

```
In [2]: import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

```
In [4]: df = pd.read_csv(r"D:\Unified_Internship\My_projectWork\Project3(heart)\heart_dise_csv.csv")
```

```
In [5]: df
```

```
Out[5]:
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	52	1	0	125	212	0	1	168	0	1.0	2	2	3	0
1	53	1	0	140	203	1	0	155	1	3.1	0	0	3	0
2	70	1	0	145	174	0	1	125	1	2.6	0	0	3	0
3	61	1	0	148	203	0	1	161	0	0.0	2	1	3	0
4	62	0	0	138	294	1	1	106	0	1.9	1	3	2	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1020	59	1	1	140	221	0	1	164	1	0.0	2	0	2	1
1021	60	1	0	125	258	0	0	141	1	2.8	1	1	3	0
1022	47	1	0	110	275	0	0	118	1	1.0	1	1	2	0
1023	50	0	0	110	254	0	0	159	0	0.0	2	0	2	1
1024	54	1	0	120	188	0	1	113	0	1.4	1	1	3	0

1025 rows × 14 columns

```
In [6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1025 entries, 0 to 1024
Data columns (total 14 columns):
#   Column      Non-Null Count  Dtype
---  -
0  age         1025 non-null   int64
1  sex         1025 non-null   int64
2  cp          1025 non-null   int64
3  trestbps    1025 non-null   int64
4  chol        1025 non-null   int64
5  fbs         1025 non-null   int64
6  restecg     1025 non-null   int64
7  thalach     1025 non-null   int64
8  exang       1025 non-null   int64
9  oldpeak     1025 non-null   float64
10 slope      1025 non-null   int64
11 ca         1025 non-null   int64
12 thal       1025 non-null   int64
13 target     1025 non-null   int64
dtypes: float64(1), int64(13)
memory usage: 112.2 KB
```

```
In [7]: df.isnull().sum()
```

```
Out[7]: 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
```

```
In [8]: pd.set_option('display.max_columns', None)
```

```
In [9]: pd.set_option('display.max_rows', None)
```

```
In [11]: df.columns = ['age', 'sex', 'chest_pain_type', 'resting_blood_sugar', 'cholesterol', 'fasting_blood_sugar', 'rest_ecg', 'max_heart_rate_achieved',
'exercise_induced_angina', 'st_depression', 'st_slope', 'num_major_vessels', 'thalassemia', 'target']
```

```
In [12]: df.columns
```

```
Out[12]: Index(['age', 'sex', 'chest_pain_type', 'resting_blood_sugar', 'cholesterol',
'fasting_blood_sugar', 'rest_ecg', 'max_heart_rate_achieved',
'exercise_induced_angina', 'st_depression', 'st_slope',
'num_major_vessels', 'thalassemia', 'target'],
dtype='object')
```

```
In [13]: def chest_pain(row):
        if row==1:
            return 'Typical Angina'
        elif row==2:
            return 'Atypical Angina'
        elif row==3:
            return 'Non-Anginal pain'
        elif row==4:
            return 'Asymptomatic'

In [14]: df['Chest_Pain']=df['chest_pain_type'].apply(chest_pain)
```

## Data Imbalance Check

```
In [15]: target=df.groupby('target').size()
        target
```

```
Out[15]:target
0    499
1    526
dtype: int64
```

```
In [16]: def heart_disease(series):
        if series==0:
            return 'Absent'
        elif series==1:
            return 'Present'
```

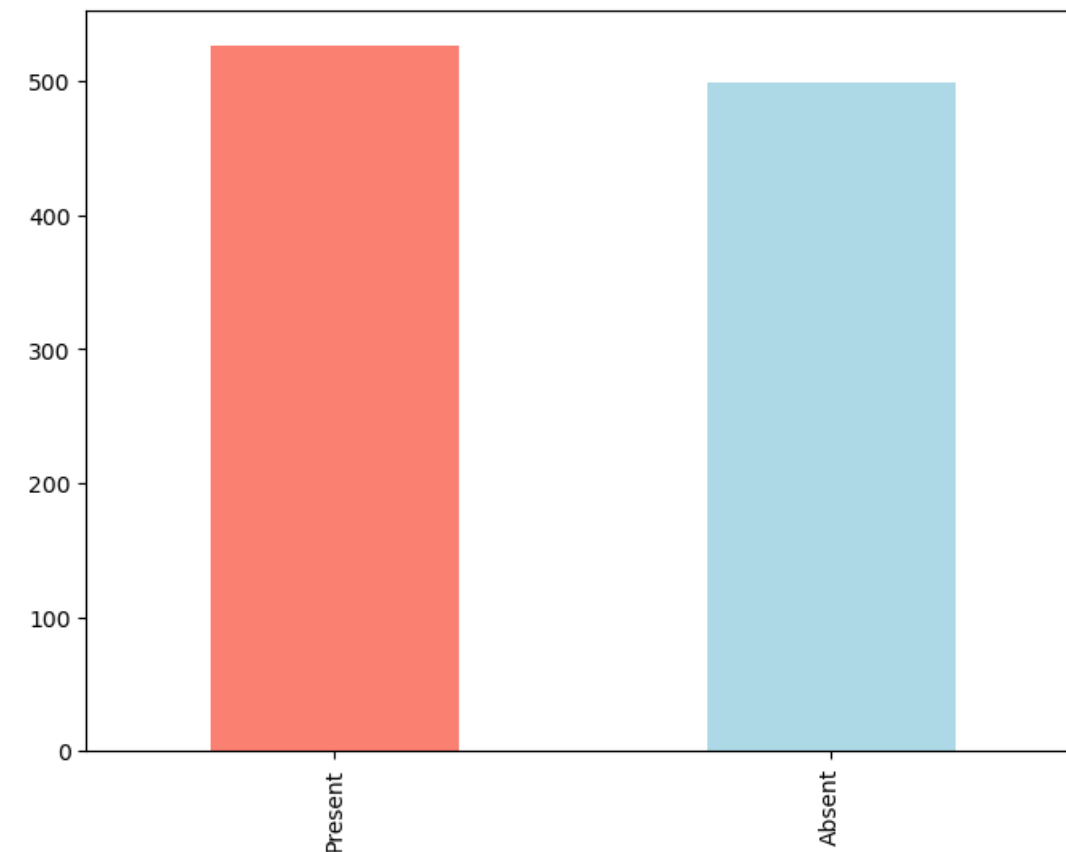
```
In [17]: df['Heart_Disease']=df['target'].apply(heart_disease)
        df.head()
```

```
Out[17]:
```

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	st
0	52	1	0	125	212	0	1	168		0
1	53	1	0	140	203	1	0	155		1
2	70	1	0	145	174	0	1	125		1
3	61	1	0	148	203	0	1	161		0
4	62	0	0	138	294	1	1	106		0

```
In [18]: df['Heart_Disease'].value_counts().plot(kind='bar', figsize=(8, 6), color=["salmon","lightblue"])
```

```
Out[18]:<Axes: >
```



```
In [19]: hd=df.groupby('Heart_Disease')['target'].count()
        hd
```

```

Out[19]:Heart_Disease
Absent    499
Present   526
Name: target, dtype: int64

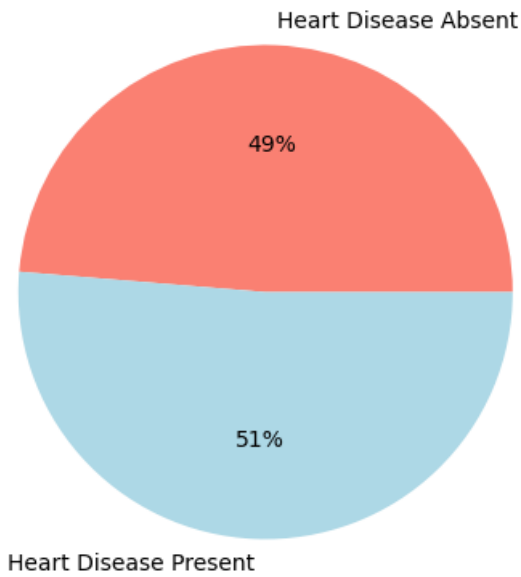
```

```

In [20]: plt.figure(figsize=(10,5))
plt.pie(hd, labels=['Heart Disease Absent','Heart Disease Present'],colors=['salmon','lightblue'], autopct='%0.0f%%')
plt.title('Heart Disease Population %', fontsize=20)
plt.show()

```

## Heart Disease Population %



Heart Disease Frequency According to Sex

```

In [21]: df.sex.value_counts()

```

```

Out[21]:1    713
         0    312
         Name: sex, dtype: int64

```

```

In [22]: # Compare target column with sex column
pd.crosstab(df.target,df.sex)

```

```

Out[22]:
      sex    0    1
target
      0   86  413
      1  226  300

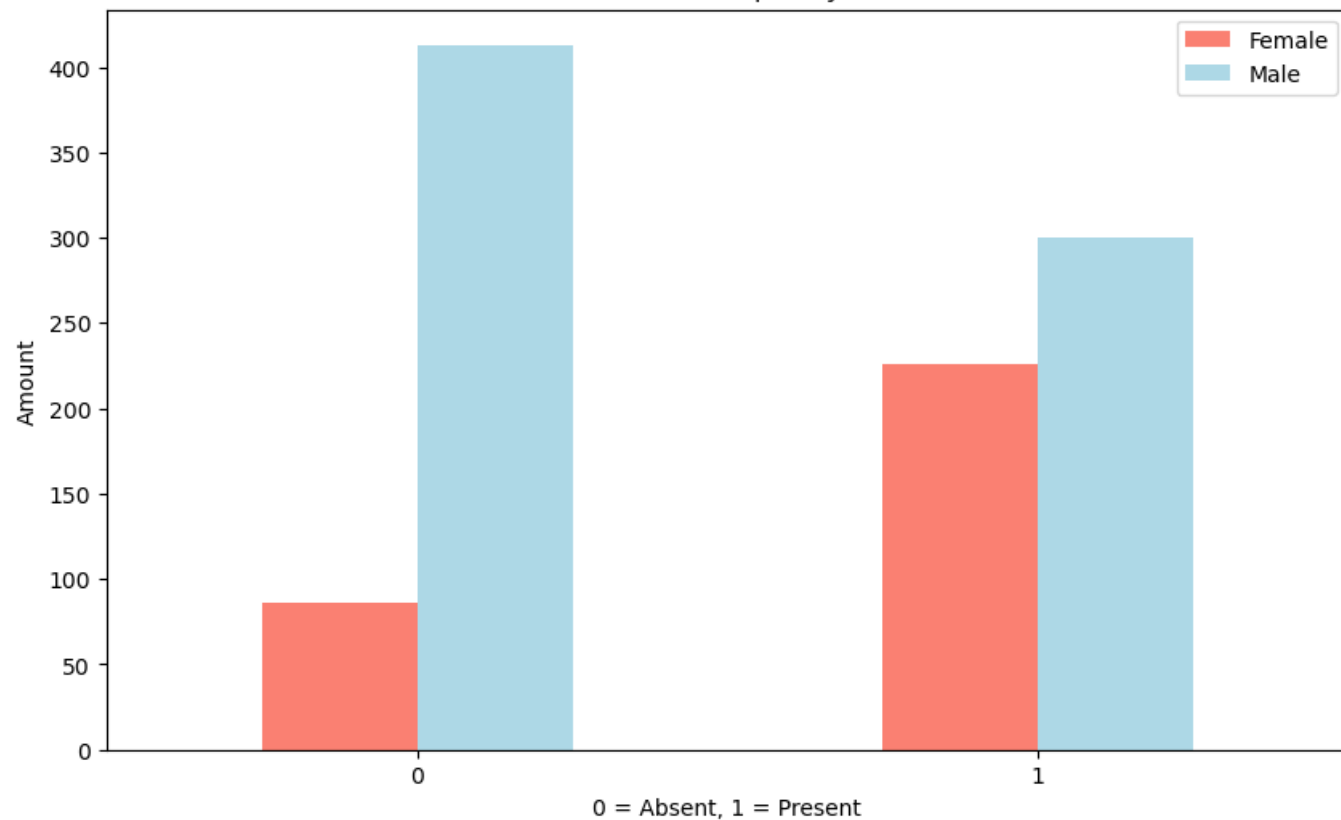
```

```

In [23]: pd.crosstab(df.target,df.sex).plot(kind="bar",
      figsize=(10,6),
      color=["salmon","lightblue"])
plt.title("Heart Disease Frequency For Sex")
plt.xlabel("0 = Absent, 1 = Present")
plt.ylabel("Amount")
plt.legend(["Female", "Male"])
plt.xticks(rotation=0);

```

Heart Disease Frequency For Sex



## Outlier Treatment

To check and remove outliers in Numerical Variables

In [24]: `df['age'].describe()`

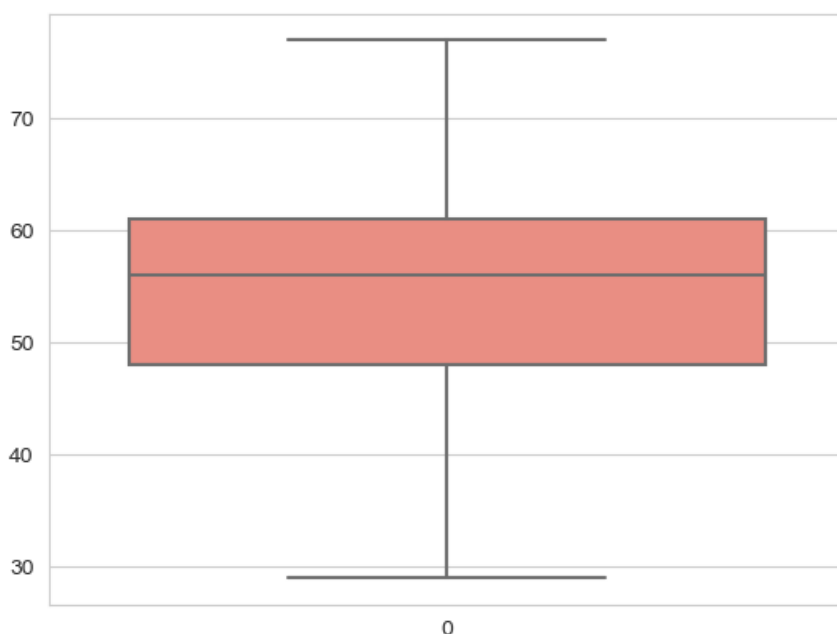
Out[24]:

count	1025.000000
mean	54.434146
std	9.072290
min	29.000000
25%	48.000000
50%	56.000000
75%	61.000000
max	77.000000
Name: age, dtype: float64	

In [25]: `sns.set_style("whitegrid")`

`sns.boxplot(data=df['age'],color='salmon')`

Out[25]: <Axes: >



One analysis can be dividing the age into elderly, middle-aged, young people according to different age range

In [26]: `Min_Age=df['age'].min()`

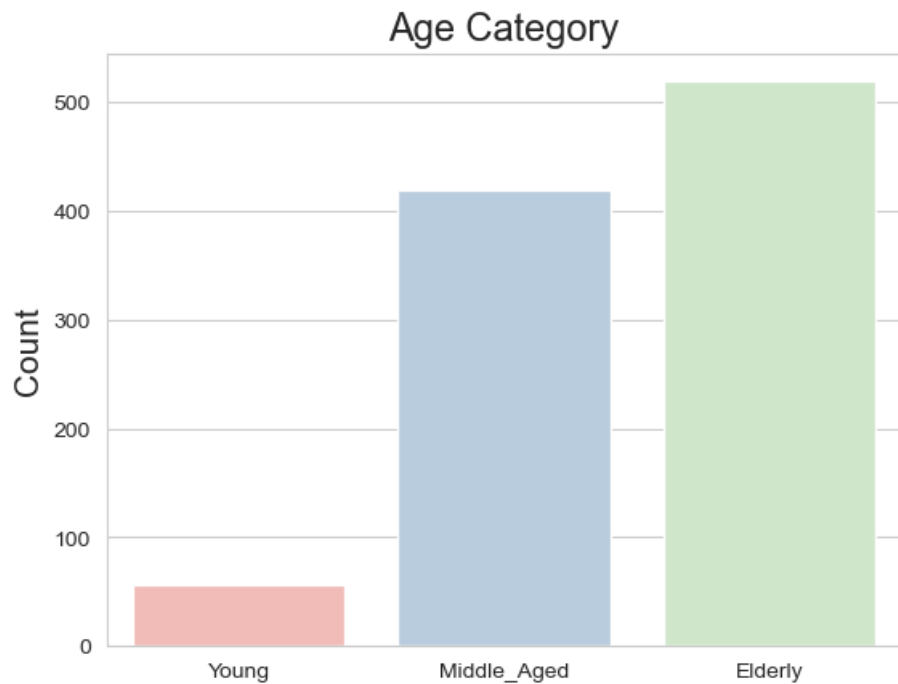
```
Max_Age=df['age'].max()
Mean_Age=df['age'].mean()
print("Minimum Age =",Min_Age)
print("Maximum Age =",Max_Age)
print("Mean Age =",Mean_Age)
```

Minimum Age = 29  
Maximum Age = 77  
Mean Age = 54.43414634146342

```
In [27]: Young=df[(df['age']>=29) & (df['age']<40)]
        Middle_Aged=df[(df['age']>=40) & (df['age']<55)]
        Elderly=df[(df['age']>55)]
        print('Young =',len(Young))
        print('Middle Aged =',len(Middle_Aged))
        print('Elderly =',len(Elderly))
```

