```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```python
df = pd.read_csv('C:\\Users\hp\Downloads\\heart.csv')
df.head()
```

```
<>:1: SyntaxWarning: invalid escape sequence '\h'
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C:\Users\hp\AppData\Local\Temp\ipykernel_30472\2915297109.py:1: SyntaxWarning: invalid escape sequence '\h'
  df = pd.read_csv('C:\\Users\hp\Downloads\\heart.csv')
```

	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

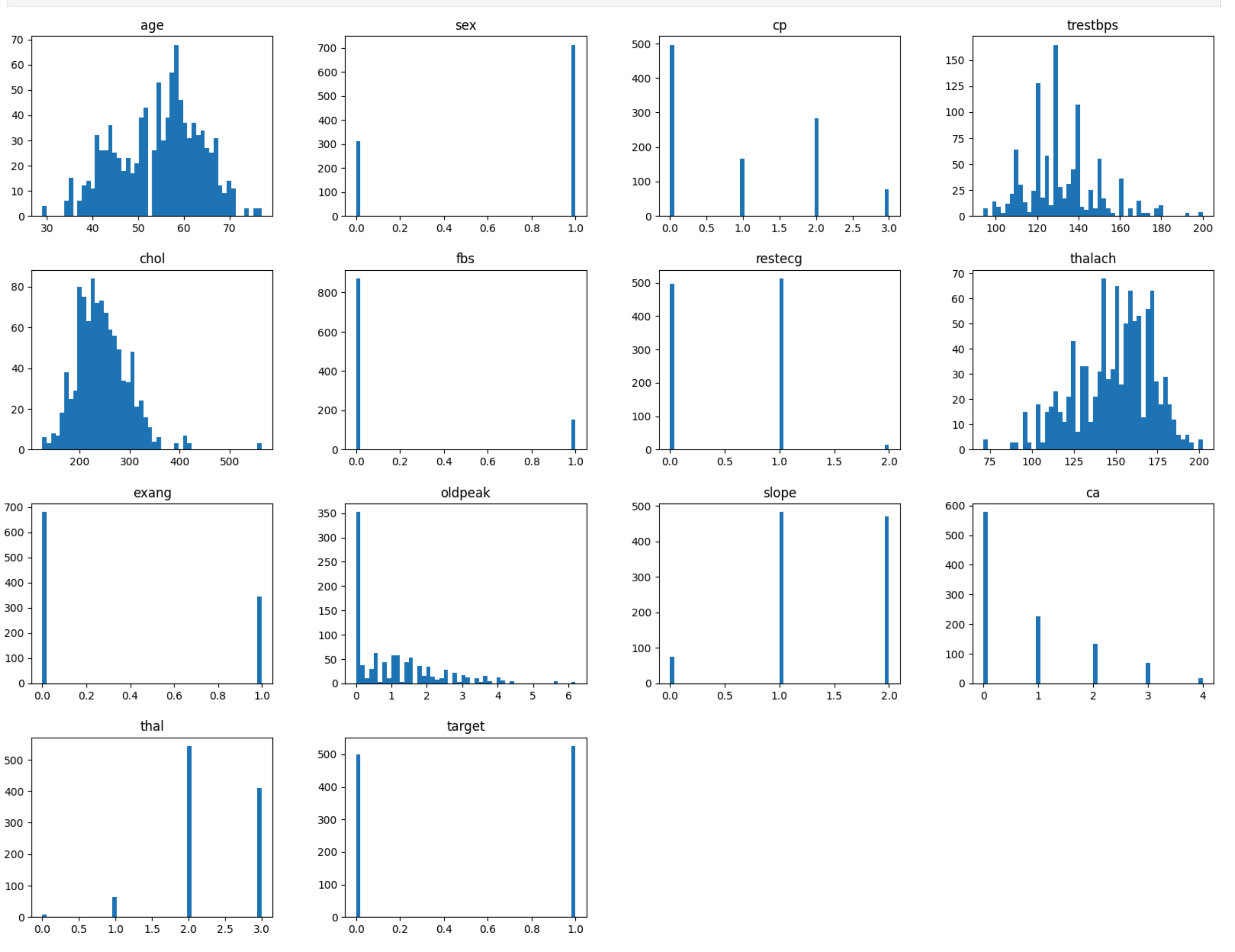
```python
df.isna().sum()
```

```
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
```

```python
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
```

```python
df.hist(bins=50, grid=False, figsize=(20,15));
```




```python
df.describe()
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
count	1025.000000	1025.000000	1025.000000	1025.000000	1025.00000	1025.000000	1025.000000	1025.000000	1025.000000	1025.000000	1025.000000	1025.000000	1025.000000	1025.000000
mean	54.434146	0.695610	0.942439	131.611707	246.00000	0.149268	0.529756	149.114146	0.336585	1.071512	1.385366	0.754146	2.323902	0.513171
