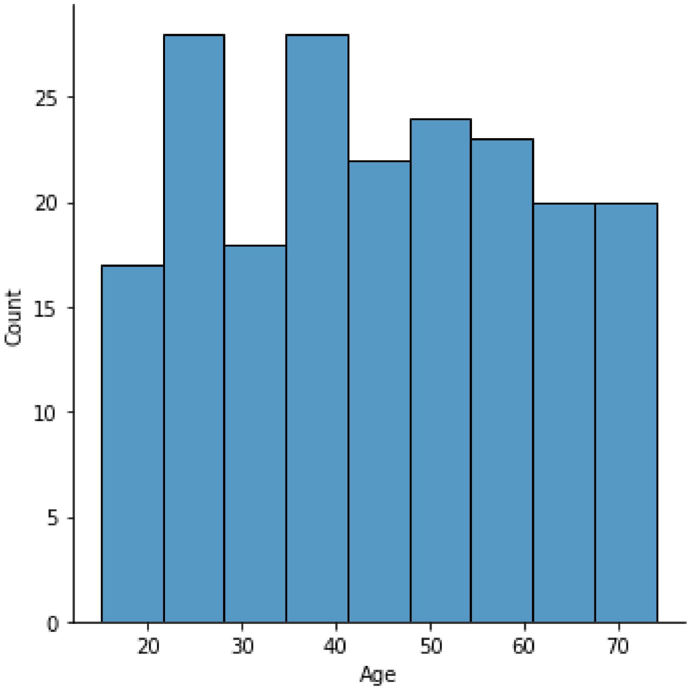
distribution plot

In [10]:

```
sns.displot(a["Age"])
```

Out[10]:

```
<seaborn.axisgrid.FacetGrid at 0x22010243e20>
```

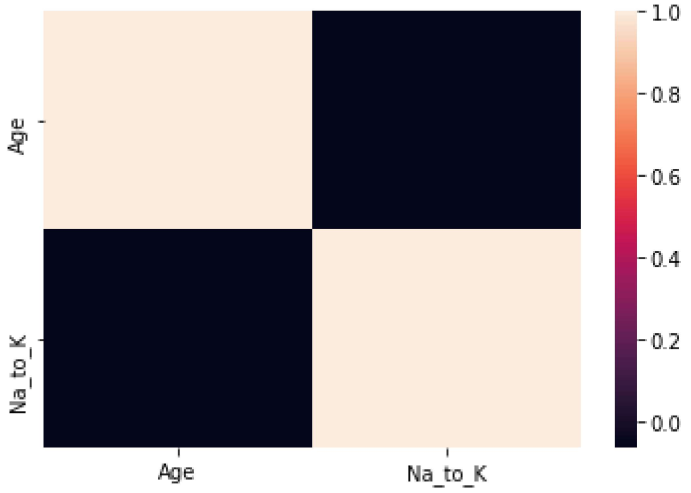


correlation

In [11]:

```
dat=data[['Age', 'Sex', 'BP', 'Cholesterol', 'Na_to_K', 'Drug']]
sns.heatmap(dat.corr())
```

Out[11]:
```
<AxesSubplot:>
```



To train the model-Model Building

In [12]:
```python
x=a[['Age']]
y=a['Age']
```

In [13]:
```python
# to split my dataset into training and test data
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3)
```

In [14]:
```python
from sklearn.linear_model import LinearRegression
lr= LinearRegression()
lr.fit(x_train,y_train)
```

Out[14]:
```
LinearRegression()
```

In [15]:
```python
print(lr.intercept_)
```

```
-7.105427357601002e-15
```

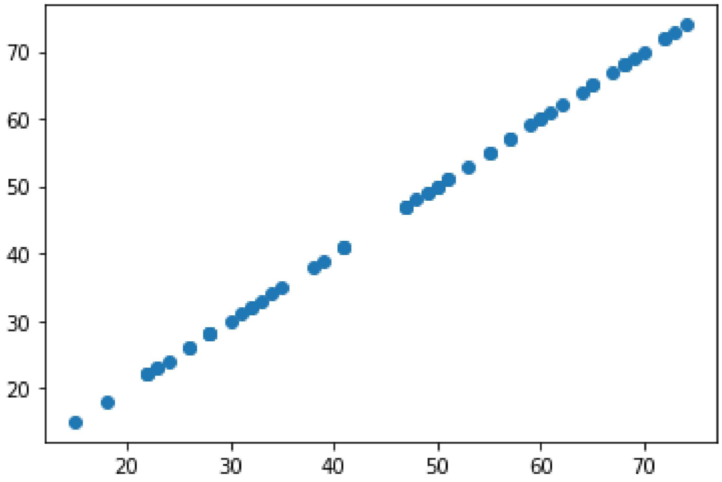
In [16]:
```python
coeff=pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
coeff
```

Out[16]:

	Co-efficient
Age	1.0

In [17]:
```python
prediction=lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[17]:
```
<matplotlib.collections.PathCollection at 0x22010b8dc10>
```



In [18]:

```
print(lr.score(x_test,y_test))
```

```
1.0
```

In [19]:

```
lr.score(x_train,y_train)
```

Out[19]:

```
1.0
```

Ridge regression

In [20]:

```
from sklearn.linear_model import Ridge,Lasso
```

In [21]:

```
rr=Ridge(alpha=10)
rr.fit(x_train,y_train)
rr.score(x_test,y_test)
```

Out[21]:

```
0.9999999252234555
```

In [22]:

```
rr.score(x_train,y_train)
```

Out[22]:

```
0.9999999271077268
```

Lasso regression

In [23]:

```
la=Lasso(alpha=10)
la.fit(x_train,y_train)
la.score(x_train,y_train)
```

Out[23]:

```
0.9985705396815336
```

In [24]:

```
la.score(x_test,y_test)
```

```
Out[24]: 0.9985335880131809
```

```
In [25]: lr.score(x_train,y_train)
```

```
Out[25]: 1.0
```

Ridge regression

```
In [26]: from sklearn.linear_model import Ridge,Lasso
```

```
In [27]: rr=Ridge(alpha=10)
         rr.fit(x_train,y_train)
         rr.score(x_test,y_test)
```

```
Out[27]: 0.9999999252234555
```

```
In [28]: rr.score(x_train,y_train)
```

```
Out[28]: 0.9999999271077268
```

Lasso regression

```
In [29]: la=Lasso(alpha=10)
         la.fit(x_train,y_train)
         la.score(x_train,y_train)
```

```
Out[29]: 0.9985705396815336
```

```
In [30]: la.score(x_test,y_test)
```

```
Out[30]: 0.9985335880131809
```

```
In [31]: from sklearn.linear_model import ElasticNet
         en=ElasticNet()
         en.fit(x_train,y_train)
```

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

```
In [32]: print(en.coef_)
```

```
[0.99622631]
```

```
In [33]: print(en.intercept_)
```

```
0.16415536806922404
```

```
In [34]: predict=en.predict(x_test)
```

```
In [35]: print(en.score(x_test,y_test))
```

```
0.9999853911657179
```

```
In [36]: from sklearn import metrics
```

```
In [37]: print("Mean Absolute error:",metrics.mean_absolute_error(y_test,predict))
```

```
Mean Absolute error: 0.056919773219404404
```

```
In [38]: print("Mean Squared error:",metrics.mean_squared_error(y_test,predict))
```

```
Mean Squared error: 0.004170866825641406
```

```
In [39]: print("Root squared error:",np.sqrt(metrics.mean_squared_error(y_test,predict)))
```

```
Root squared error: 0.0645822485334895
```