Young = 57  
Middle Aged = 419  
Elderly = 519

```
In [28]: sns.barplot(x=['Young','Middle_Aged','Elderly'], y=[len(Young), len(Middle_Aged), len(Elderly)], palette='Pastel1')
        plt.title('Age Category', fontsize=17)
        plt.ylabel('Count', fontsize=15)
        plt.show()
```



```
In [29]: def gender(row):
        if row==1:
            return 'Male'
        elif row==0:
            return 'Female'
```

```
In [30]: df['sex1']=df['sex'].apply(gender)
        df.head()
```

```
Out[30]:
```

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	st
0	52	1	0	125	212	0	1	168		0
1	53	1	0	140	203	1	0	155		1
2	70	1	0	145	174	0	1	125		1
3	61	1	0	148	203	0	1	161		0
4	62	0	0	138	294	1	1	106		0



```
In [31]: def age_range(row):
        if row>=29 and row<40:
            return 'Young'
        elif row>=40 and row<55:
            return 'Middle Aged'
        elif row>55:
            return 'Elderly'
```

```
In [32]: df['Age_Range']=df['age'].apply(age_range)
        df.head()
```

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	st
0	52	1	0	125	212	0	1	168	0	
1	53	1	0	140	203	1	0	155	1	
2	70	1	0	145	174	0	1	125	1	
3	61	1	0	148	203	0	1	161	0	
4	62	0	0	138	294	1	1	106	0	



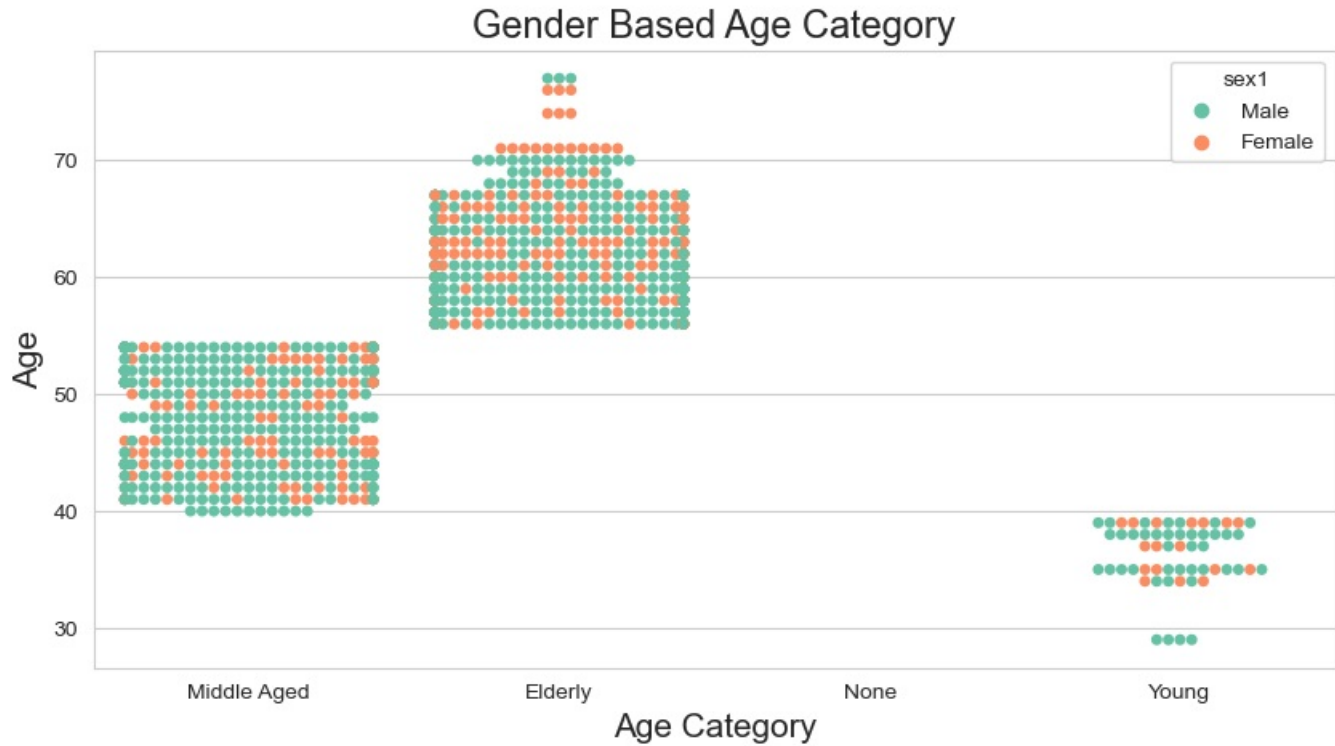
```
In [33]: plt.figure(figsize=(10,5))
sns.swarmplot(x='Age_Range', y='age', hue='sex1', data=df, palette='Set2')
plt.title('Gender Based Age Category', fontsize=17)
plt.xlabel('Age Category', fontsize=15)
plt.ylabel('Age', fontsize=15)
plt.show()
```

C:\Users\Lenovo\anaconda3\lib\site-packages\seaborn\categorical.py:3544: UserWarning: 19.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.  
warnings.warn(msg, UserWarning)

C:\Users\Lenovo\anaconda3\lib\site-packages\seaborn\categorical.py:3544: UserWarning: 31.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.  
warnings.warn(msg, UserWarning)

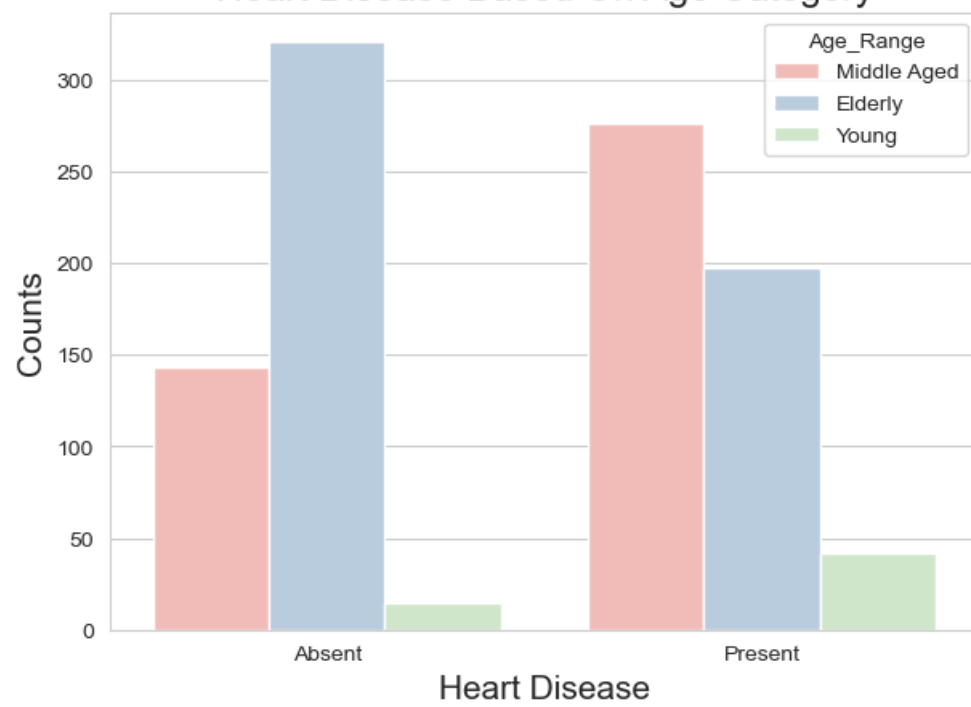
C:\Users\Lenovo\anaconda3\lib\site-packages\seaborn\categorical.py:3544: UserWarning: 28.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.  
warnings.warn(msg, UserWarning)

C:\Users\Lenovo\anaconda3\lib\site-packages\seaborn\categorical.py:3544: UserWarning: 40.8% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.  
warnings.warn(msg, UserWarning)



```
In [34]: plt.figure(figsize=(7,5))
hue_order=['Young Age', 'Middle Age', 'Elder Age']
sns.countplot(x='Heart_Disease', hue='Age_Range', data=df, palette='Pastel1')
plt.title('Heart Disease Based On Age Category', fontsize=17)
plt.xlabel('Heart Disease', fontsize=15)
plt.ylabel('Counts', fontsize=15)
plt.show()
```

# Heart Disease Based On Age Category



In [35]: df.columns

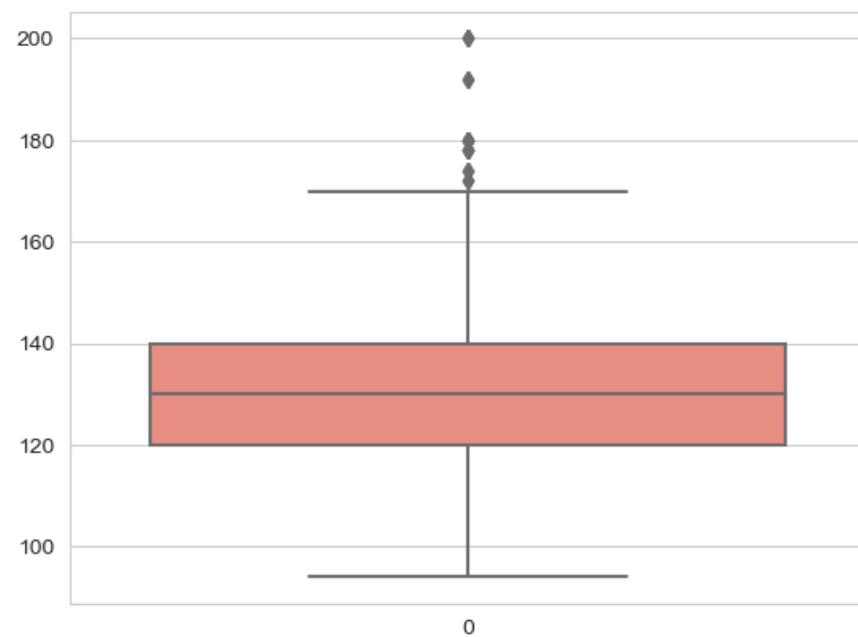
Out[35]:Index(['age', 'sex', 'chest\_pain\_type', 'resting\_blood\_sugar', 'cholesterol',  
'fasting\_blood\_sugar', 'rest\_ecg', 'max\_heart\_rate\_achieved',  
'exercise\_induced\_angina', 'st\_depression', 'st\_slope',  
'num\_major\_vessels', 'thalassemia', 'target', 'Chest\_Pain',  
'Heart\_Disease', 'sex1', 'Age\_Range'],  
dtype='object')

In [36]: df['resting\_blood\_sugar'].describe()

Out[36]:count 1025.000000  
mean 131.611707  
std 17.516718  
min 94.000000  
25% 120.000000  
50% 130.000000  
75% 140.000000  
max 200.000000  
Name: resting\_blood\_sugar, dtype: float64

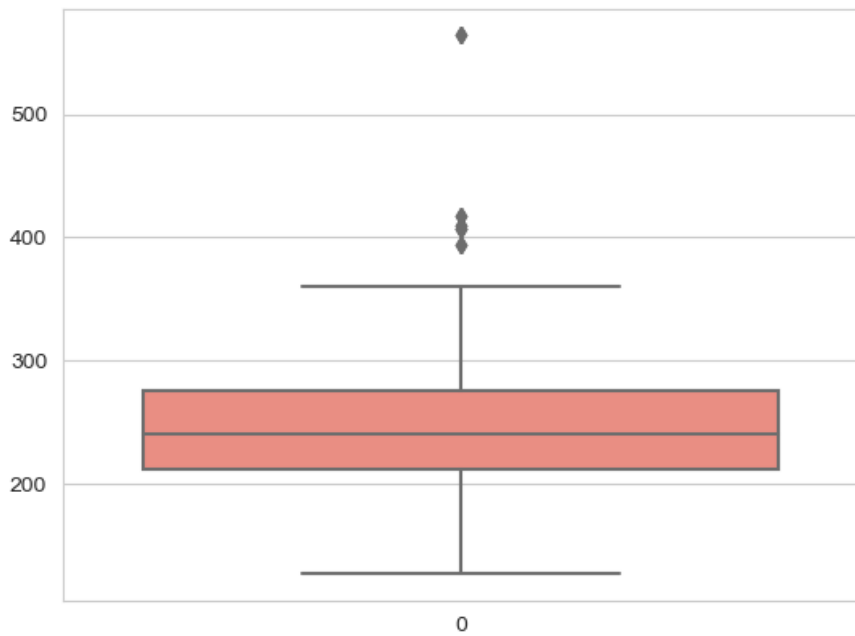
In [37]: sns.boxplot(data=df['resting\_blood\_sugar'],color='salmon')

Out[37]:<Axes: >



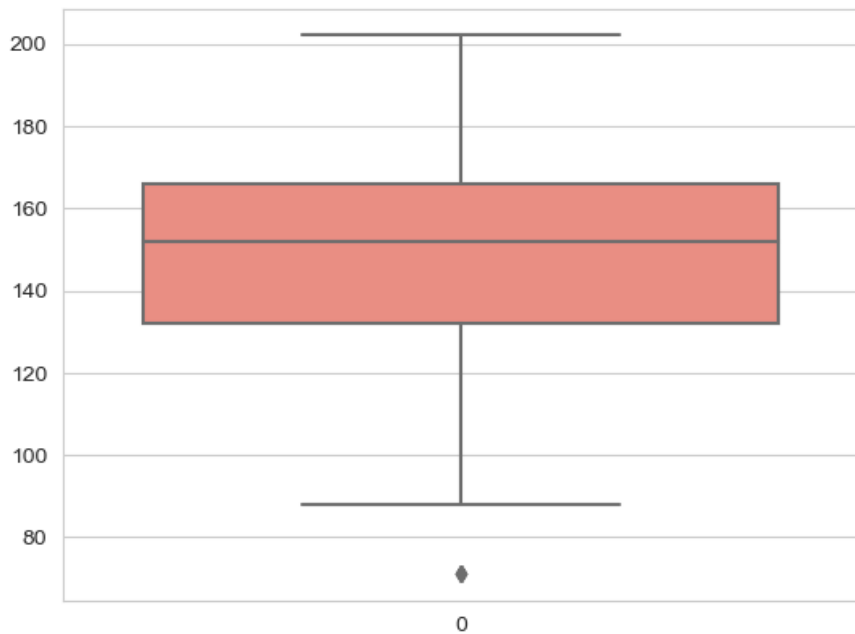
In [38]: sns.boxplot(data=df['cholesterol'],color='salmon')

Out[38]:<Axes: >



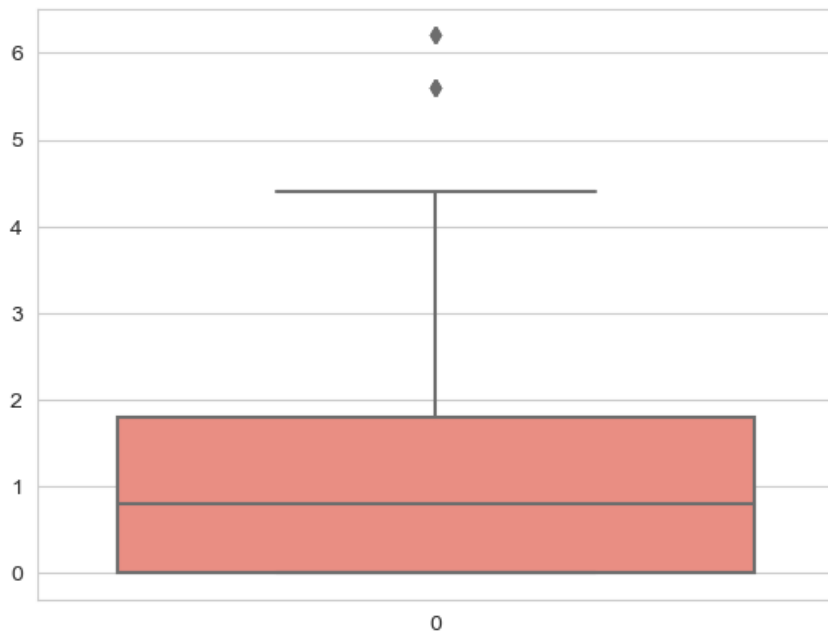
In [39]: sns.boxplot(data=df['max\_heart\_rate\_achieved'],color='salmon')

Out[39]:<Axes: >



In [40]: sns.boxplot(data=df['st\_depression'],color='salmon')

Out[40]:<Axes: >





From the box plots we can see there are Outliers in st\_depression, max\_heart\_rate\_achieved, resting\_blood\_sugar and cholesterol in these variables. So lets drop the outlier value and replace the outlier using IQR.