std	9.072290	0.460373	1.029641	17.516718	51.59251	0.356527	0.527878	23.005724	0.472772	1.175053	0.617755	1.030798	0.620660	0.500070
min	29.000000	0.000000	0.000000	94.000000	126.00000	0.000000	0.000000	71.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	48.000000	0.000000	0.000000	120.000000	211.00000	0.000000	0.000000	132.000000	0.000000	0.000000	1.000000	0.000000	2.000000	0.000000
50%	56.000000	1.000000	1.000000	130.000000	240.00000	0.000000	1.000000	152.000000	0.000000	0.800000	1.000000	0.000000	2.000000	1.000000
75%	61.000000	1.000000	2.000000	140.000000	275.00000	0.000000	1.000000	166.000000	1.000000	1.800000	2.000000	1.000000	3.000000	1.000000
max	77.000000	1.000000	3.000000	200.000000	564.00000	1.000000	2.000000	202.000000	1.000000	6.200000	2.000000	4.000000	3.000000	1.000000

Questions =

1. How many people have heart disease and how many prople doesn't have heart disease?
2. People of which sex has most heart disease?
3. People of which sex has which type of chest pain most?
4. People with which chest pain are most prob to have heart disease?

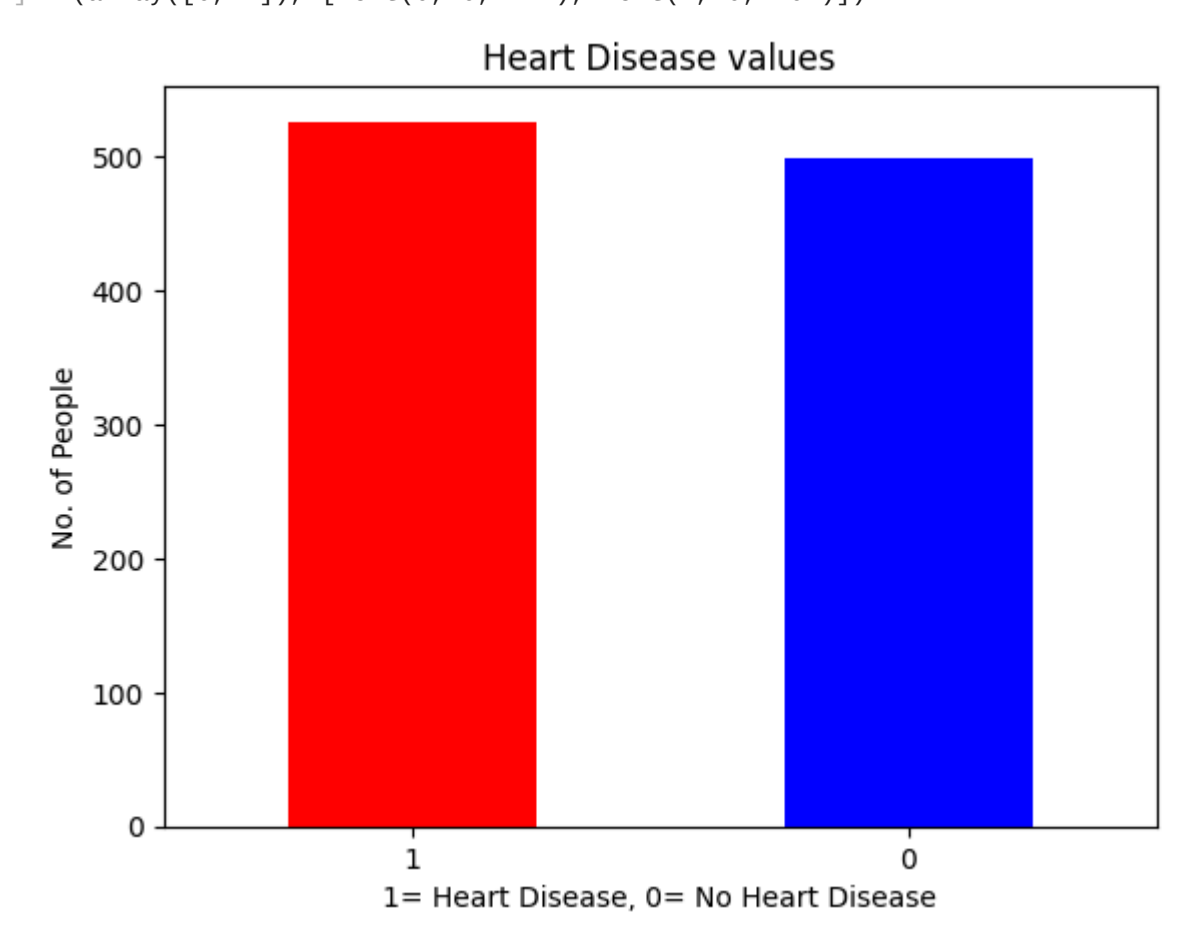
```python
# 1. How many people have heart disease and how many prople doesn't have heart disease?

