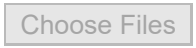
Import Libraries

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

Load the Data

```
from google.colab import files
uploaded = files.upload()
```



heart.csv

- **heart.csv**(application/vnd.ms-excel) - 11328 bytes, last modified: 12/11/2021 - 100% done

```
Saving heart.csv to heart.csv
```

Store the data into a variable

```
df = pd.read_csv("heart.csv")
```

Print First 5 rows of data

```
df.head()
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca
0	63	1	3	145	233	1	0	150	0	2.3	0	0
1	37	1	2	130	250	0	1	187	0	3.5	0	0
2	41	0	1	130	204	0	0	172	0	1.4	2	0
3	56	1	1	120	236	0	1	178	0	0.8	2	0
4	57	0	0	120	354	0	1	163	1	0.6	2	0

Get the Shape of Data

```
df.shape
```

```
(303, 14)
```

Count the null or empty value in each column

```
df.isna().sum()
```

```
age         0
sex         0
cp          0
trestbps    0
chol        0
fbs         0
restecg     0
thalach     0
exang       0
oldpeak     0
slope       0
ca          0
thal        0
target      0
dtype: int64
```

Another way to check null or missing values

```
df.isnull().values.any()
```

```
False
```

View some basic statistics

```
df.describe()
```

	age	sex	cp	trestbps	chol	fbs	res
count	303.000000	303.000000	303.000000	303.000000	303.000000	303.000000	303.00
mean	54.366337	0.683168	0.966997	131.623762	246.264026	0.148515	0.52
std	9.082101	0.466011	1.032052	17.538143	51.830751	0.356198	0.52

Get the count of the number of patients with and without heart disease

75%	61.000000	1.000000	2.000000	140.000000	274.500000	0.000000	1.00

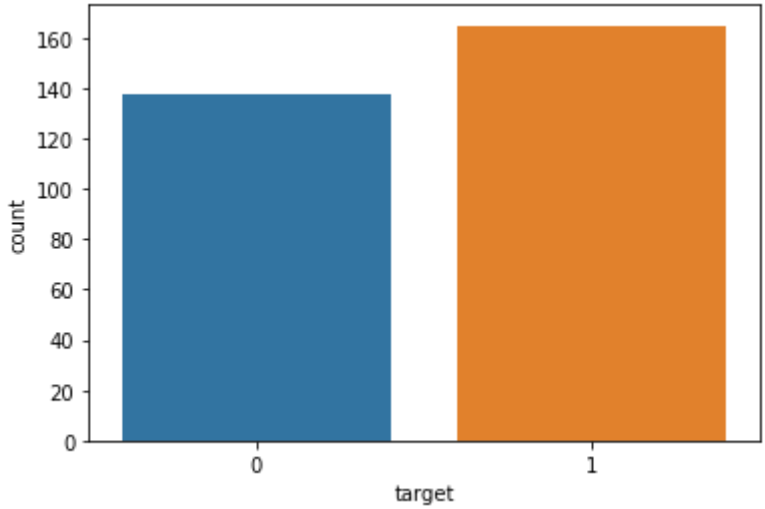
```
df['target'].value_counts()
```

```
1    165
0    138
Name: target, dtype: int64
```

Visualize the count

```
sns.countplot(df['target'])
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: P
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7fc0f460a490>
```

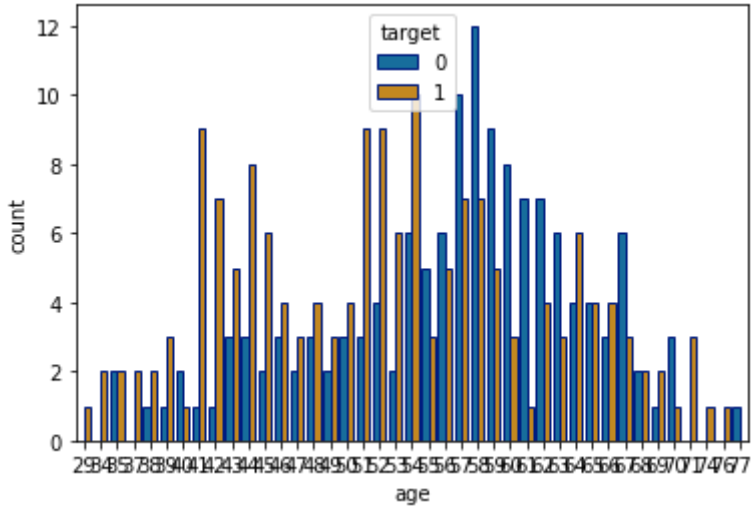


Look at the number of people with disease that exceed the number of people without disease