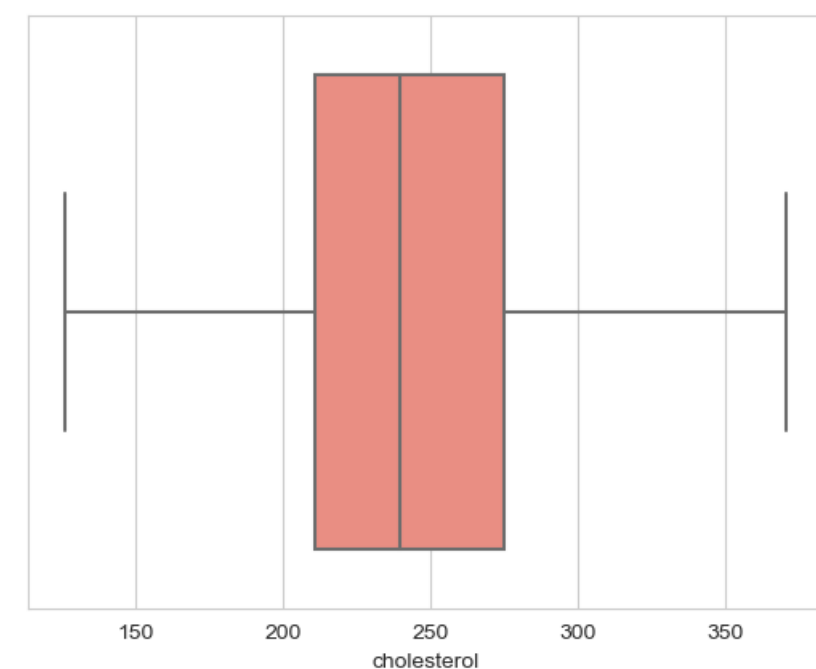
```
In [41]: df1=df.copy()
```

```
In [42]: def remove_outlier(col):
sorted(col)
Q1, Q3 = col.quantile([0.25,0.75])
IQR = Q3 - Q1
low_rang = Q1 - (1.5 * IQR)
upp_rang = Q3 + (1.5 * IQR)
return low_rang, upp_rang
```

```
In [44]: low_chol, upp_chol = remove_outlier(df1['cholesterol'])
low_chol
df1['cholesterol'] = np.where(df1['cholesterol']>upp_chol, upp_chol, df1['cholesterol'])
df1['cholesterol'] = np.where(df1['cholesterol']<low_chol, low_chol, df1['cholesterol'])
```

```
In [45]: sns.boxplot(x = 'cholesterol', data = df1,color='salmon')
```

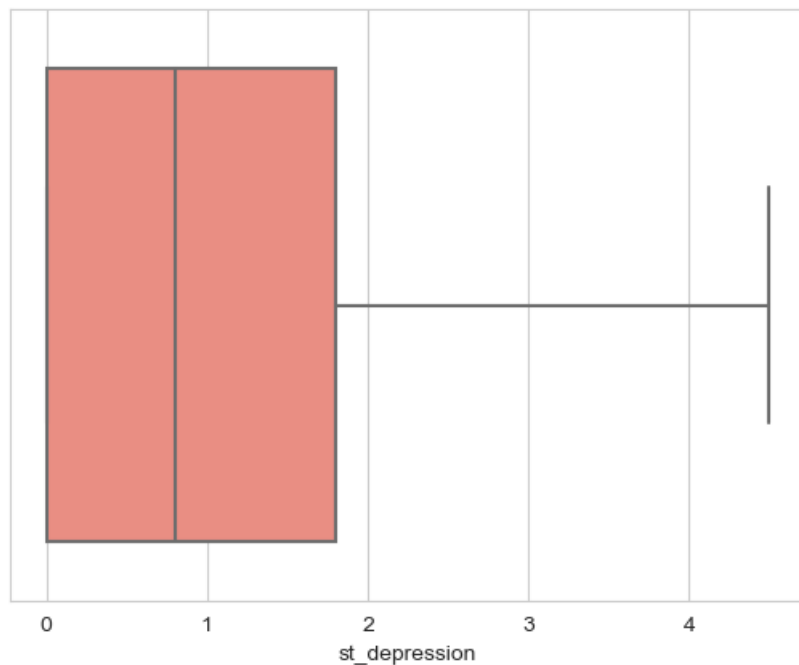
```
Out[45]:<Axes: xlabel='cholesterol'>
```



```
In [46]: low_depr, upp_depr = remove_outlier(df1['st_depression'])
df1['st_depression'] = np.where(df1['st_depression']>upp_depr, upp_depr, df1['st_depression'])
df1['st_depression'] = np.where(df1['st_depression']<low_depr, low_depr, df1['st_depression'])
```

```
In [47]: sns.boxplot(x = 'st_depression', data = df1,color='salmon')
```

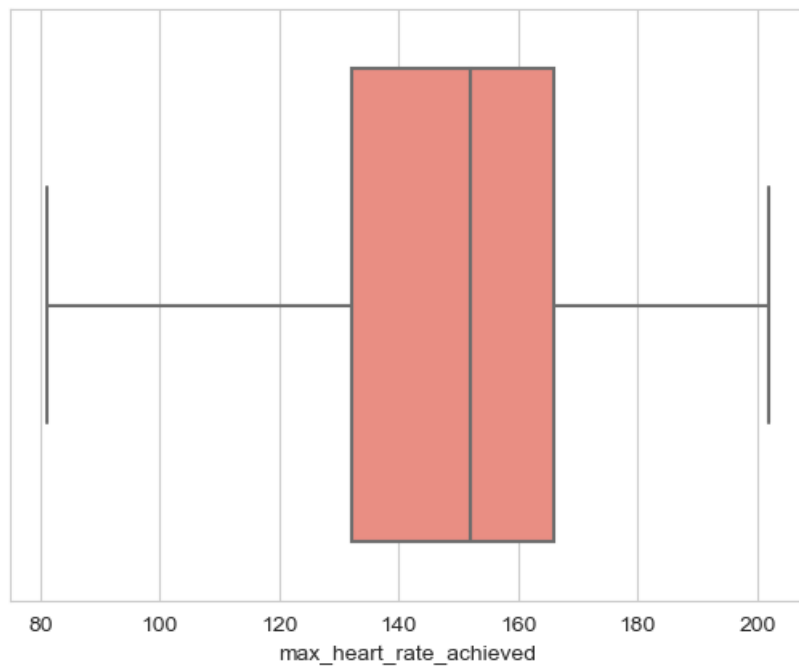
Out[47]:<Axes: xlabel='st\_depression'>



```
In [48]: low_hrate, upp_hrate = remove_outlier(df1['max_heart_rate_achieved'])
         df1['max_heart_rate_achieved'] = np.where(df1['max_heart_rate_achieved']>upp_hrate, upp_hrate, df1['max_heart_rate_achieved'])
         df1['max_heart_rate_achieved'] = np.where(df1['max_heart_rate_achieved']<low_hrate, low_hrate, df1['max_heart_rate_achieved'])
```

```
In [49]: sns.boxplot(x = 'max_heart_rate_achieved', data = df1,color='salmon')
```

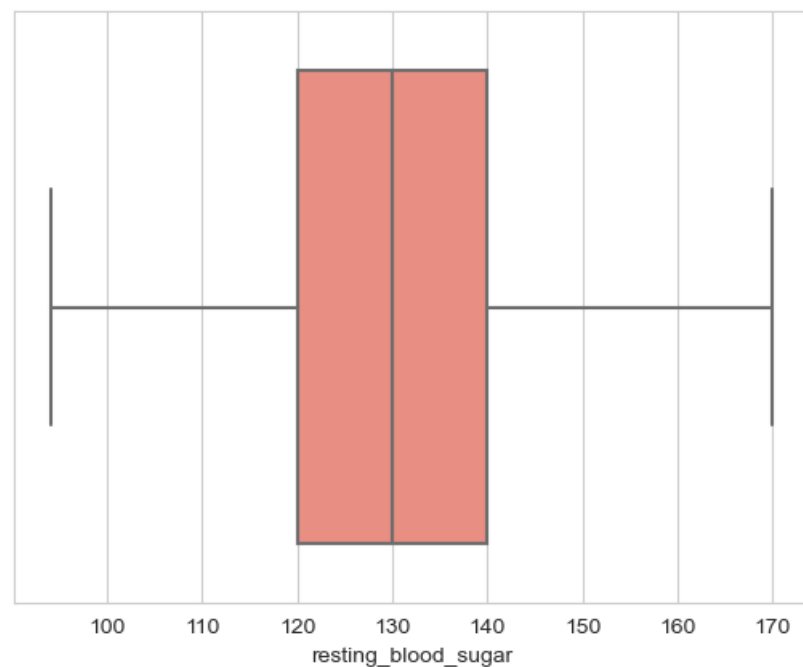
Out[49]:<Axes: xlabel='max\_heart\_rate\_achieved'>



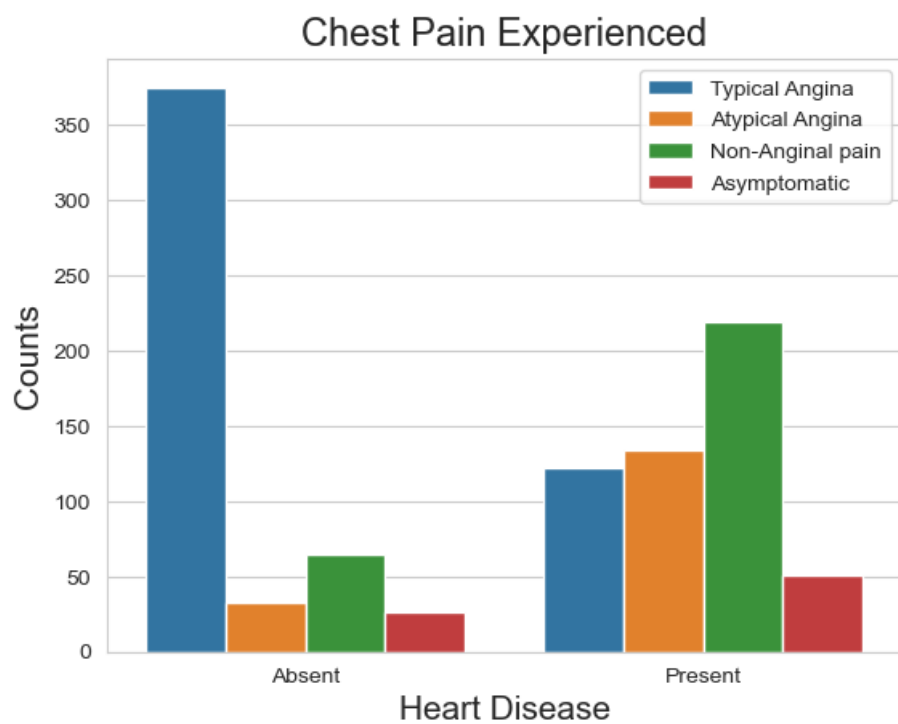
```
In [50]: low_rbs, upp_rbs = remove_outlier(df1['resting_blood_sugar'])
         df1['resting_blood_sugar'] = np.where(df1['resting_blood_sugar']>upp_rbs, upp_rbs, df1['resting_blood_sugar'])
         df1['resting_blood_sugar'] = np.where(df1['resting_blood_sugar']<low_rbs, low_rbs, df1['resting_blood_sugar'])
```

```
In [51]: sns.boxplot(x = 'resting_blood_sugar', data = df1,color='salmon')
```

Out[51]:<Axes: xlabel='resting\_blood\_sugar'>



```
In [52]: ##Count Plot Creation of Chest Pain Experienced
%matplotlib inline
sns.countplot(x=df1['Heart_Disease'], hue='chest_pain_type', data=df1)
plt.title('Chest Pain Experienced', fontsize=17)
plt.xlabel('Heart Disease',fontsize=15)
plt.ylabel('Counts',fontsize=15)
plt.legend(labels=['Typical Angina','Atypical Angina','Non-Anginal pain','Asymptomatic'])
plt.show()
```



```
In [53]: df.columns
Out[53]:Index(['age', 'sex', 'chest_pain_type', 'resting_blood_sugar', 'cholesterol',
'fasting_blood_sugar', 'rest_ecg', 'max_heart_rate_achieved',
'exercise_induced_angina', 'st_depression', 'st_slope',
'num_major_vessels', 'thalassemia', 'target', 'Chest_Pain',
'Heart_Disease', 'sex1', 'Age_Range'],
dtype='object')
```

**-> It seems people having asymptomatic chest pain have a higher chance of heart disease**

**-> Asymptomatic Chest pain means neither causing nor exhibiting symptoms of Heart disease.**

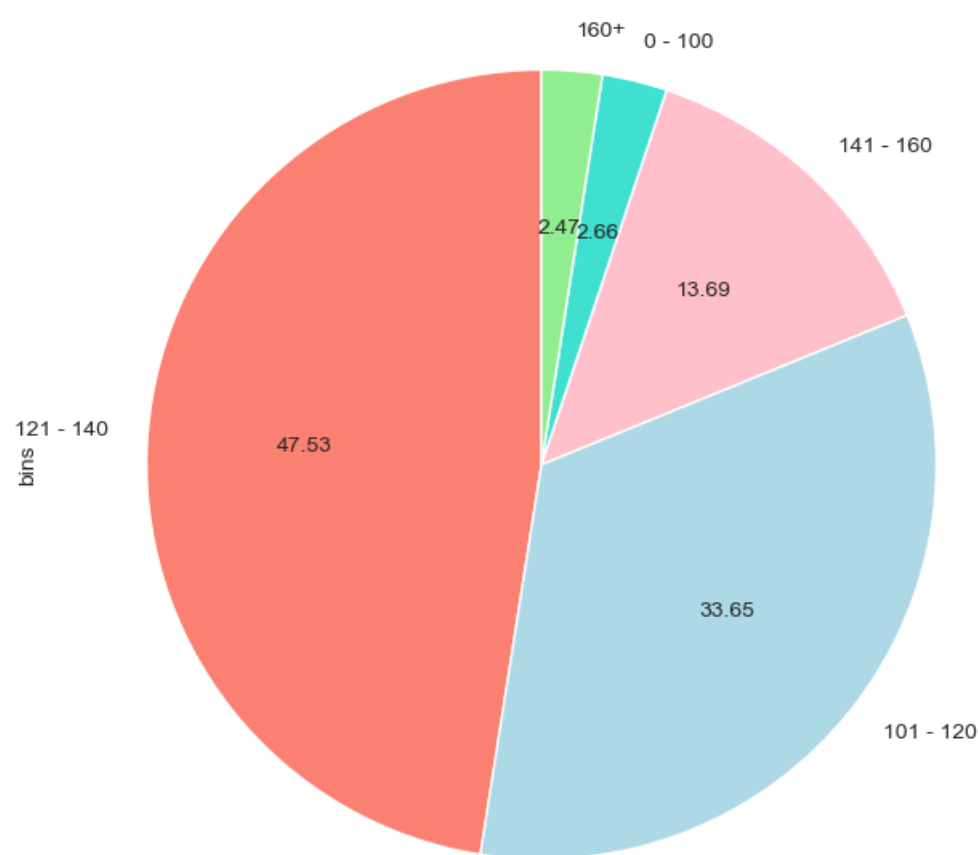
```
In [55]: #Bar Plot Creation of Person's Resting Blood Pressure (mm Hg)
```

```
sns.barplot(x='sex1', y='resting_blood_sugar', data=df1, palette='Set2')
plt.title("Blood Pressure", fontsize=17)
plt.xlabel('Sex', fontsize=15)
plt.ylabel("Person's Resting Blood Pressure (mm Hg)", fontsize=12)
plt.show()
```



-> Blood Pressure Rate is almost equal in Males and Females

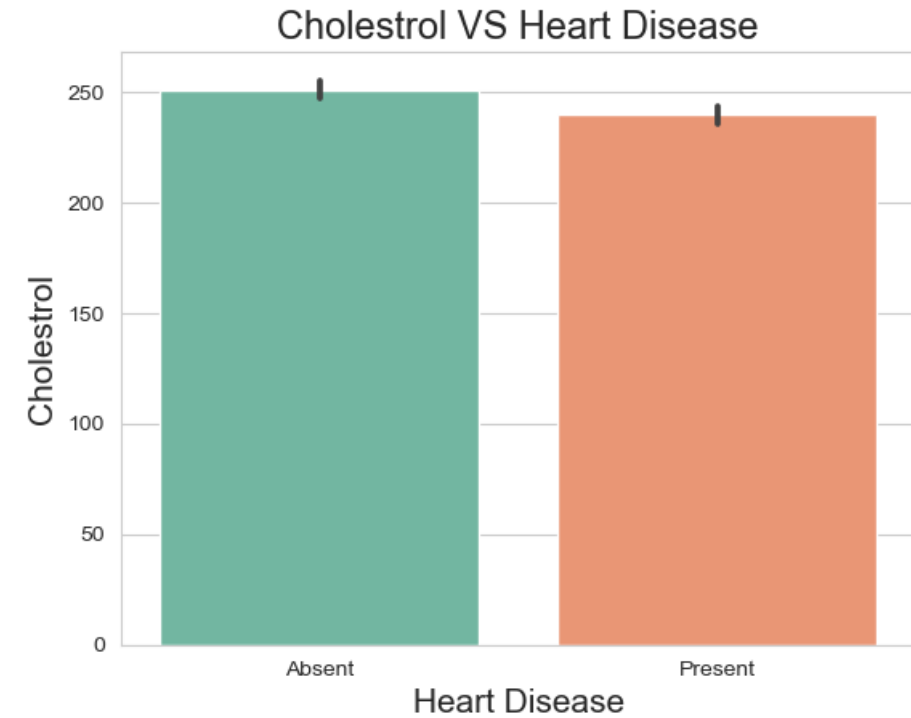
```
In [56]: df1['bins'] = pd.cut(df1['resting_blood_sugar'],bins=[0,100,120,140,160,180], labels=["0 - 100","101 - 120","121 - 140","141 - 160","160+"])
plt.figure(figsize=(8,8))
df1[df1['target']==1]['bins'].value_counts().plot.pie(autopct="%0.2f", colors=["salmon","lightblue","pink","turquoise","lightgreen"],startangle=90,fontsize=10)
Out[56]:<Axes: ylabel='bins'>
```