df.target.value_counts()
```

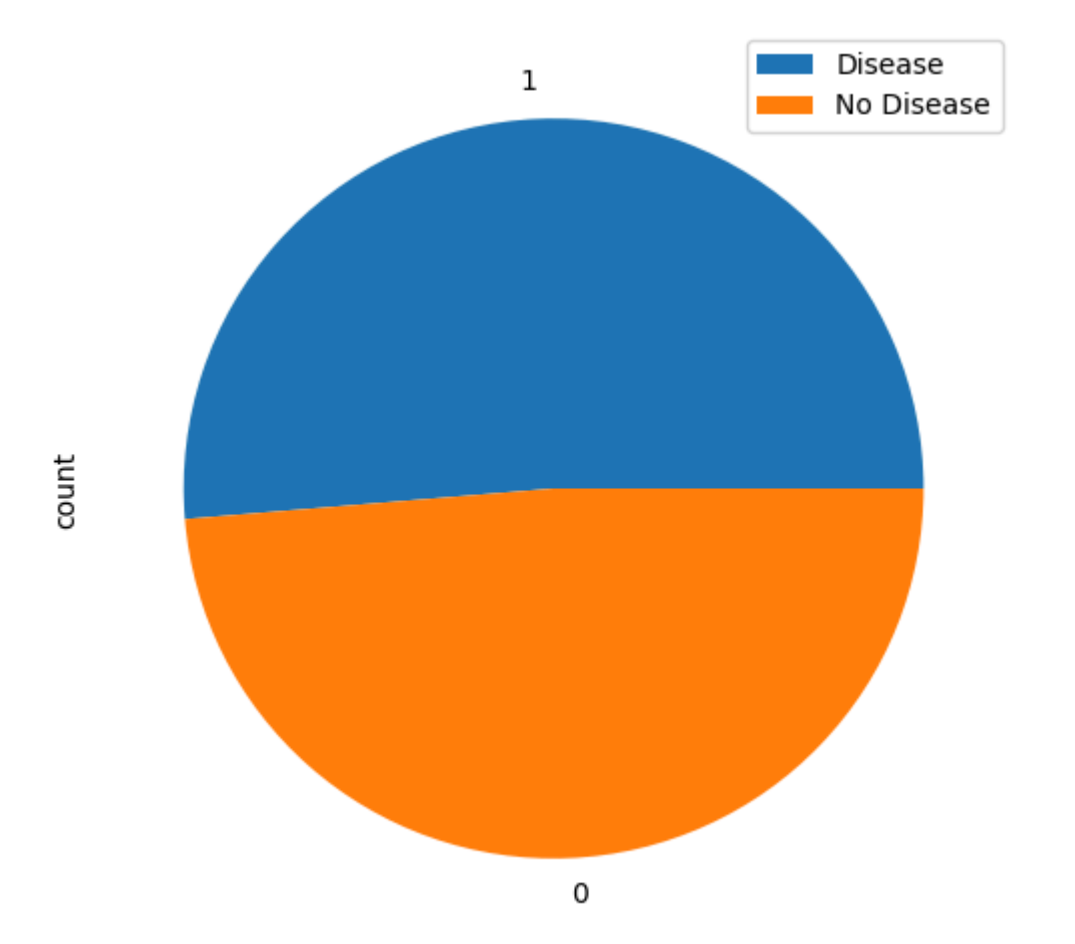
```
target
1    526
0    499
Name: count, dtype: int64
```