```
#Visualize the count
```

```
sns.countplot(x='age' , hue = 'target',data=df,palette='colorblind',edgecolor=sns.color_pa
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc0f3dd9410>
```

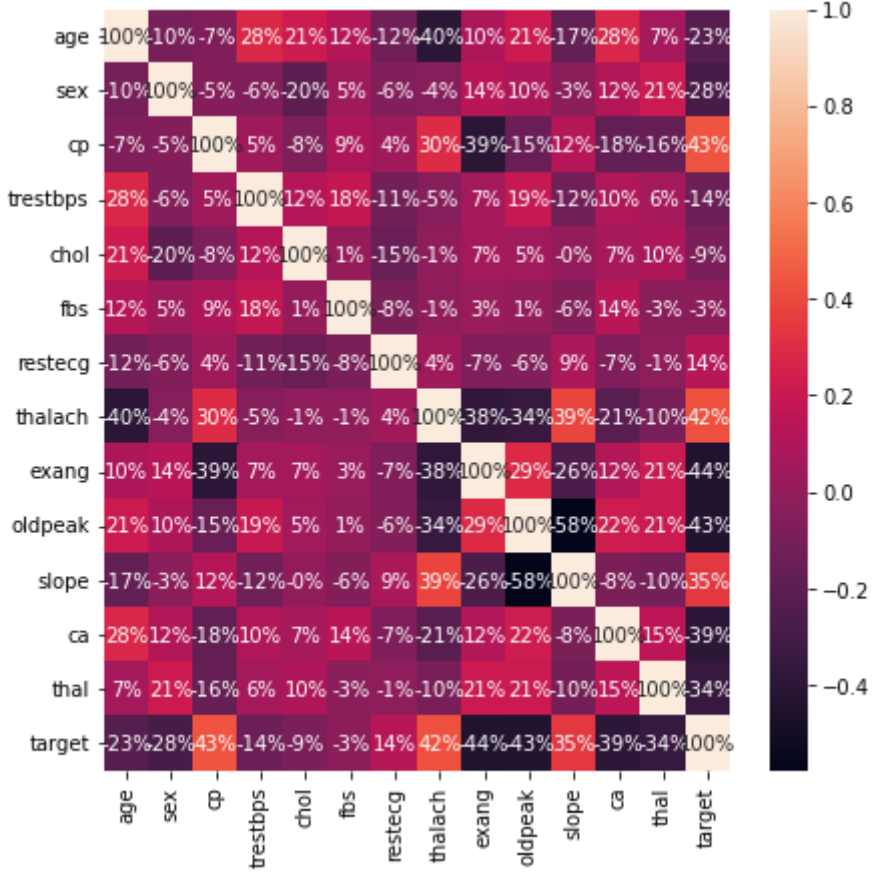



```
#Get the correlation of the columns
df.corr()
```

	age	sex	cp	trestbps	chol	fbs	restecg	th
age	1.000000	-0.098447	-0.068653	0.279351	0.213678	0.121308	-0.116211	-0.3
sex	-0.098447	1.000000	-0.049353	-0.056769	-0.197912	0.045032	-0.058196	-0.0
cp	-0.068653	-0.049353	1.000000	0.047608	-0.076904	0.094444	0.044421	0.2
trestbps	0.279351	-0.056769	0.047608	1.000000	0.123174	0.177531	-0.114103	-0.0
chol	0.213678	-0.197912	-0.076904	0.123174	1.000000	0.013294	-0.151040	-0.0
fbs	0.121308	0.045032	0.094444	0.177531	0.013294	1.000000	-0.084189	-0.0
restecg	-0.116211	-0.058196	0.044421	-0.114103	-0.151040	-0.084189	1.000000	0.0
thalach	-0.398522	-0.044020	0.295762	-0.046698	-0.009940	-0.008567	0.044123	1.0
exang	0.096801	0.141664	-0.394280	0.067616	0.067023	0.025665	-0.070733	-0.3
oldpeak	0.210013	0.096093	-0.149230	0.193216	0.053952	0.005747	-0.058770	-0.3
slope	-0.168814	-0.030711	0.119717	-0.121475	-0.004038	-0.059894	0.093045	0.3
ca	0.276326	0.118261	-0.181053	0.101389	0.070511	0.137979	-0.072042	-0.2

```
#Visualize the data
plt.figure(figsize=(7,7))
sns.heatmap(df.corr(),annot=True,fmt='.0%')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc0f450c750>
```



Split the data into feature data and target data

```
X = df.iloc[:,:-1].values
Y= df.iloc[:,-1].values
```

Split the data into 75% training data set and 25% testing data set

```
from sklearn.model_selection import train_test_split
X_train , X_test , Y_train , Y_test = train_test_split(X,Y ,test_size=0.25 ,stratify=Y, ra
```

Features Scaling

Scale the values in the data to be values between 0 and 1 inclusive

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
```

```
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

Training the LogisticRegression model with training data

```
from sklearn.linear_model import LogisticRegression
model = LogisticRegression()
model.fit(X_train,Y_train)
```

```
LogisticRegression()
```

Model Evaluation

Accuracy Score

```
from sklearn.metrics import accuracy_score
X_train_prediction = model.predict(X_train)
training_data_accuracy = accuracy_score(X_train_prediction,Y_train)
```

```
print("Accuracy on Training Data: ",training_data_accuracy)
```

```
Accuracy on Training Data:  0.8325991189427313
```

```
X_test_prediction = model.predict(X_test)
test_data_accuracy = accuracy_score(X_test_prediction,Y_test)
```

```
print("Accuracy on Testing Data: ",test_data_accuracy)
```

```
Accuracy on Testing Data:  0.8157894736842105
```

Building Prediction System

```
input_data=(59,1,0,135,234,0,1,161,0,0.5,1,0,3)

#Changing the input data into numpy array
input_data_narray= np.asarray(input_data)

#reshaping the numpy array and predicting for only on instance
input_data_reshape = input_data_narray.reshape(1,-1)
```

```
prediction = model.predict(input_data_reshape)
print(prediction)

if(prediction[0] == 0):
  print("The Person does not have any Heart Disease")
else:
  print("Person has Heart Disease !")
```

```
[1]
Person has Heart Disease !
```

Credits

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