Patients having resting blood sugar(diastolic state) <90mm Hg in diastolic state have less chances of heart disease

In [57]: #Bar Plot Creation of Cholesterol VS Heart Disease

```
sns.barplot(x='Heart_Disease', y='cholesterol', data=df1, palette='Set2')
plt.title('Cholesterol VS Heart Disease', fontsize=17)
plt.xlabel('Heart Disease', fontsize=15)
plt.ylabel('Cholesterol', fontsize=15)
plt.show()
```

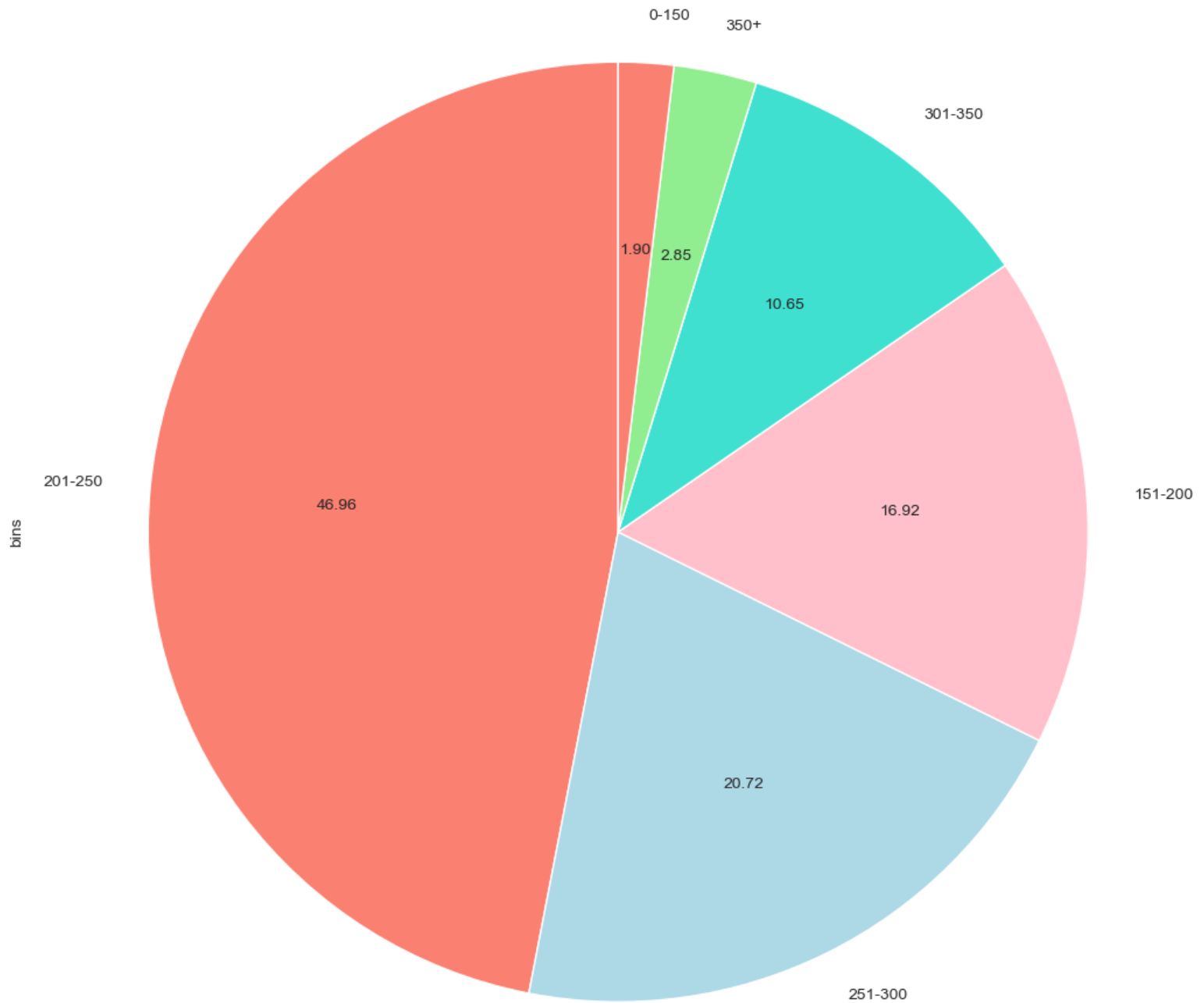


-> Higher Cholesterol Level results Chances Of Heart Disease

```
In [58]: df1['bins'] = pd.cut(df1['cholesterol'],bins=[0,150,200,250,300,350,400], labels=["0-150","151-200","201-250","251-300","301-350","350+"])
plt.figure(figsize=(13,14))
df1[df1['target']==1]['bins'].value_counts().plot.pie(autopct="%0.2f", colors=["salmon","lightblue","pink","turquoise","lightgreen"],startangle=90,fontsize=10)
plt.title(label="Cholesterol details against target\n",loc="left",fontstyle='italic')
```

Out[58]:Text(0.0, 1.0, 'Cholestrol details against target\n')

### Cholestrol details against target

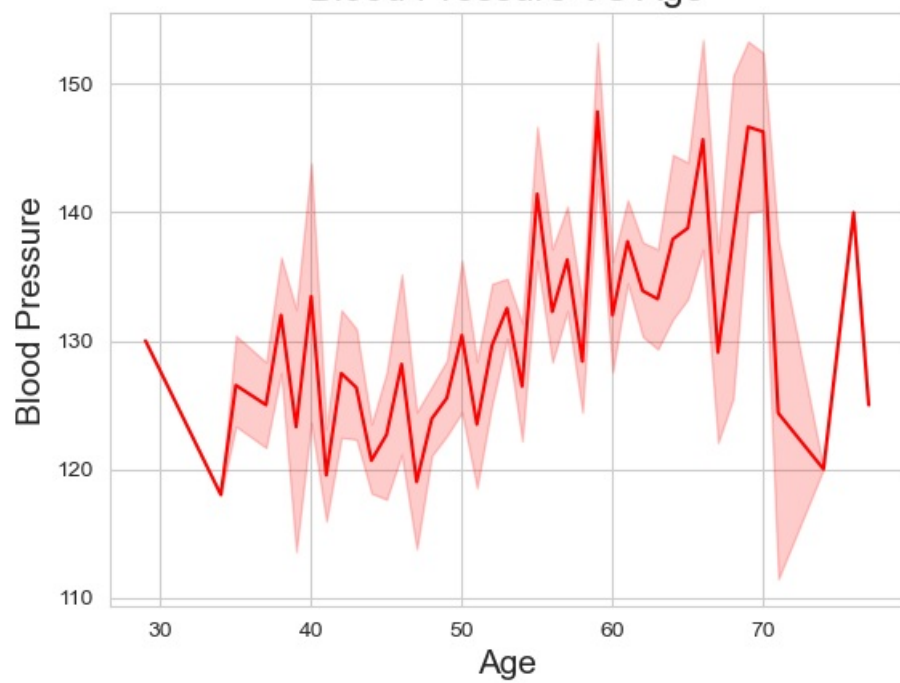


Patients having cholesterol level between 200 to 300 mg/dl have higher chances of having heart disease.

In [59]: #Line Plot Creation of Blood Pressure VS Age

```
sns.lineplot(x='age', y='resting_blood_sugar', data=df1, color='r')
plt.title('Blood Pressure VS Age', fontsize=17)
plt.xlabel('Age', fontsize=15)
plt.ylabel('Blood Pressure', fontsize=15)
plt.show()
```

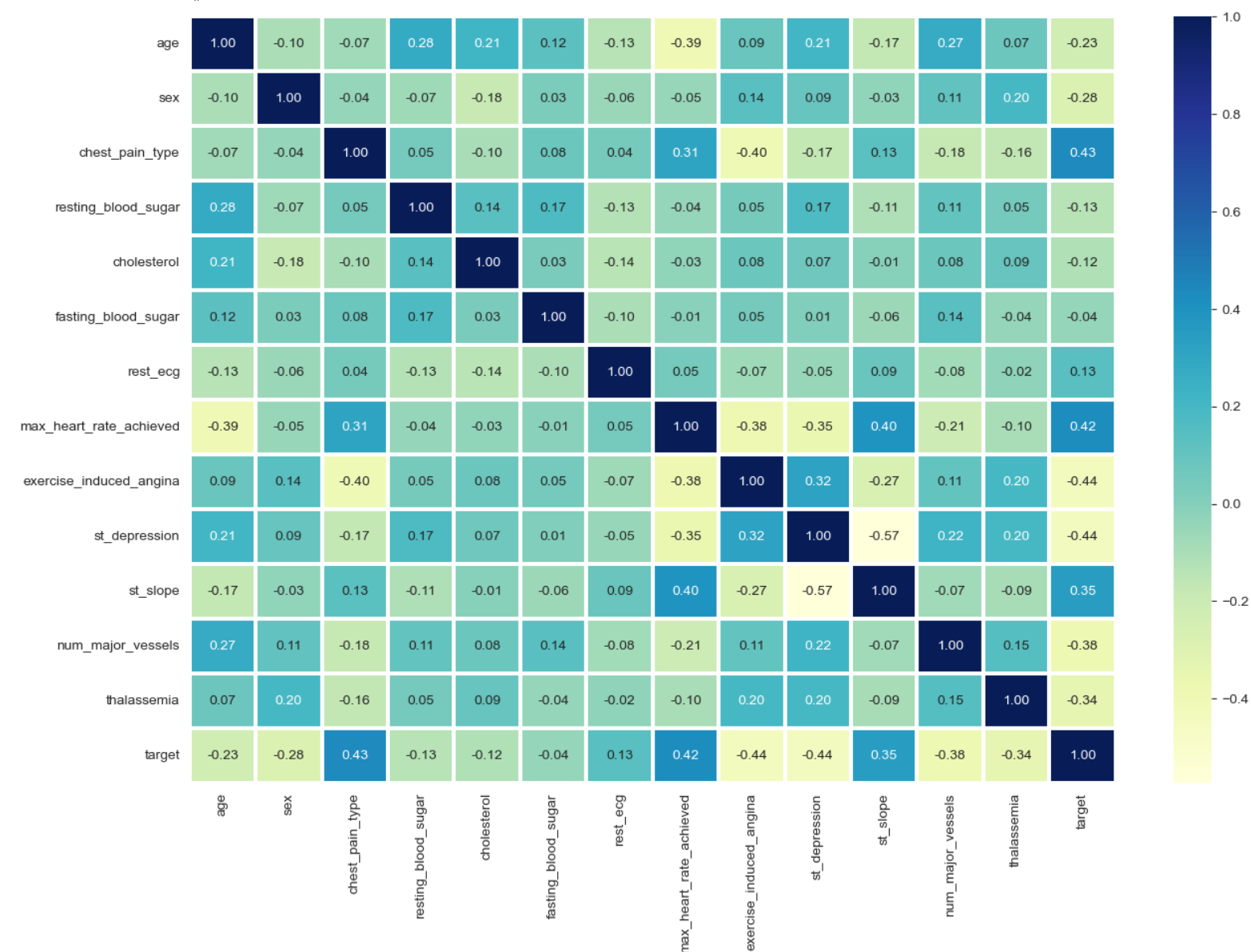
Blood Pressure VS Age



**Blood Pressure increases between age of 50 to 60 and continues the pattern till 70.**

```
In [60]: corr_matrix = df1.corr()
fig,ax = plt.subplots(figsize=(15,10))
ax = sns.heatmap(corr_matrix,
                 annot=True,
                 linewidth=1.5,
                 fmt=".2f",
                 cmap="YlGnBu");
```

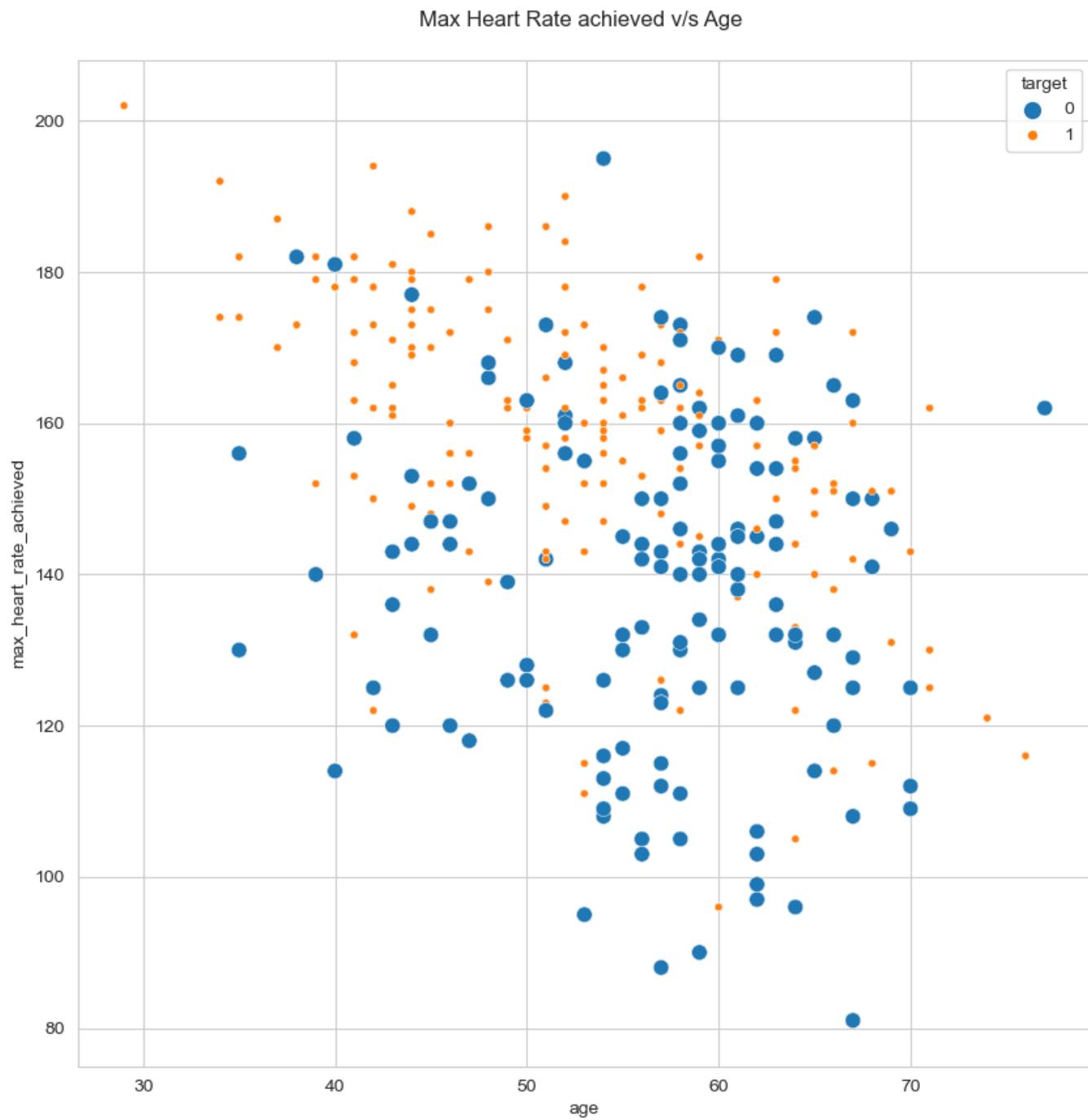
```
corr_matrix = df1.corr()
```



```
In [61]: # Observable from the heatmap above that there is a correlation between age and max_heart_rate_achieved with negative correlation of -0.39
plt.figure(figsize = (10, 10))
sns.scatterplot(x='age', y='max_heart_rate_achieved', hue='target', data=df1, size='target')
plt.title("Max Heart Rate achieved v/s Age \n")
```