```python
df.target.value_counts().plot(kind= 'bar', color = ['red', 'blue'])
plt.title("Heart Disease values")
plt.xlabel("1= Heart Disease, 0= No Heart Disease")
plt.ylabel("No. of People")
plt.xticks(rotation=0)
```

```
(array([0, 1]), [Text(0, 0, '1'), Text(1, 0, '0')])
```




```python
#Ploting a pie chart
df.target.value_counts().plot(kind= 'pie', figsize= (8,6))
plt.legend(["Disease", "No Disease"]);
```



2. People of which sex has most heart disease?

```python
df.sex.value_counts()  #0 represent Female & 1 represent Male
```

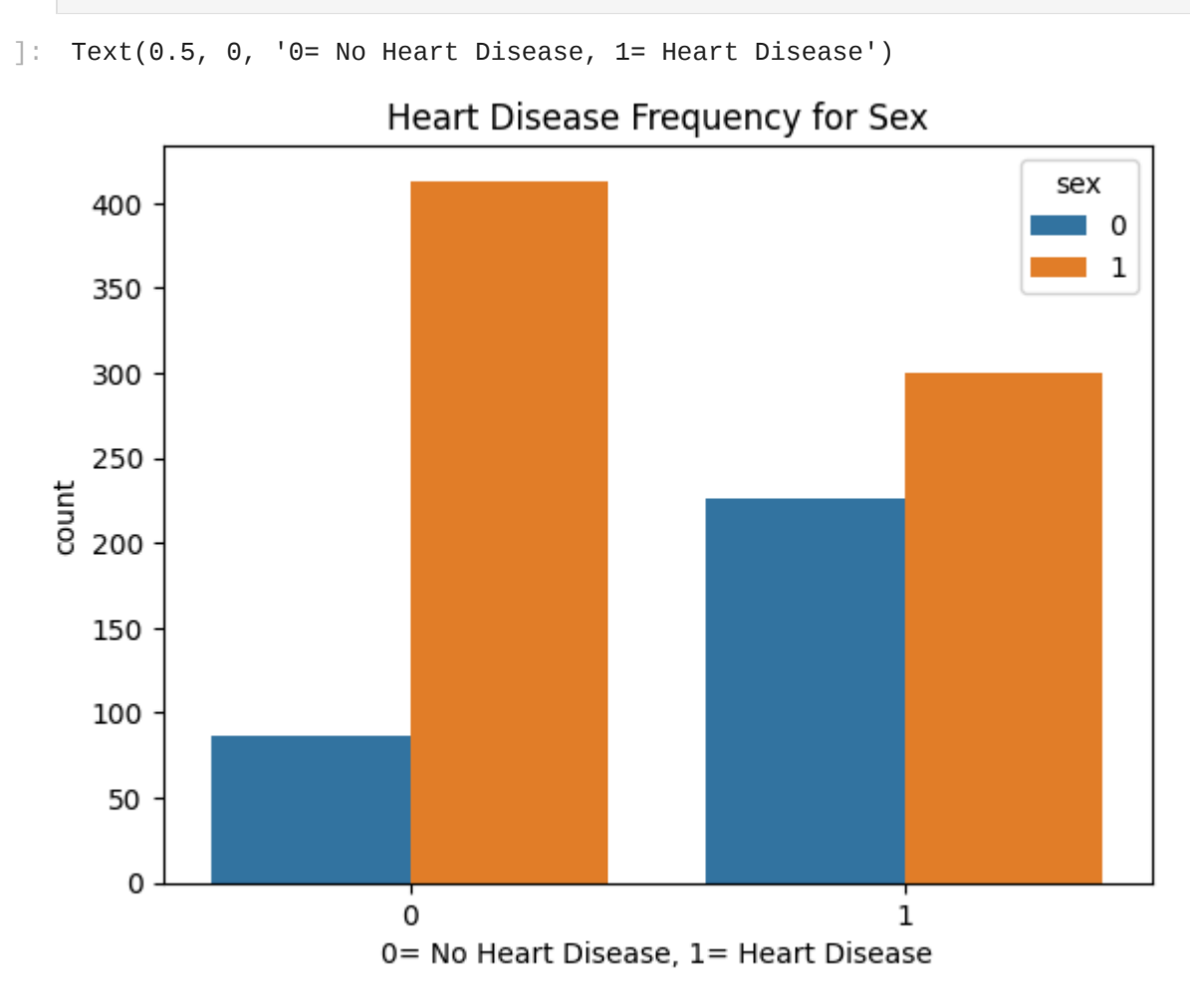
```
sex
1    713
0    312
Name: count, dtype: int64
```

```python
pd.crosstab(df.target, df.sex)
```

sex	0	1
target		
0	86	413
1	226	300

```python
sns.countplot( x= 'target', data= df, hue = 'sex')
plt.title("Heart Disease Frequency for Sex")
plt.xlabel("0= No Heart Disease, 1= Heart Disease")
```

```
Text(0.5, 0, '0= No Heart Disease, 1= Heart Disease')
```

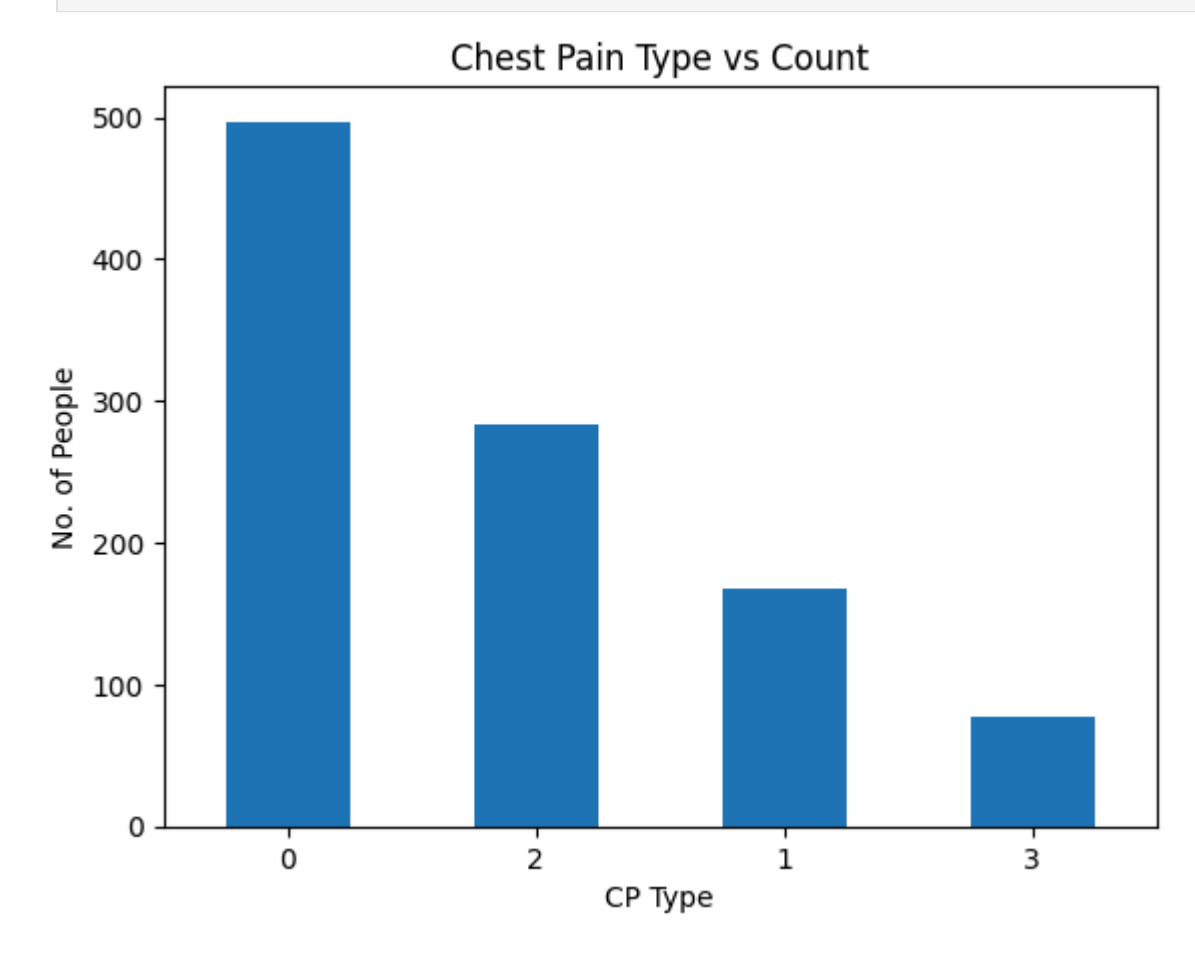


3. People of which sex has which type of chest pain most?

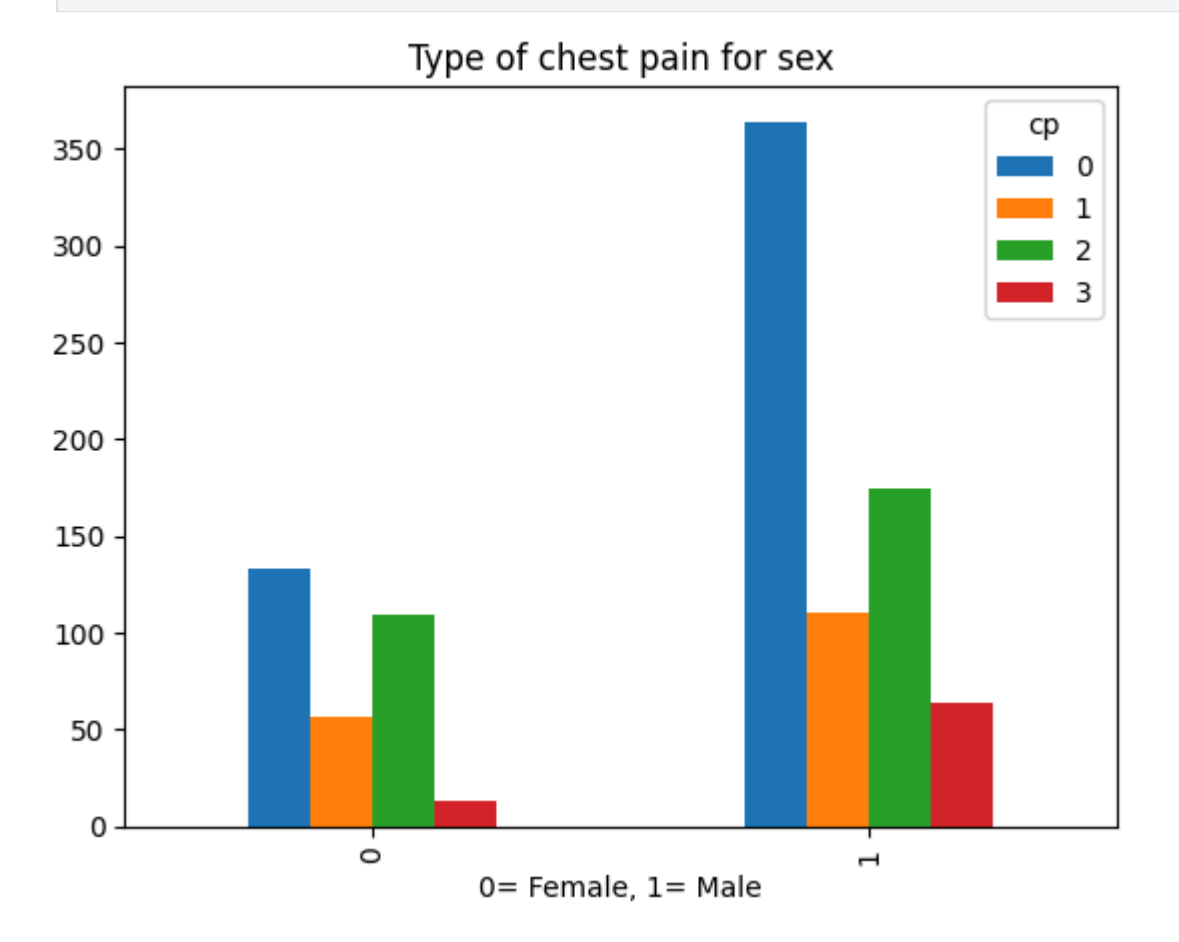
```python
df.cp.value_counts()
```