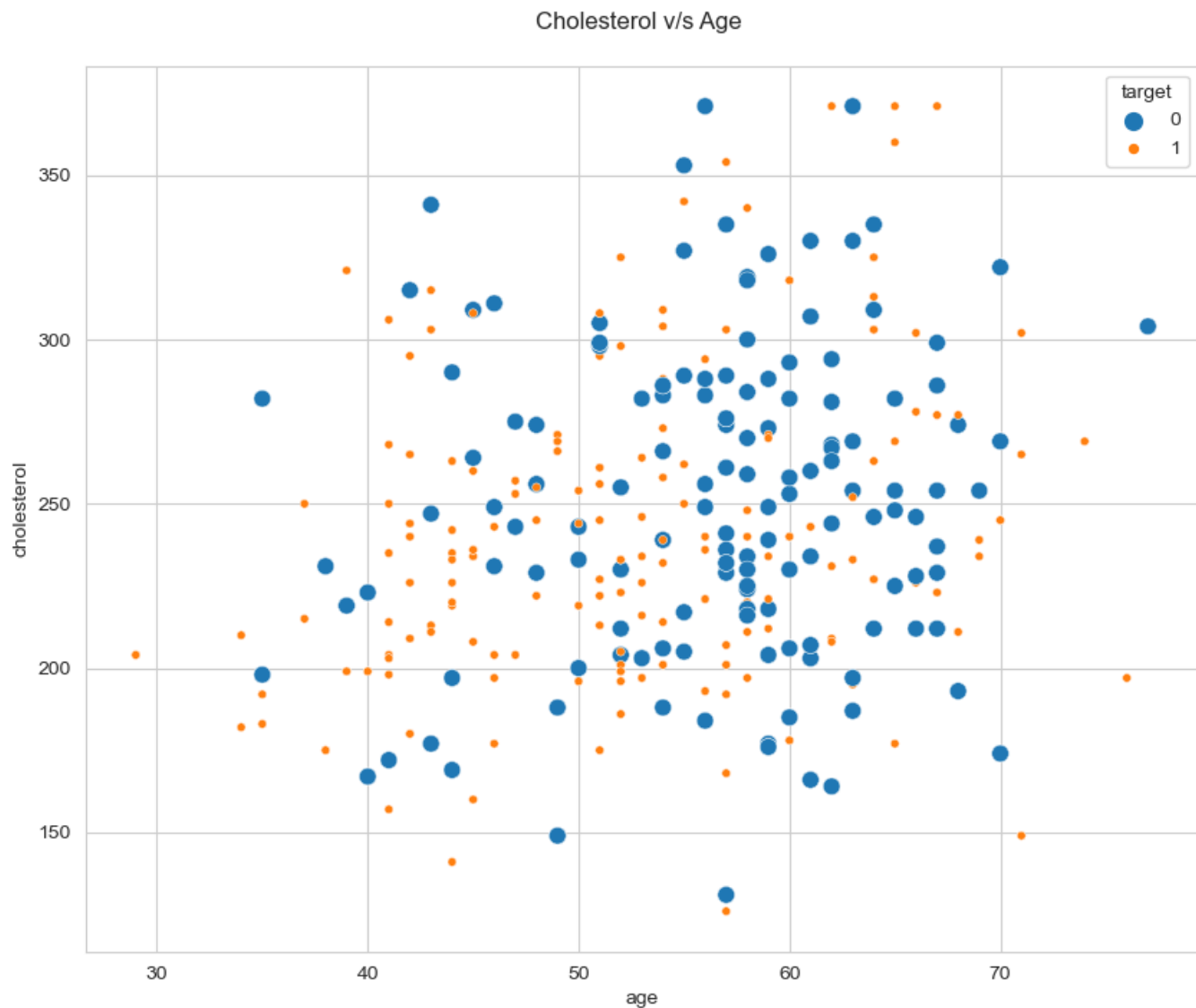
Out[61]:Text(0.5, 1.0, 'Max Heart Rate achieved v/s Age \n')



**There are more number of people suffering form Heart Disease, between the age 55-65 and have Heart Rate between 140-160**

```
In [62]: plt.figure(figsize = (10, 8))
sns.scatterplot(x='age', y='cholesterol',hue='target',data=df1,size='target')
plt.title("Cholesterol v/s Age \n")
```

Out[62]:Text(0.5, 1.0, 'Cholesterol v/s Age \n')



**Most of the people suffering from Heart Disease are above 50 and their Cholesterol Level ranges between 200-350**

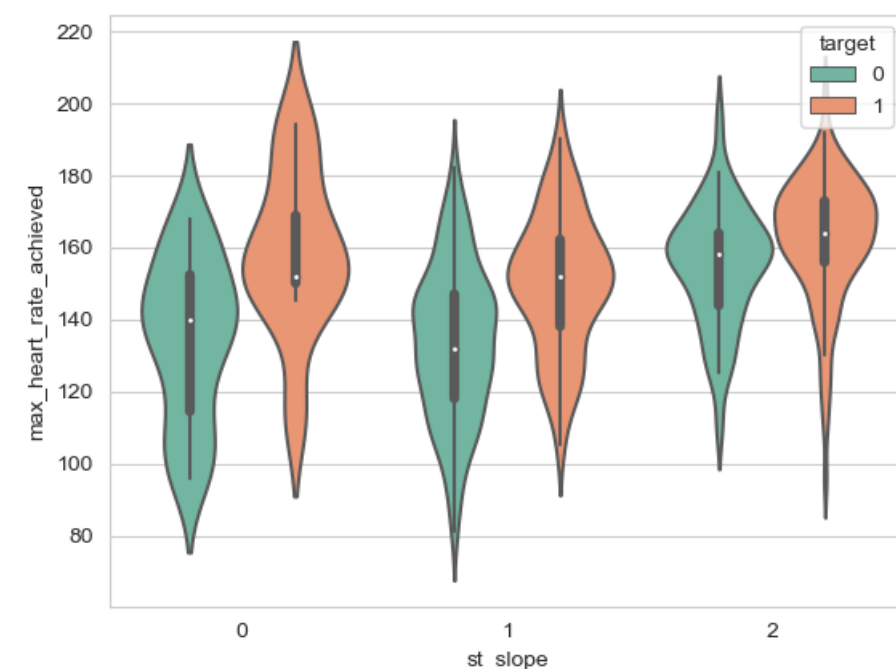
**People with age<40 have low cholesterol level**

```
In [63]: ax = sns.violinplot(x="st_slope", y="max_heart_rate_achieved", hue="target", data=df1, palette="Set2")
plt.title("max_heart_rate_achieved v/s st slope \n \n 1: upsloping, Value 2: flat, Value 3: downsloping \n")
```

Out[63]:Text(0.5, 1.0, 'max\_heart\_rate\_achieved v/s st slope \n \n 1: upsloping, Value 2: flat, Value 3: downsloping \n')

max\_heart\_rate\_achieved v/s st slope

1: upsloping, Value 2: flat, Value 3: downsloping



People suffering from Heart Disease, have max heart rate ranging between 120-170 and have downsloping meaning the signs of an unhealthy heart.

In [70]: df.to\_csv("D:\\Unified\_Internship\\My\_projectWork\\Project3(heart)Heart Disease Diagnostic.csv",index = False)

-----  
PermissionError Traceback (most recent call last)

Cell In[70], line 1

--> 1 df.to\_csv("D:\\Unified\_Internship\\My\_projectWork\\Project3(heart)Heart Disease Diagnostic.csv",index = False)

File ~\anaconda3\lib\site-packages\pandas\util\\_decorators.py:211, in deprecate\_kwarg.<locals>.\_deprecate\_kwarg.<locals>.wrapper(\*args, \*\*kwargs)

```
209     else:
210         kwargs[new_arg_name] = new_arg_value
--> 211 return func(*args, **kwargs)
```

File ~\anaconda3\lib\site-packages\pandas\core\generic.py:3720, in NDFrame.to\_csv(self, path\_or\_buf, sep, na\_rep, float\_format, columns, header, index, index\_label, mode, encoding, compression, quoting, quotechar, lineterminator, chunksize, date\_format, doublequote, escapechar, decimal, errors, storage\_options)

```
3709 df = self if isinstance(self, ABCDataFrame) else self.to_frame()
3711 formatter = DataFrameFormatter(
3712     frame=df,
3713     header=header,
3714     (...)
3717     decimal=decimal,
3718 )
-> 3720 return DataFrameRenderer(formatter).to_csv(
3721     path_or_buf,
3722     lineterminator=lineterminator,
3723     sep=sep,
3724     encoding=encoding,
3725     errors=errors,
3726     compression=compression,
3727     quoting=quoting,
3728     columns=columns,
3729     index_label=index_label,
3730     mode=mode,
3731     chunksize=chunksize,
3732     quotechar=quotechar,
3733     date_format=date_format,
3734     doublequote=doublequote,
3735     escapechar=escapechar,
3736     storage_options=storage_options,
3737 )
```

File ~\anaconda3\lib\site-packages\pandas\util\\_decorators.py:211, in deprecate\_kwarg.<locals>.\_deprecate\_kwarg.<locals>.wrapper(\*args, \*\*kwargs)

```
209     else:
210         kwargs[new_arg_name] = new_arg_value
--> 211 return func(*args, **kwargs)
```

File ~\anaconda3\lib\site-packages\pandas\io\formats\format.py:1189, in DataFrameRenderer.to\_csv(self, path\_or\_buf, encoding, sep, columns, index\_label, mode, compression, quoting, quotechar, lineterminator, chunksize, date\_format, doublequote, escapechar, errors, storage\_options)

```
1168     created_buffer = False
1170 csv_formatter = CSVFormatter(
1171     path_or_buf=path_or_buf,
1172     lineterminator=lineterminator,
1173     (...)
1187     formatter=self.fmt,
1188 )
-> 1189 csv_formatter.save()
1191 if created_buffer:
1192     assert isinstance(path_or_buf, StringIO)
```

File ~\anaconda3\lib\site-packages\pandas\io\formats\csvs.py:241, in CSVFormatter.save(self)

```
237 """
238 Create the writer & save.
239 """
240 # apply compression and byte/text conversion
--> 241 with get_handle(
242     self.filepath_or_buffer,
243     self.mode,
244     encoding=self.encoding,
245     errors=self.errors,
246     compression=self.compression,
247     storage_options=self.storage_options,
248 ) as handles:
249
250     # Note: self.encoding is irrelevant here
251     self.writer = csvlib.writer(
252         handles.handle,
253         lineterminator=self.lineterminator,
254         (...)
258         quotechar=self.quotechar,
```

```
259 )
261 self._save()

File ~\anaconda3\lib\site-packages\pandas\io\common.py:856, in get_handle(path_or_buf, mode, encoding, compression, memory_map, is_text, errors, storage_options)
851 elif isinstance(handle, str):
852     # Check whether the filename is to be opened in binary mode.
853     # Binary mode does not support 'encoding' and 'newline'.
854     if ioargs.encoding and "b" not in ioargs.mode:
855         # Encoding
--> 856         handle = open(
857             handle,
858             ioargs.mode,
859             encoding=ioargs.encoding,
860             errors=errors,
861             newline="",
862         )
863     else:
864         # Binary mode
865         handle = open(handle, ioargs.mode)
```

**PermissionError:** [Errno 13] Permission denied: 'D:\\Unified\_Internship\\My\_projectWork\\Project3(heart)Heart Disease Diagnostic.csv'

In [68]: df

Out[68]:

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
0	52	1	0	125	212	0	1	168	0
1	53	1	0	140	203	1	0	155	1
2	70	1	0	145	174	0	1	125	1
3	61	1	0	148	203	0	1	161	0
4	62	0	0	138	294	1	1	106	0
5	58	0	0	100	248	0	0	122	0
6	58	1	0	114	318	0	2	140	0
7	55	1	0	160	289	0	0	145	1
8	46	1	0	120	249	0	0	144	0
9	54	1	0	122	286	0	0	116	1
10	71	0	0	112	149	0	1	125	0
11	43	0	0	132	341	1	0	136	1
12	34	0	1	118	210	0	1	192	0
13	51	1	0	140	298	0	1	122	1
14	52	1	0	128	204	1	1	156	1
15	34	0	1	118	210	0	1	192	0
16	51	0	2	140	308	0	0	142	0
17	54	1	0	124	266	0	0	109	1
18	50	0	1	120	244	0	1	162	0
19	58	1	2	140	211	1	0	165	0
20	60	1	2	140	185	0	0	155	0
21	67	0	0	106	223	0	1	142	0
22	45	1	0	104	208	0	0	148	1
23	63	0	2	135	252	0	0	172	0
24	42	0	2	120	209	0	1	173	0
25	61	0	0	145	307	0	0	146	1
26	44	1	2	130	233	0	1	179	1
27	58	0	1	136	319	1	0	152	0
28	56	1	2	130	256	1	0	142	1
29	55	0	0	180	327	0	2	117	1
30	44	1	0	120	169	0	1	144	1

id	age	sex	chest_pain_type		resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
			typical	atypical						
31	59	1	0	0	120	244	0	1	162	1
32	57	1	0	0	130	131	0	1	115	1
33	70	1	2	0	160	269	0	1	112	1
34	50	1	2	0	129	196	0	1	163	0
35	46	1	2	0	150	231	0	1	147	0
36	51	1	3	0	125	213	0	0	125	1
37	59	1	0	0	138	271	0	0	182	0
38	64	1	0	0	128	263	0	1	105	1
39	57	1	2	0	128	229	0	0	150	0
40	65	0	2	0	160	360	0	0	151	0
41	54	1	2	0	120	258	0	0	147	0
42	61	0	0	0	130	330	0	0	169	0
43	46	1	0	0	120	249	0	0	144	0
44	55	0	1	0	132	342	0	1	166	0
45	42	1	0	0	140	226	0	1	178	0
46	41	1	1	0	135	203	0	1	132	0
47	66	0	0	0	178	228	1	1	165	1
48	66	0	2	0	146	278	0	0	152	0
49	60	1	0	0	117	230	1	1	160	1
50	58	0	3	0	150	283	1	0	162	0
51	57	0	0	0	140	241	0	1	123	1
52	38	1	2	0	138	175	0	1	173	0
53	49	1	2	0	120	188	0	1	139	0
54	55	1	0	0	140	217	0	1	111	1
55	55	1	0	0	140	217	0	1	111	1
56	56	1	3	0	120	193	0	0	162	0
57	48	1	1	0	130	245	0	0	180	0
58	67	1	2	0	152	212	0	0	150	0
59	57	1	1	0	154	232	0	0	164	0
60	29	1	1	0	130	204	0	0	202	0
61	66	0	2	0	146	278	0	0	152	0
62	67	1	0	0	100	299	0	0	125	1
63	59	1	2	0	150	212	1	1	157	0
64	29	1	1	0	130	204	0	0	202	0
65	59	1	3	0	170	288	0	0	159	0
66	53	1	2	0	130	197	1	0	152	0
67	42	1	0	0	136	315	0	1	125	1
68	37	0	2	0	120	215	0	1	170	0
69	62	0	0	0	160	164	0	0	145	0

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
70	59	1	0	170	320	0	0	140	1
71	61	1	0	140	207	0	0	138	1
72	56	1	0	125	249	1	0	144	1
73	59	1	0	140	177	0	1	162	1
74	48	1	0	130	256	1	0	150	1
75	47	1	2	138	257	0	0	156	0
76	48	1	2	124	255	1	1	175	0
77	63	1	0	140	187	0	0	144	1
78	52	1	1	134	201	0	1	158	0
79	52	1	1	134	201	0	1	158	0
80	50	1	2	140	233	0	1	163	0
81	49	1	2	118	149	0	0	126	0
82	46	1	2	150	231	0	1	147	0
83	38	1	2	138	175	0	1	173	0
84	37	0	2	120	215	0	1	170	0
85	44	1	1	120	220	0	1	170	0
86	58	1	2	140	211	1	0	165	0
87	59	0	0	174	249	0	1	143	1
88	62	0	0	140	268	0	0	160	0
89	68	1	0	144	193	1	1	141	0
90	54	0	2	108	267	0	0	167	0
91	62	0	0	124	209	0	1	163	0
92	63	1	0	140	187	0	0	144	1
93	44	1	0	120	169	0	1	144	1
94	62	1	1	128	208	1	0	140	0
95	45	0	0	138	236	0	0	152	1
96	57	0	0	128	303	0	0	159	0
97	53	1	0	123	282	0	1	95	1
98	65	1	0	110	248	0	0	158	0
99	76	0	2	140	197	0	2	116	0
100	43	0	2	122	213	0	1	165	0
101	57	1	2	150	126	1	1	173	0
102	54	1	1	108	309	0	1	156	0
103	47	1	2	138	257	0	0	156	0
104	52	1	3	118	186	0	0	190	0
105	47	1	0	110	275	0	0	118	1
106	51	1	0	140	299	0	1	173	1
107	62	1	1	120	281	0	0	103	0
108	40	1	0	152	223	0	1	181	0
109	54	1	0	110	206	0	0	108	1
110	44	1	0	110	197	0	0	177	0
111	53	1	0	142	226	0	0	111	1
112	49	1	0	120	250	1	0	150	0

id	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
112	48	1	0	130	250	1	0	150	1
113	57	1	0	110	335	0	1	143	1
114	59	1	2	126	218	1	1	134	0
115	61	0	0	145	307	0	0	146	1
116	63	1	0	130	254	0	0	147	0
117	43	1	0	120	177	0	0	120	1
118	29	1	1	130	204	0	0	202	0
119	42	1	1	120	295	0	1	162	0
120	54	1	1	108	309	0	1	156	0
121	44	1	0	120	169	0	1	144	1
122	60	1	0	145	282	0	0	142	1
123	65	0	2	140	417	1	0	157	0
124	61	1	0	120	260	0	1	140	1
125	60	0	3	150	240	0	1	171	0
126	66	1	0	120	302	0	0	151	0
127	53	1	2	130	197	1	0	152	0
128	52	1	2	138	223	0	1	169	0
129	57	1	0	140	192	0	1	148	0
130	60	0	3	150	240	0	1	171	0
131	51	0	2	130	256	0	0	149	0
132	41	1	1	135	203	0	1	132	0
133	50	1	2	129	196	0	1	163	0
134	54	1	1	108	309	0	1	156	0
135	58	0	0	170	225	1	0	146	1
136	55	0	1	132	342	0	1	166	0
137	64	0	0	180	325	0	1	154	1
138	47	1	2	138	257	0	0	156	0
139	41	1	1	110	235	0	1	153	0
140	57	1	0	152	274	0	1	88	1
141	63	0	0	124	197	0	1	136	1
142	61	1	3	134	234	0	1	145	0
143	34	1	3	118	182	0	0	174	0
144	47	1	0	112	204	0	1	143	0
145	40	1	0	110	167	0	0	114	1
146	51	0	2	120	295	0	0	157	0
147	41	1	0	110	172	0	0	158	0
148	52	1	3	152	298	1	1	178	0
149	39	1	2	140	321	0	0	182	0
150	58	1	0	114	318	0	2	140	0
151	54	1	1	192	283	0	0	195	0

id	age	sex	chest_pain_type		resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_anging
			0	1						
152	53	1			125	300			171	0
153	54	1		2	120	258	0	0	147	0
154	63	1		0	130	330	1	0	132	1
155	54	1		1	108	309	0	1	156	0
156	40	1		3	140	199	0	1	178	1
157	54	1		2	120	258	0	0	147	0
158	67	0		2	115	564	0	0	160	0
159	41	1		1	120	157	0	1	182	0
160	77	1		0	125	304	0	0	162	1
161	51	1		2	100	222	0	1	143	1
162	77	1		0	125	304	0	0	162	1
163	48	1		0	124	274	0	0	166	0
164	56	1		0	125	249	1	0	144	1
165	59	1		0	170	326	0	0	140	1
166	56	1		0	132	184	0	0	105	1
167	57	0		0	120	354	0	1	163	1
168	43	1		2	130	315	0	1	162	0
169	45	0		1	112	160	0	1	138	0
170	43	1		0	150	247	0	1	171	0
171	56	1		0	130	283	1	0	103	1
172	56	1		1	120	240	0	1	169	0
173	39	0		2	94	199	0	1	179	0
174	54	1		0	110	239	0	1	126	1
175	56	0		0	200	288	1	0	133	1
176	56	1		0	130	283	1	0	103	1
177	64	1		0	120	246	0	0	96	1
178	44	1		0	110	197	0	0	177	0
179	56	0		0	134	409	0	0	150	1
180	63	1		0	140	187	0	0	144	1
181	64	1		3	110	211	0	0	144	1
182	60	1		0	140	293	0	0	170	0
183	42	1		2	130	180	0	1	150	0
184	45	1		1	128	308	0	0	170	0
185	57	1		0	165	289	1	0	124	0
186	40	1		0	110	167	0	0	114	1
187	56	1		0	125	249	1	0	144	1
188	63	1		0	130	254	0	0	147	0
189	64	1		2	125	309	0	1	131	1
190	41	1		2	112	250	0	1	179	0
191	56	1		1	130	221	0	0	163	0
192	67	0		2	115	564	0	0	160	0
193	69	1		3	160	234	1	0	131	0



id	age	sex	chest_pain_type		resting_blood_sugar		cholesterol	fasting_blood_sugar		rest_ecg	max_heart_rate_achieved		exercise_induced_angina
			typical	atypical	normal	high		normal	high		normal	high	
194	57	1	0	1	0	150	212	0	1	1	157	160	0
195	59	1	0	1	2	150	212	1	1	1	157	160	0
196	58	1	0	1	0	100	234	0	1	1	156	159	0
197	45	1	0	1	0	115	260	0	0	0	185	188	0
198	60	0	0	1	2	102	318	0	1	1	160	163	0
199	50	1	0	1	0	144	200	0	0	0	126	129	1
200	62	0	0	1	0	124	209	0	1	1	163	166	0
201	34	1	0	1	3	118	182	0	0	0	174	177	0
202	52	1	0	1	3	152	298	1	1	1	178	181	0
203	64	1	0	1	3	170	227	0	0	0	155	158	0
204	66	0	0	1	2	146	278	0	0	0	152	155	0
205	42	1	0	1	3	148	244	0	0	0	178	181	0
206	59	1	0	1	2	126	218	1	1	1	134	137	0
207	41	1	0	1	2	112	250	0	1	1	179	182	0
208	38	1	0	1	2	138	175	0	1	1	173	176	0
209	62	1	0	1	1	120	281	0	0	0	103	106	0
210	42	1	0	1	2	120	240	1	1	1	194	197	0
211	67	1	0	1	0	100	299	0	0	0	125	128	1
212	50	1	0	1	0	150	243	0	0	0	128	131	0
213	43	1	0	1	2	130	315	0	1	1	162	165	0
214	45	1	0	1	1	128	308	0	0	0	170	173	0
215	49	1	0	1	1	130	266	0	1	1	171	174	0
216	65	1	0	1	0	135	254	0	0	0	127	130	0
217	41	1	0	1	1	120	157	0	1	1	182	185	0
218	46	1	0	1	0	140	311	0	1	1	120	123	1
219	54	1	0	1	0	122	286	0	0	0	116	119	1
220	57	0	0	1	1	130	236	0	0	0	174	177	0
221	63	1	0	1	0	130	254	0	0	0	147	150	0
222	64	1	0	1	3	110	211	0	0	0	144	147	1
223	39	0	0	1	2	94	199	0	1	1	179	182	0
224	51	1	0	1	0	140	261	0	0	0	186	189	1
225	54	1	0	1	2	150	232	0	0	0	165	168	0
226	49	1	0	1	2	118	149	0	0	0	126	129	0
227	44	0	0	1	2	118	242	0	1	1	149	152	0
228	52	1	0	1	1	128	205	1	1	1	184	187	0
229	66	0	0	1	0	178	228	1	1	1	165	168	1
230	58	1	0	1	0	125	300	0	0	0	171	174	0
231	56	1	0	1	1	120	236	0	1	1	178	181	0

id	patient_info		chest_pain_type	vitals		cholesterol	glucose		rest_ecg	max_heart_rate_achieved	exercise_induced_angina
	age	sex		resting_blood_sugar	fasting_blood_sugar		postprandial_blood_sugar	hba1c			
232	60	1	0	125	258	125	141	0	0	141	0
233	41	0	1	126	306	126	163	0	1	163	0
234	49	0	0	130	269	130	163	0	1	163	0
235	64	1	3	170	227	170	155	0	0	155	0
236	49	1	2	118	149	118	126	0	0	126	0
237	57	1	1	124	261	124	141	0	1	141	0
238	60	1	0	117	230	117	160	1	1	160	1
239	62	0	0	150	244	150	154	0	1	154	1
240	54	0	1	132	288	132	159	1	0	159	1
241	67	1	2	152	212	152	150	0	0	150	0
242	38	1	2	138	175	138	173	0	1	173	0
243	60	1	2	140	185	140	155	0	0	155	0
244	51	1	2	125	245	125	166	1	0	166	0
245	44	1	1	130	219	130	188	0	0	188	0
246	54	1	1	192	283	192	195	0	0	195	0
247	46	1	0	140	311	140	120	0	1	120	1
248	39	0	2	138	220	138	152	0	1	152	0
249	42	1	2	130	180	130	150	0	1	150	0
250	47	1	0	110	275	110	118	0	0	118	1
251	45	0	1	112	160	112	138	0	1	138	0
252	55	1	0	132	353	132	132	0	1	132	1
253	57	1	0	165	289	165	124	1	0	124	0
254	35	1	0	120	198	120	130	0	1	130	1
255	62	0	0	140	394	140	157	0	0	157	0
256	35	0	0	138	183	138	182	0	1	182	0
257	64	0	0	180	325	180	154	0	1	154	1
258	38	1	3	120	231	120	182	0	1	182	1
259	66	1	0	120	302	120	151	0	0	151	0
260	44	1	2	120	226	120	169	0	1	169	0
261	54	1	2	150	232	150	165	0	0	165	0
262	48	1	0	122	222	122	186	0	0	186	0
263	55	0	1	132	342	132	166	0	1	166	0
264	58	0	0	170	225	170	146	1	0	146	1
265	45	1	0	104	208	104	148	0	0	148	1
266	53	1	0	123	282	123	95	0	1	95	1
267	67	1	0	120	237	120	71	0	1	71	0
268	58	1	2	132	224	132	173	0	0	173	0
269	71	0	2	110	265	110	130	1	0	130	0
270	43	1	0	110	211	110	161	0	1	161	0
271	44	1	1	120	263	120	173	0	1	173	0
272	39	0	2	138	220	138	152	0	1	152	0
273	51	1	1	140	230	140	160	0	1	160	0

id	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
273	66	1	0	160	228	0	0	138	0
274	66	1	0	160	228	0	0	138	0
275	56	1	0	130	283	1	0	103	1
276	57	1	0	132	207	0	1	168	1
277	44	1	1	130	219	0	0	188	0
278	55	1	0	160	289	0	0	145	1
279	41	0	1	105	198	0	1	168	0
280	45	0	1	130	234	0	0	175	0
281	35	1	1	122	192	0	1	174	0
282	41	0	1	130	204	0	0	172	0
283	64	1	3	110	211	0	0	144	1
284	58	1	2	132	224	0	0	173	0
285	71	0	2	110	265	1	0	130	0
286	64	0	2	140	313	0	1	133	0
287	71	0	1	160	302	0	1	162	0
288	58	0	2	120	340	0	1	172	0
289	40	1	0	152	223	0	1	181	0
290	52	1	2	138	223	0	1	169	0
291	58	1	0	128	259	0	0	130	1
292	61	1	2	150	243	1	1	137	1
293	59	1	2	150	212	1	1	157	0
294	56	0	0	200	288	1	0	133	1
295	67	1	0	100	299	0	0	125	1
296	67	1	0	120	237	0	1	71	0
297	58	1	0	150	270	0	0	111	1
298	35	1	1	122	192	0	1	174	0
299	52	1	1	120	325	0	1	172	0
300	46	0	1	105	204	0	1	172	0
301	51	1	2	94	227	0	1	154	1
302	55	0	1	132	342	0	1	166	0
303	60	1	0	145	282	0	0	142	1
304	52	0	2	136	196	0	0	169	0
305	62	1	0	120	267	0	1	99	1
306	44	0	2	118	242	0	1	149	0
307	44	1	1	120	220	0	1	170	0
308	59	1	2	126	218	1	1	134	0
309	56	0	1	140	294	0	0	153	0
310	61	1	0	120	260	0	1	140	1
311	48	1	0	130	256	1	0	150	1
312	70	1	2	160	269	0	1	112	1

id	age	sex	chest_pain_type		resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
			typical	atypical						
313	40	1	0	3	140	199	0	1	178	1
314	40	1	0	3	140	199	0	1	178	1
315	42	1	0	3	148	244	0	0	178	0
316	64	0	0	2	140	313	0	1	133	0
317	63	0	0	2	135	252	0	0	172	0
318	59	1	0	0	140	177	0	1	162	1
319	53	0	0	2	128	216	0	0	115	0
320	53	0	0	0	130	264	0	0	143	0
321	48	0	0	2	130	275	0	1	139	0
322	45	1	0	0	142	309	0	0	147	1
323	66	1	0	1	160	246	0	1	120	1
324	48	1	0	1	130	245	0	0	180	0
325	56	0	0	1	140	294	0	0	153	0
326	54	1	0	1	192	283	0	0	195	0
327	57	1	0	0	150	276	0	0	112	1
328	70	1	0	0	130	322	0	0	109	0
329	53	0	0	2	128	216	0	0	115	0
330	37	0	0	2	120	215	0	1	170	0
331	63	0	0	0	108	269	0	1	169	1
332	37	1	0	2	130	250	0	1	187	0
333	54	0	0	2	110	214	0	1	158	0
334	60	1	0	0	130	206	0	0	132	1
335	58	1	0	0	150	270	0	0	111	1
336	57	1	0	2	150	126	1	1	173	0
337	54	1	0	2	125	273	0	0	152	0
338	56	1	0	2	130	256	1	0	142	1
339	60	1	0	0	130	253	0	1	144	1
340	38	1	0	2	138	175	0	1	173	0
341	44	1	0	2	120	226	0	1	169	0
342	65	0	0	2	155	269	0	1	148	0
343	52	1	0	2	172	199	1	1	162	0
344	41	1	0	1	120	157	0	1	182	0
345	66	1	0	1	160	246	0	1	120	1
346	50	1	0	0	150	243	0	0	128	0
347	54	0	0	2	108	267	0	0	167	0
348	43	1	0	0	132	247	1	0	143	1
349	62	0	0	2	130	263	0	1	97	0
350	66	1	0	0	120	302	0	0	151	0
351	50	1	0	0	144	200	0	0	126	1

id	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
352	57	1	0	110	201	0	1	126	1
353	57	1	0	110	201	0	1	126	1
354	57	1	1	124	261	0	1	141	0
355	46	0	0	138	243	0	0	152	1
356	59	1	0	164	176	1	0	90	0
357	67	1	0	160	286	0	0	108	1
358	59	1	3	134	204	0	1	162	0
359	53	0	2	128	216	0	0	115	0
360	48	1	0	122	222	0	0	186	0
361	62	1	2	130	231	0	1	146	0
362	43	0	2	122	213	0	1	165	0
363	53	1	2	130	246	1	0	173	0
364	57	0	1	130	236	0	0	174	0
365	53	1	2	130	246	1	0	173	0
366	58	1	2	112	230	0	0	165	0
367	48	1	1	110	229	0	1	168	0
368	58	1	2	105	240	0	0	154	1
369	51	1	2	110	175	0	1	123	0
370	43	0	0	132	341	1	0	136	1
371	55	1	0	132	353	0	1	132	1
372	54	0	2	110	214	0	1	158	0
373	58	1	1	120	284	0	0	160	0
374	46	0	2	142	177	0	0	160	1
375	66	1	0	160	228	0	0	138	0
376	59	1	1	140	221	0	1	164	1
377	64	0	0	130	303	0	1	122	0
378	67	1	0	120	237	0	1	71	0
379	52	1	3	118	186	0	0	190	0
380	58	1	0	146	218	0	1	105	0
381	58	1	2	132	224	0	0	173	0
382	59	1	0	110	239	0	0	142	1
383	58	1	0	150	270	0	0	111	1
384	35	1	0	126	282	0	0	156	1
385	51	1	2	110	175	0	1	123	0
386	42	0	2	120	209	0	1	173	0
387	77	1	0	125	304	0	0	162	1
388	64	1	0	120	246	0	0	96	1
389	63	1	3	145	233	1	0	150	0
390	58	0	1	136	319	1	0	152	0
391	45	1	3	110	264	0	1	132	0

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
392	51	1	2	110	175	0	1	123	0
393	62	0	0	160	164	0	0	145	0
394	63	1	0	130	330	1	0	132	1
395	66	0	2	146	278	0	0	152	0
396	68	1	2	180	274	1	0	150	1
397	40	1	0	110	167	0	0	114	1
398	66	1	0	160	228	0	0	138	0
399	63	1	3	145	233	1	0	150	0
400	49	1	2	120	188	0	1	139	0
401	71	0	0	112	149	0	1	125	0
402	70	1	1	156	245	0	0	143	0
403	46	0	1	105	204	0	1	172	0
404	61	1	0	140	207	0	0	138	1
405	56	1	2	130	256	1	0	142	1
406	58	1	2	140	211	1	0	165	0
407	58	1	0	100	234	0	1	156	0
408	46	0	0	138	243	0	0	152	1
409	46	1	2	150	231	0	1	147	0
410	41	0	1	105	198	0	1	168	0
411	56	1	0	125	249	1	0	144	1
412	57	1	0	150	276	0	0	112	1
413	70	1	0	130	322	0	0	109	0
414	59	1	3	170	288	0	0	159	0
415	41	0	1	130	204	0	0	172	0
416	54	1	2	125	273	0	0	152	0
417	52	1	2	138	223	0	1	169	0
418	62	0	0	124	209	0	1	163	0
419	65	0	2	160	360	0	0	151	0
420	57	0	0	128	303	0	0	159	0
421	42	0	0	102	265	0	0	122	0
422	57	0	0	120	354	0	1	163	1
423	58	0	1	136	319	1	0	152	0
424	45	1	0	142	309	0	0	147	1
425	51	0	0	130	305	0	1	142	1
426	54	0	2	160	201	0	1	163	0
427	57	1	2	150	168	0	1	174	0
428	43	1	0	132	247	1	0	143	1
429	47	1	2	108	243	0	1	152	0
430	67	1	2	152	212	0	0	150	0
431	65	0	0	150	225	0	0	114	0
432	60	0	2	102	318	0	1	160	0