```
cp
0    497
2    284
1    167
3     77
Name: count, dtype: int64
```

```python
#plotting bar chart
df.cp.value_counts().plot(kind='bar')
plt.title("Chest Pain Type vs Count")
plt.xlabel("CP Type")
plt.ylabel("No. of People")
plt.xticks(rotation = 0);
```




```python
pd.crosstab(df.sex, df.cp).plot(kind='bar')
plt.title("Type of chest pain for sex")
plt.xlabel("0= Female, 1= Male");
```

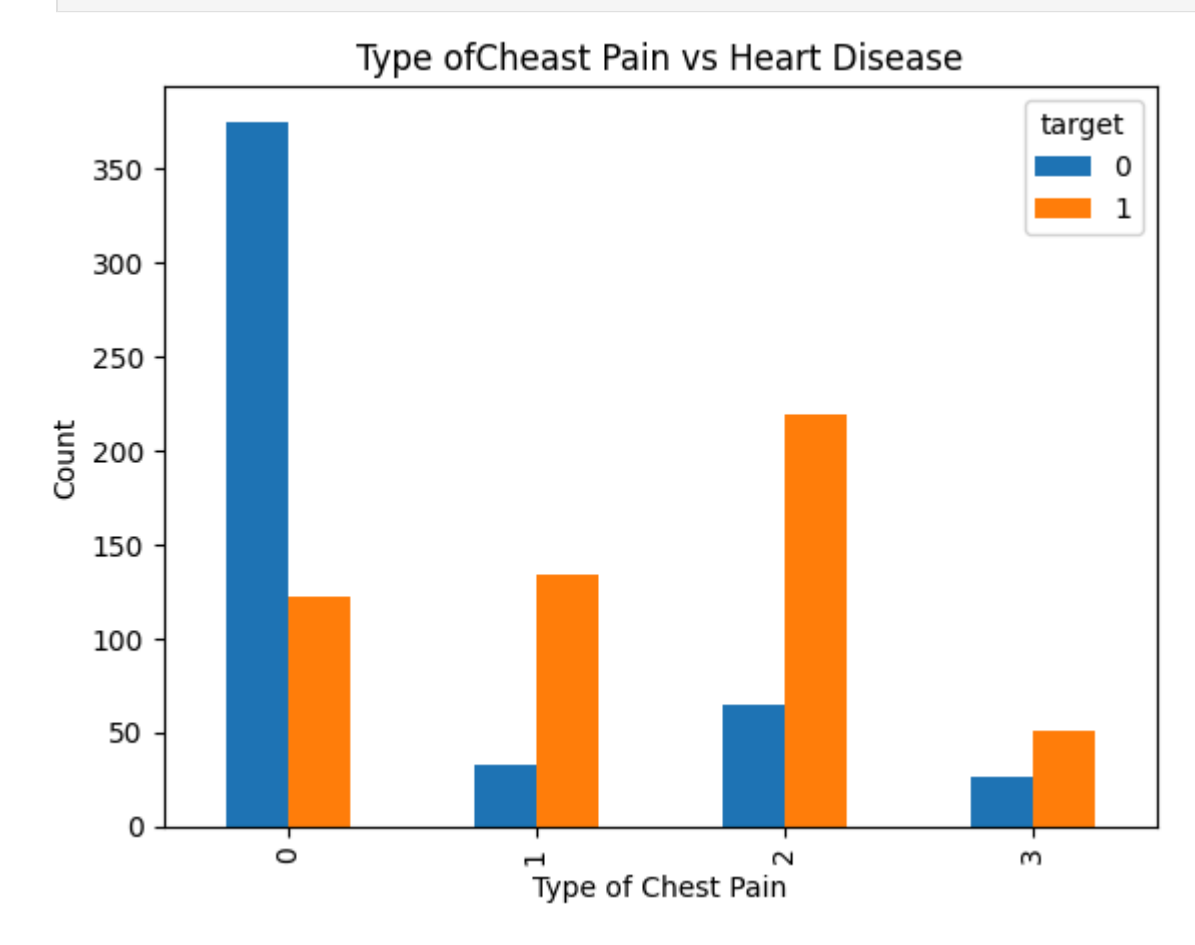


4. People with which chest pain are most prob to have heart disease?