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
433	37	1	2	130	250	0	1	187	0
434	41	0	2	112	268	0	0	172	1
435	57	0	0	120	354	0	1	163	1
436	59	0	0	174	249	0	1	143	1
437	67	1	0	120	229	0	0	129	1
438	47	1	2	130	253	0	1	179	0
439	58	1	1	120	284	0	0	160	0
440	62	0	0	150	244	0	1	154	1
441	60	1	0	140	293	0	0	170	0
442	57	1	0	152	274	0	1	88	1
443	57	1	2	150	168	0	1	174	0
444	47	1	2	130	253	0	1	179	0
445	52	1	1	128	205	1	1	184	0
446	53	1	2	130	246	1	0	173	0
447	55	1	0	160	289	0	0	145	1
448	51	0	2	120	295	0	0	157	0
449	52	1	0	112	230	0	1	160	0
450	63	0	0	150	407	0	0	154	0
451	49	0	1	134	271	0	1	162	0
452	66	0	0	178	228	1	1	165	1
453	49	0	1	134	271	0	1	162	0
454	65	0	0	150	225	0	0	114	0
455	69	1	3	160	234	1	0	131	0
456	47	1	2	108	243	0	1	152	0
457	39	0	2	138	220	0	1	152	0
458	43	1	0	150	247	0	1	171	0
459	51	1	0	140	261	0	0	186	1
460	69	1	2	140	254	0	0	146	0
461	48	1	2	124	255	1	1	175	0
462	52	1	3	118	186	0	0	190	0
463	43	1	0	110	211	0	1	161	0
464	67	0	2	115	564	0	0	160	0
465	38	1	2	138	175	0	1	173	0
466	44	1	1	130	219	0	0	188	0
467	47	1	0	110	275	0	0	118	1
468	61	1	2	150	243	1	1	137	1
469	67	1	0	160	286	0	0	108	1
470	60	0	3	150	240	0	1	171	0
471	64	0	2	140	313	0	1	133	0
472	58	0	0	130	197	0	1	131	0

id	patient_info		vitals		lab_results		clinical_data		treatment_plan		outcomes	
	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	medication_adherence	quality_of_life_score	follow_up_status
473	41	1	2	130	214	0	0	168	0	95%	7.5	Stable
474	48	1	1	110	229	0	1	168	0	80%	6.8	Improving
475	57	1	2	150	126	1	1	173	0	70%	6.2	Stable
476	57	1	0	165	289	1	0	124	0	60%	5.9	Declining
477	57	1	2	128	229	0	0	150	0	85%	7.1	Stable
478	39	1	2	140	321	0	0	182	0	90%	7.8	Stable
479	58	1	0	128	216	0	0	131	1	75%	6.5	Improving
480	51	0	0	130	305	0	1	142	1	88%	7.3	Stable
481	63	0	0	150	407	0	0	154	0	65%	5.7	Declining
482	51	1	0	140	298	0	1	122	1	78%	6.3	Improving
483	35	1	1	122	192	0	1	174	0	92%	7.9	Stable
484	65	1	0	110	248	0	0	158	0	68%	5.8	Declining
485	62	1	1	120	281	0	0	103	0	82%	7.0	Stable
486	41	1	0	110	172	0	0	158	0	98%	8.1	Stable
487	65	1	0	135	254	0	0	127	0	72%	6.1	Improving
488	54	0	1	132	288	1	0	159	1	87%	7.2	Stable
489	61	1	2	150	243	1	1	137	1	76%	6.4	Improving
490	57	0	0	128	303	0	0	159	0	63%	5.6	Declining
491	57	1	2	150	168	0	1	174	0	89%	7.4	Stable
492	64	1	2	125	309	0	1	131	1	74%	6.2	Improving
493	55	1	0	132	353	0	1	132	1	81%	7.0	Stable
494	51	1	2	125	245	1	0	166	0	77%	6.3	Improving
495	59	1	0	135	234	0	1	161	0	83%	7.1	Stable
496	68	1	2	180	274	1	0	150	1	69%	5.9	Declining
497	57	1	1	154	232	0	0	164	0	91%	7.7	Stable
498	54	1	0	140	239	0	1	160	0	86%	7.2	Stable
499	46	0	2	142	177	0	0	160	1	79%	6.6	Improving
500	71	0	0	112	149	0	1	125	0	61%	5.5	Declining
501	35	0	0	138	183	0	1	182	0	93%	7.6	Stable
502	46	0	2	142	177	0	0	160	1	84%	7.3	Stable
503	45	0	1	130	234	0	0	175	0	96%	8.0	Stable
504	47	1	2	108	243	0	1	152	0	80%	6.8	Improving
505	44	0	2	118	242	0	1	149	0	73%	6.0	Improving
506	61	1	0	120	260	0	1	140	1	88%	7.3	Stable
507	41	0	1	130	204	0	0	172	0	97%	8.0	Stable
508	56	0	0	200	288	1	0	133	1	67%	5.7	Declining
509	55	0	0	180	327	0	2	117	1	71%	6.0	Improving
510	54	0	1	132	288	1	0	159	1	85%	7.1	Stable
511	43	1	0	120	177	0	0	120	1	99%	8.2	Stable
512	44	1	0	112	290	0	0	153	0	94%	7.9	Stable
513	54	1	0	110	206	0	0	108	1	87%	7.2	Stable
514	44	1	1	120	220	0	1	170	0	90%	7.5	Stable



id	patient_info		vitals		lab_results		clinical_data		treatment_plan		follow_up	
	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	medication_prescribed	next_checkup_date	notes
515	49	1	2	120	188	0	1	139	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
516	60	1	0	130	206	0	0	132	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
517	41	0	1	105	198	0	1	168	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
518	49	1	2	120	188	0	1	139	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
519	61	1	0	148	203	0	1	161	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
520	59	1	0	140	177	0	1	162	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
521	58	1	1	125	220	0	1	144	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
522	67	0	2	152	277	0	1	172	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
523	61	1	0	148	203	0	1	161	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
524	58	1	2	112	230	0	0	165	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
525	51	0	2	130	256	0	0	149	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
526	62	0	0	160	164	0	0	145	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
527	62	0	0	124	209	0	1	163	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
528	59	1	3	178	270	0	0	145	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
529	69	1	3	160	234	1	0	131	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
530	60	0	0	150	258	0	0	157	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
531	65	0	2	155	269	0	1	148	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
532	63	0	0	124	197	0	1	136	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
533	53	0	0	138	234	0	0	160	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
534	54	0	2	108	267	0	0	167	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
535	76	0	2	140	197	0	2	116	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
536	50	0	2	120	219	0	1	158	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
537	52	1	1	120	325	0	1	172	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
538	46	1	0	120	249	0	0	144	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
539	64	1	3	170	227	0	0	155	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
540	58	1	0	128	259	0	0	130	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
541	44	1	2	140	235	0	0	180	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
542	62	0	0	140	394	0	0	157	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
543	59	1	3	134	204	0	1	162	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
544	54	1	2	125	273	0	0	152	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
545	48	1	1	110	229	0	1	168	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
546	70	1	0	130	322	0	0	109	0	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
547	67	0	0	106	223	0	1	142	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms
548	51	0	2	120	295	0	0	157	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
549	68	1	2	118	277	0	1	151	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
550	69	1	2	140	254	0	0	146	0	Aspirin, Metformin	2024-09-15	Stable, no symptoms
551	54	1	0	122	286	0	0	116	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
552	43	0	0	132	341	1	0	136	1	Atorvastatin, Nitroglycerin	2024-09-20	Mild chest pain on exertion
553	53	1	2	130	197	1	0	152	0	Aspirin, Metformin	2024-09-18	Stable, no symptoms

id	age	sex	chest_pain_type	resting_blood_sugar		cholesterol	fasting_blood_sugar		rest_ecg	max_heart_rate_achieved		exercise_induced_angina
				mmol_l	mg_dl		mmol_l	mg_dl		bpm	%_predicted	
554	58	1	0	100	180	231	5.6	100	1	150	95	0
555	67	1	0	125	225	254	6.9	123	1	163	90	0
556	59	1	0	140	252	177	7.8	139	0	162	92	1
557	48	1	0	122	222	222	5.5	99	0	186	100	0
558	39	0	2	94	169	199	5.2	94	1	179	98	0
559	67	1	0	120	216	237	5.4	97	0	71	55	0
560	58	0	0	130	234	197	6.1	110	0	131	85	0
561	65	0	2	155	279	269	7.5	135	0	148	88	0
562	42	0	2	120	216	209	5.4	97	1	173	96	0
563	44	1	0	112	201	290	5.0	90	0	153	93	0
564	56	1	0	132	237	184	5.9	105	0	105	75	1
565	53	0	0	138	246	234	6.1	110	0	160	90	0
566	50	0	0	110	198	254	4.9	88	0	159	92	0
567	41	1	2	130	234	214	5.9	105	0	168	94	0
568	54	0	2	160	288	201	7.2	129	0	163	89	0
569	42	1	2	120	216	240	5.4	97	1	194	100	0
570	54	0	2	135	243	304	6.0	108	1	170	91	0
571	60	1	0	145	261	282	6.5	117	0	142	87	1
572	34	1	3	118	212	182	5.3	95	0	174	97	0
573	44	1	0	112	201	290	5.0	90	0	153	93	0
574	60	1	0	125	225	258	5.6	100	0	141	89	1
575	43	1	0	150	270	247	6.7	120	0	171	95	0
576	52	1	3	152	274	298	6.8	122	1	178	97	0
577	70	1	0	130	234	322	5.9	105	0	109	70	0
578	62	0	0	140	252	394	6.3	113	0	157	88	0
579	58	1	0	146	263	218	6.5	117	0	105	78	0
580	46	1	1	101	182	197	4.6	83	1	156	90	0
581	44	1	2	140	252	235	6.1	110	0	180	98	0
582	55	1	1	130	234	262	5.9	105	0	155	90	0
583	43	1	0	120	216	177	5.4	97	0	120	80	1
584	55	1	0	132	237	353	5.9	105	0	132	82	1
585	40	1	3	140	252	199	6.1	110	0	178	96	1
586	64	1	2	125	225	309	5.6	100	0	131	85	1
587	59	1	0	164	295	176	7.3	130	1	90	65	0
588	61	0	0	145	261	307	6.5	117	0	146	87	1
589	54	1	0	122	222	286	5.5	99	0	116	72	1
590	74	0	1	120	216	269	5.4	97	0	121	73	1
591	63	0	0	108	194	269	4.9	88	0	169	92	1
592	70	1	2	160	288	269	7.2	129	0	112	70	1
593	63	0	0	108	194	269	4.9	88	0	169	92	1
594	64	1	0	145	261	212	6.5	117	0	132	82	0
595	61	1	0	148	266	203	6.6	119	0	161	90	0
596	59	1	1	140	252	221	6.1	110	0	164	91	1

id	age	sex	chest_pain_type		resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
			typical	atypical						
597	58	1	0	1	120	284	0	0	160	0
598	58	1	0	1	120	284	0	0	160	0
599	63	0	0	1	140	195	0	1	179	0
600	62	0	0	2	130	263	0	1	97	0
601	46	1	0	0	140	311	0	1	120	1
602	58	0	0	2	120	340	0	1	172	0
603	63	0	0	1	140	195	0	1	179	0
604	47	1	0	2	130	253	0	1	179	0
605	71	0	0	2	110	265	1	0	130	0
606	66	1	0	0	112	212	0	0	132	1
607	42	1	0	0	136	315	0	1	125	1
608	64	1	0	0	145	212	0	0	132	0
609	55	0	0	0	180	327	0	2	117	1
610	43	0	0	0	132	341	1	0	136	1
611	55	0	0	0	128	205	0	2	130	1
612	58	0	0	0	170	225	1	0	146	1
613	55	1	0	0	140	217	0	1	111	1
614	51	0	0	0	130	305	0	1	142	1
615	50	0	0	2	120	219	0	1	158	0
616	43	1	0	0	115	303	0	1	181	0
617	41	0	0	1	126	306	0	1	163	0
618	49	1	0	1	130	266	0	1	171	0
619	65	1	0	0	110	248	0	0	158	0
620	57	1	0	0	152	274	0	1	88	1
621	48	1	0	0	130	256	1	0	150	1
622	62	0	0	0	138	294	1	1	106	0
623	61	1	0	3	134	234	0	1	145	0
624	59	1	0	3	178	270	0	0	145	0
625	69	1	0	2	140	254	0	0	146	0
626	58	1	0	2	132	224	0	0	173	0
627	38	1	0	3	120	231	0	1	182	1
628	69	0	0	3	140	239	0	1	151	0
629	65	1	0	3	138	282	1	0	174	0
630	45	1	0	3	110	264	0	1	132	0
631	49	1	0	1	130	266	0	1	171	0
632	45	0	0	1	130	234	0	0	175	0
633	61	1	0	0	138	166	0	0	125	1
634	52	1	0	0	125	212	0	1	168	0
635	53	0	0	0	130	264	0	0	143	0
636	59	0	0	0	174	249	0	1	143	1

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
637	58	0	2	120	340	0	1	172	0
638	65	1	3	138	282	1	0	174	0
639	58	0	0	130	197	0	1	131	0
640	46	0	0	138	243	0	0	152	1
641	56	0	0	134	409	0	0	150	1
642	64	1	0	128	263	0	1	105	1
643	65	1	0	120	177	0	1	140	0
644	44	1	2	120	226	0	1	169	0
645	50	1	0	150	243	0	0	128	0
646	47	1	2	108	243	0	1	152	0
647	64	0	0	130	303	0	1	122	0
648	71	0	0	112	149	0	1	125	0
649	45	0	1	130	234	0	0	175	0
650	62	1	0	120	267	0	1	99	1
651	41	1	1	120	157	0	1	182	0
652	66	0	3	150	226	0	1	114	0
653	56	1	0	130	283	1	0	103	1
654	41	0	1	126	306	0	1	163	0
655	41	1	1	110	235	0	1	153	0
656	57	0	1	130	236	0	0	174	0
657	39	0	2	138	220	0	1	152	0
658	64	1	2	125	309	0	1	131	1
659	59	1	0	138	271	0	0	182	0
660	61	1	0	138	166	0	0	125	1
661	58	1	0	114	318	0	2	140	0
662	47	1	0	112	204	0	1	143	0
663	58	0	0	100	248	0	0	122	0
664	66	0	3	150	226	0	1	114	0
665	65	0	2	140	417	1	0	157	0
666	35	1	1	122	192	0	1	174	0
667	57	1	1	124	261	0	1	141	0
668	29	1	1	130	204	0	0	202	0
669	66	1	1	160	246	0	1	120	1
670	61	0	0	130	330	0	0	169	0
671	52	1	0	125	212	0	1	168	0
672	68	1	2	118	277	0	1	151	0
673	54	1	2	120	258	0	0	147	0
674	63	1	0	130	330	1	0	132	1
675	58	1	0	100	234	0	1	156	0
676	60	1	0	130	253	0	1	144	1
677	63	1	0	130	254	0	0	147	0

id	age	sex	cardiovascular		metabolic		respiratory		renal		neurological	
			chest_pain_type	resting_blood_sugar	fasting_blood_sugar	cholesterol	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
678	65	1	1	105	120	280	1	180	1	0	150	1
679	68	1	2	120	140	274	1	160	0	0	150	1
680	42	1	1	120	120	295	0	162	1	1	162	0
681	59	1	0	170	170	326	0	140	0	0	140	1
682	59	1	0	164	176	176	1	90	0	0	90	0
683	43	1	0	120	120	177	0	120	0	0	120	1
684	60	1	2	140	140	185	0	155	0	0	155	0
685	63	0	0	150	150	407	0	154	0	0	154	0
686	52	1	0	128	128	204	1	156	1	1	156	1
687	58	1	0	125	125	300	0	171	0	0	171	0
688	56	0	0	200	200	288	1	133	0	0	133	1
689	54	0	2	135	135	304	1	170	1	1	170	0
690	58	1	2	105	105	240	0	154	0	0	154	1
691	55	0	1	135	135	250	0	161	0	0	161	0
692	53	1	0	140	140	203	1	155	0	0	155	1
693	63	0	1	140	140	195	0	179	0	1	179	0
694	39	1	0	118	118	219	0	140	0	1	140	0
695	35	1	0	126	126	282	0	156	0	0	156	1
696	50	0	2	120	120	219	0	158	0	1	158	0
697	67	1	2	152	152	212	0	150	0	0	150	0
698	66	1	0	112	112	212	0	132	0	0	132	1
699	35	1	0	126	126	282	0	156	0	0	156	1
700	41	1	2	130	130	214	0	168	0	0	168	0
701	35	1	0	120	120	198	0	130	0	1	130	1
702	71	0	1	160	160	302	0	162	0	1	162	0
703	57	1	0	110	110	201	0	126	0	1	126	1
704	51	1	2	94	94	227	0	154	0	1	154	1
705	58	1	0	128	128	216	0	131	0	0	131	1
706	57	1	2	128	128	229	0	150	0	0	150	0
707	56	0	1	140	140	294	0	153	0	0	153	0
708	60	0	2	120	120	178	1	96	1	1	96	0
709	45	1	3	110	110	264	0	132	0	1	132	0
710	56	1	1	130	130	221	0	163	0	0	163	0
711	35	1	0	120	120	198	0	130	0	1	130	1
712	45	0	1	112	112	160	0	138	0	1	138	0
713	66	0	3	150	150	226	0	114	0	1	114	0
714	51	1	3	125	125	213	0	125	0	0	125	1
715	70	1	1	156	156	245	0	143	0	0	143	0
716	55	0	0	128	128	205	0	130	0	2	130	1
717	56	1	2	130	130	256	1	142	0	0	142	1

id	age	sex	cardiovascular		metabolic		respiratory		renal		neurological	
			chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	hypertension	diabetes	stroke
718	55	1	0	105	230	120	1	150	0	1	0	0
719	52	1	0	108	233	115	1	147	0	1	0	0
720	64	1	2	140	335	130	0	158	1	1	0	0
721	45	1	0	115	260	125	0	185	0	1	0	0
722	67	0	2	152	277	135	0	172	1	1	0	0
723	68	0	2	120	211	120	0	115	0	1	0	0
724	74	0	1	120	269	125	0	121	0	1	1	1
725	60	0	0	150	258	120	0	157	0	1	0	0
726	48	1	0	124	274	120	0	166	0	1	0	0
727	56	1	1	130	221	125	0	163	0	1	0	0
728	46	1	0	140	311	120	0	120	0	1	1	1
729	55	0	1	135	250	120	0	161	0	1	0	0
730	44	1	1	120	220	120	0	170	0	1	0	0
731	52	1	0	112	230	120	0	160	0	1	0	0
732	51	1	2	94	227	120	0	154	0	1	1	1
733	44	0	2	108	141	120	0	175	0	1	0	0
734	52	1	0	128	204	125	1	156	0	1	1	1
735	50	1	2	129	196	120	0	163	0	1	0	0
736	59	1	0	110	239	120	0	142	0	1	1	1
737	67	1	0	120	229	120	0	129	0	1	1	1
738	58	1	0	125	300	120	0	171	0	1	0	0
739	52	1	0	128	255	120	0	161	0	1	1	1
740	44	1	2	140	235	120	0	180	0	1	0	0
741	41	0	2	112	268	120	0	172	0	1	1	1
742	63	1	0	130	330	125	1	132	0	1	1	1
743	58	1	1	125	220	120	0	144	0	1	0	0
744	60	0	2	102	318	120	0	160	0	1	0	0
745	51	1	2	100	222	120	0	143	0	1	1	1
746	64	1	2	140	335	130	0	158	1	1	0	0
747	60	1	0	117	230	120	1	160	0	1	1	1
748	44	1	2	120	226	120	0	169	0	1	0	0
749	58	1	1	125	220	120	0	144	0	1	0	0
750	55	1	1	130	262	120	0	155	0	1	0	0
751	65	0	2	160	360	130	0	151	0	1	0	0
752	48	1	1	130	245	120	0	180	0	1	0	0
753	65	1	0	120	177	120	0	140	0	1	0	0
754	51	0	2	130	256	120	0	149	0	1	0	0
755	48	1	2	124	255	120	1	175	0	1	0	0
756	64	1	0	120	246	120	0	96	0	1	1	1
757	66	1	0	160	228	120	0	138	0	1	0	0
758	46	0	1	105	204	120	0	172	0	1	0	0

id	age	sex	chest_pain_type		resting_blood_sugar		cholesterol	fasting_blood_sugar		rest_ecg	max_heart_rate_achieved		exercise_induced_angina	
			typical	atypical	normal	abnormal	total	normal	abnormal	normal	normal	abnormal	no	yes
759	61	0			0		150	330	0	0	169		0	
760	57	1			0		150	276	0	0	112		1	
761	49	0			0		130	269	0	1	163		0	
762	56	1			1		130	221	0	0	163		0	
763	58	0			3		150	283	1	0	162		0	
764	63	1			0		140	187	0	0	144		1	
765	57	1			0		110	335	0	1	143		1	
766	57	1			0		110	335	0	1	143		1	
767	68	1			0		144	193	1	1	141		0	
768	46	1			1		101	197	1	1	156		0	
769	71	0			2		110	265	1	0	130		0	
770	41	1			1		135	203	0	1	132		0	
771	45	0			0		138	236	0	0	152		1	
772	62	0			0		150	244	0	1	154		1	
773	65	0			0		150	225	0	0	114		0	
774	48	0			2		130	275	0	1	139		0	
775	51	1			2		100	222	0	1	143		1	
776	61	0			0		145	307	0	0	146		1	
777	53	1			0		123	282	0	1	95		1	
778	59	1			3		134	204	0	1	162		0	
779	34	0			1		118	210	0	1	192		0	
780	44	1			0		120	169	0	1	144		1	
781	58	1			0		146	218	0	1	105		0	
782	64	0			0		130	303	0	1	122		0	
783	56	1			1		120	240	0	1	169		0	
784	54	1			2		150	232	0	0	165		0	
785	55	1			0		160	289	0	0	145		1	
786	67	1			0		125	254	1	1	163		0	
787	51	1			0		140	298	0	1	122		1	
788	62	0			0		138	294	1	1	106		0	
789	62	1			1		120	281	0	0	103		0	
790	54	1			0		110	239	0	1	126		1	
791	54	1			0		110	239	0	1	126		1	
792	68	1			0		144	193	1	1	141		0	
793	60	0			2		120	178	1	1	96		0	
794	61	1			3		134	234	0	1	145		0	
795	62	1			1		128	208	1	0	140		0	
796	41	1			1		135	203	0	1	132		0	
797	65	0			0		150	225	0	0	114		0	
798	59	1			3		170	288	0	0	159		0	
799	43	1			0		115	303	0	1	181		0	
800	67	1			0		120	229	0	0	129		1	

id	age	sex	cardiovascular		metabolic		respiratory		renal		neurological	
			chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina	creatinine	gcs	consciousness
802	63	0	0	124	197	0	1	136	1	1.2	15	1
803	52	1	0	112	230	0	1	160	0	1.1	14	0
804	58	0	0	130	197	0	1	131	0	1.3	16	0
805	53	1	0	142	226	0	0	111	1	1.4	17	1
806	57	1	0	150	276	0	0	112	1	1.5	18	1
807	44	1	2	130	233	0	1	179	1	1.6	19	1
808	51	1	2	94	227	0	1	154	1	1.7	20	1
809	54	0	2	110	214	0	1	158	0	1.8	21	0
810	40	1	0	110	167	0	0	114	1	1.9	22	1
811	57	1	1	124	261	0	1	141	0	2.0	23	0
812	62	0	0	140	268	0	0	160	0	2.1	24	0
813	53	1	0	140	203	1	0	155	1	2.2	25	1
814	62	1	1	128	208	1	0	140	0	2.3	26	0
815	58	1	2	105	240	0	0	154	1	2.4	27	1
816	70	1	1	156	245	0	0	143	0	2.5	28	0
817	45	1	0	115	260	0	0	185	0	2.6	29	0
818	42	1	3	148	244	0	0	178	0	2.7	30	0
819	58	0	0	170	225	1	0	146	1	2.8	31	1
820	61	1	0	140	207	0	0	138	1	2.9	32	1
821	62	0	0	140	268	0	0	160	0	3.0	33	0
822	60	1	0	130	253	0	1	144	1	3.1	34	1
823	54	1	0	140	239	0	1	160	0	3.2	35	0
824	61	1	0	138	166	0	0	125	1	3.3	36	1
825	63	0	2	135	252	0	0	172	0	3.4	37	0
826	42	1	2	130	180	0	1	150	0	3.5	38	0
827	57	1	2	128	229	0	0	150	0	3.6	39	0
828	44	1	2	130	233	0	1	179	1	3.7	40	1
829	54	1	0	124	266	0	0	109	1	3.8	41	1
830	51	1	2	100	222	0	1	143	1	3.9	42	1
831	58	1	1	125	220	0	1	144	0	4.0	43	0
832	68	1	2	118	277	0	1	151	0	4.1	44	0
833	55	1	0	140	217	0	1	111	1	4.2	45	1
834	42	1	0	136	315	0	1	125	1	4.3	46	1
835	49	1	2	118	149	0	0	126	0	4.4	47	0
836	53	0	0	138	234	0	0	160	0	4.5	48	0
837	52	1	2	172	199	1	1	162	0	4.6	49	0
838	51	1	3	125	213	0	0	125	1	4.7	50	1
839	51	1	0	140	261	0	0	186	1	4.8	51	1
840	70	1	0	145	174	0	1	125	1	4.9	52	1
841	35	0	0	138	183	0	1	182	0	5.0	53	0
842	58	1	2	112	230	0	0	165	0	5.1	54	0



	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
843	59	1	3	160	273	0	0	125	0
844	60	1	0	140	293	0	0	170	0
845	56	1	0	132	184	0	0	105	1
846	35	0	0	138	183	0	1	182	0
847	61	1	0	138	166	0	0	125	1
848	58	0	3	150	283	1	0	162	0
849	52	1	0	128	255	0	1	161	1
850	58	1	1	120	284	0	0	160	0
851	37	1	2	130	250	0	1	187	0
852	52	1	0	128	255	0	1	161	1
853	67	1	0	120	229	0	0	129	1
854	65	1	3	138	282	1	0	174	0
855	46	1	1	101	197	1	1	156	0
856	68	0	2	120	211	0	0	115	0
857	43	1	0	115	303	0	1	181	0
858	68	0	2	120	211	0	0	115	0
859	51	1	0	140	299	0	1	173	1
860	52	1	0	112	230	0	1	160	0
861	64	1	2	140	335	0	1	158	0
862	59	1	3	170	288	0	0	159	0
863	52	1	0	125	212	0	1	168	0
864	59	1	3	160	273	0	0	125	0
865	60	0	3	150	240	0	1	171	0
866	41	1	2	112	250	0	1	179	0
867	41	1	1	110	235	0	1	153	0
868	56	1	1	120	240	0	1	169	0
869	56	1	1	120	236	0	1	178	0
870	48	0	2	130	275	0	1	139	0
871	39	1	2	140	321	0	0	182	0
872	64	1	3	170	227	0	0	155	0
873	57	1	0	140	192	0	1	148	0
874	59	1	3	160	273	0	0	125	0
875	60	1	0	130	206	0	0	132	1
876	61	1	0	140	207	0	0	138	1
877	43	0	2	122	213	0	1	165	0
878	54	1	0	120	188	0	1	113	0
879	59	1	0	138	271	0	0	182	0
880	57	1	0	132	207	0	1	168	1

id	age	sex	chest_pain_type		resting_blood_sugar	cholesterol	fasting_blood_sugar		rest_ecg	max_heart_rate_achieved	exercise_induced_angina
			typical	atypical			normal	abnormal			
881	57	1	0	0	130	131	0	1	0	115	1
882	57	1	0	0	130	131	0	1	0	115	1
883	48	1	0	0	124	274	0	0	0	166	0
884	70	1	0	0	145	174	0	1	0	125	1
885	57	1	0	0	165	289	1	0	0	124	0
886	61	1	0	0	120	260	0	1	0	140	1
887	57	1	0	0	110	201	0	1	0	126	1
888	60	0	0	0	150	258	0	0	0	157	0
889	63	0	0	0	150	407	0	0	0	154	0
890	55	0	0	0	128	205	0	2	0	130	1
891	64	0	0	0	180	325	0	1	0	154	1
892	54	1	0	0	110	239	0	1	0	126	1
893	52	1	0	0	128	204	1	1	0	156	1
894	51	1	0	0	140	299	0	1	0	173	1
895	62	0	2	2	130	263	0	1	0	97	0
896	59	1	3	3	178	270	0	0	0	145	0
897	52	1	1	1	134	201	0	1	0	158	0
898	42	0	0	0	102	265	0	0	0	122	0
899	59	1	0	0	135	234	0	1	0	161	0
900	61	1	3	3	134	234	0	1	0	145	0
901	42	0	0	0	102	265	0	0	0	122	0
902	62	0	0	0	140	268	0	0	0	160	0
903	59	1	2	2	126	218	1	1	0	134	0
904	55	1	1	1	130	262	0	1	0	155	0
905	64	1	0	0	120	246	0	0	0	96	1
906	42	1	0	0	140	226	0	1	0	178	0
907	50	0	1	1	120	244	0	1	0	162	0
908	62	1	0	0	120	267	0	1	0	99	1
909	50	1	0	0	144	200	0	0	0	126	1
910	50	1	2	2	140	233	0	1	0	163	0
911	58	0	1	1	136	319	1	0	0	152	0
912	35	1	0	0	120	198	0	1	0	130	1
913	45	1	0	0	104	208	0	0	0	148	1
914	66	1	0	0	112	212	0	0	0	132	1
915	46	1	0	0	120	249	0	0	0	144	0
916	65	1	0	0	135	254	0	0	0	127	0
917	47	1	2	2	130	253	0	1	0	179	0
918	59	1	3	3	134	204	0	1	0	162	0
919	38	1	3	3	120	231	0	1	0	182	1
920	39	1	0	0	118	219	0	1	0	140	0
921	58	1	0	0	146	218	0	1	0	105	0
922	44	1	1	1	120	263	0	1	0	173	0
923	54	1	0	0	140	239	0	1	0	160	0
924	61	0	0	0	130	330	0	0	0	169	0
925	57	1	0	0	130	131	0	1	0	115	1

id	age	sex	chest_pain_type		resting_blood_sugar		cholesterol	fasting_blood_sugar		rest_ecg	max_heart_rate_achieved		exercise_induced_angina	
			typical	atypical	normal	abnormal	total	normal	abnormal	normal	normal	abnormal	no	yes
926	54	1			0		110		206	0		108		1
927	42	1		2			120		240	1		194		0
928	54	1		0			124		266	0		109		1
929	60	1		0			130		206	0		132		1
930	65	1		0			135		254	0		127		0
931	40	1		0			152		223	0	1	181		0
932	51	0		2			140		308	0		142		0
933	38	1		3			120		231	0	1	182		1
934	42	1		2			130		180	0	1	150		0
935	56	1		1			120		240	0	1	169		0
936	43	1		2			130		315	0	1	162		0
937	64	1		2			140		335	0	1	158		0
938	53	1		0			142		226	0		111		1
939	49	0		1			134		271	0	1	162		0
940	57	0		0			140		241	0	1	123		1
941	52	0		2			136		196	0		169		0
942	69	0		3			140		239	0	1	151		0
943	65	1		0			120		177	0	1	140		0
944	66	0		0			178		228	1	1	165		1
945	56	1		3			120		193	0		162		0
946	67	0		2			152		277	0	1	172		0
947	54	0		2			160		201	0	1	163		0
948	70	1		0			145		174	0	1	125		1
949	57	1		0			132		207	0	1	168		1
950	67	1		0			160		286	0		108		1
951	62	0		2			130		263	0	1	97		0
952	54	0		2			135		304	1	1	170		0
953	45	0		0			138		236	0		152		1
954	53	0		0			130		264	0		143		0
955	62	1		2			130		231	0	1	146		0
956	49	0		0			130		269	0	1	163		0
957	50	1		2			140		233	0	1	163		0
958	65	0		2			140		417	1		157		0
959	69	0		3			140		239	0	1	151		0
960	52	0		2			136		196	0		169		0
961	58	0		0			100		248	0		122		0
962	52	1		0			108		233	1	1	147		0
963	57	0		0			140		241	0	1	123		1
964	44	0		2			108		141	0	1	175		0
965	76	0		2			140		197	0	2	116		0

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
966	58	1	0	128	259	0	0	130	1
967	60	0	2	120	178	1	1	96	0
968	53	1	0	140	203	1	0	155	1
969	52	1	1	120	325	0	1	172	0
970	38	1	2	138	175	0	1	173	0
971	52	1	2	172	199	1	1	162	0
972	52	1	3	118	186	0	0	190	0
973	51	1	2	125	245	1	0	166	0
974	43	1	0	110	211	0	1	161	0
975	39	1	0	118	219	0	1	140	0
976	63	0	0	108	269	0	1	169	1
977	52	1	1	128	205	1	1	184	0
978	44	1	0	110	197	0	0	177	0
979	45	1	0	142	309	0	0	147	1
980	57	1	0	140	192	0	1	148	0
981	39	1	0	118	219	0	1	140	0
982	67	0	0	106	223	0	1	142	0
983	64	1	0	128	263	0	1	105	1
984	59	1	0	135	234	0	1	161	0
985	62	1	2	130	231	0	1	146	0
986	55	0	0	180	327	0	2	117	1
987	57	1	1	154	232	0	0	164	0
988	60	1	0	140	293	0	0	170	0
989	71	0	1	160	302	0	1	162	0
990	56	1	1	120	236	0	1	178	0
991	60	1	0	117	230	1	1	160	1
992	50	0	0	110	254	0	0	159	0
993	43	1	0	132	247	1	0	143	1
994	59	1	0	110	239	0	0	142	1
995	44	1	1	120	263	0	1	173	0
996	56	0	0	134	409	0	0	150	1
997	54	1	0	120	188	0	1	113	0
998	42	1	0	136	315	0	1	125	1
999	67	1	0	125	254	1	1	163	0
1000	64	1	0	145	212	0	0	132	0
1001	42	1	0	140	226	0	1	178	0
1002	66	1	0	112	212	0	0	132	1
1003	52	1	0	108	233	1	1	147	0
1004	51	0	2	140	308	0	0	142	0
1005	55	0	0	128	205	0	2	130	1
1006	58	1	2	140	211	1	0	165	0
1007	56	1	3	120	193	0	0	162	0
1008	42	1	1	120	295	0	1	162	0
1009	40	1	0	152	223	0	1	181	0

	age	sex	chest_pain_type	resting_blood_sugar	cholesterol	fasting_blood_sugar	rest_ecg	max_heart_rate_achieved	exercise_induced_angina
1010	45	1	1	128	308	0	0	170	0
1011	48	1	1	110	229	0	1	168	0
1012	58	1	0	114	318	0	2	140	0
1013	44	0	2	108	141	0	1	175	0
1014	58	1	0	128	216	0	0	131	1
1015	65	1	3	138	282	1	0	174	0
1016	53	1	0	123	282	0	1	95	1
1017	41	1	0	110	172	0	0	158	0
1018	47	1	0	112	204	0	1	143	0
1019	59	1	1	140	221	0	1	164	1
1020	60	1	0	125	258	0	0	141	1
1021	47	1	0	110	275	0	0	118	1
1022	50	0	0	110	254	0	0	159	0
1023	54	1	0	120	188	0	1	113	0

```
In []: df.to_csv("D:\\Unified_Internship\\My_projectWork\\Project3(heart)Heart Disease Diagnostic.csv",index = False)
```