```python
pd.crosstab(df.cp,df.target)
```

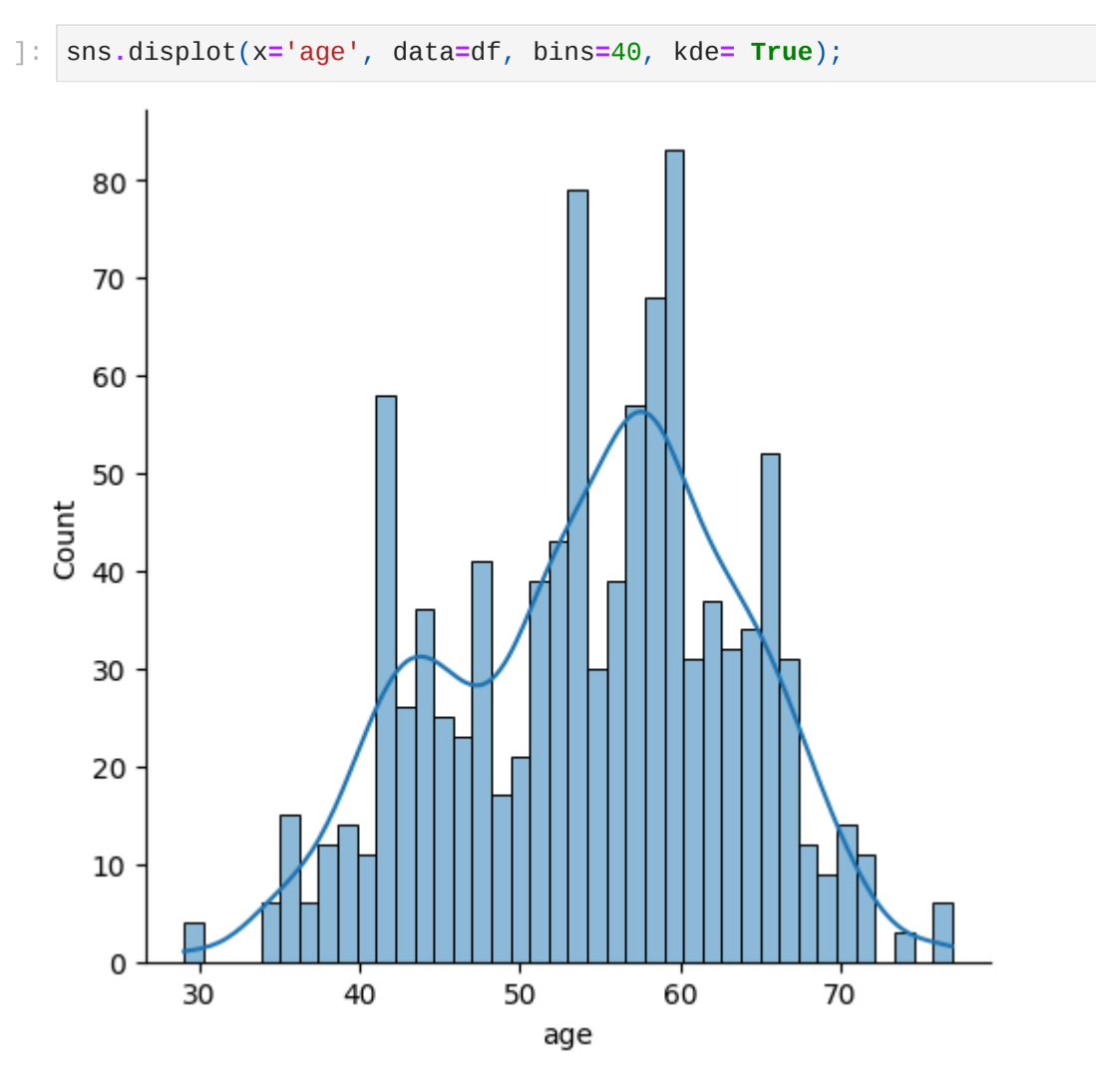
target	0	1
cp		
0	375	122
1	33	134
2	65	219
3	26	51

```python
pd.crosstab(df.cp, df.target).plot(kind='bar')
plt.title("Type ofCheast Pain vs Heart Disease")
plt.xlabel("Type of Chest Pain")
plt.ylabel("Count");
```



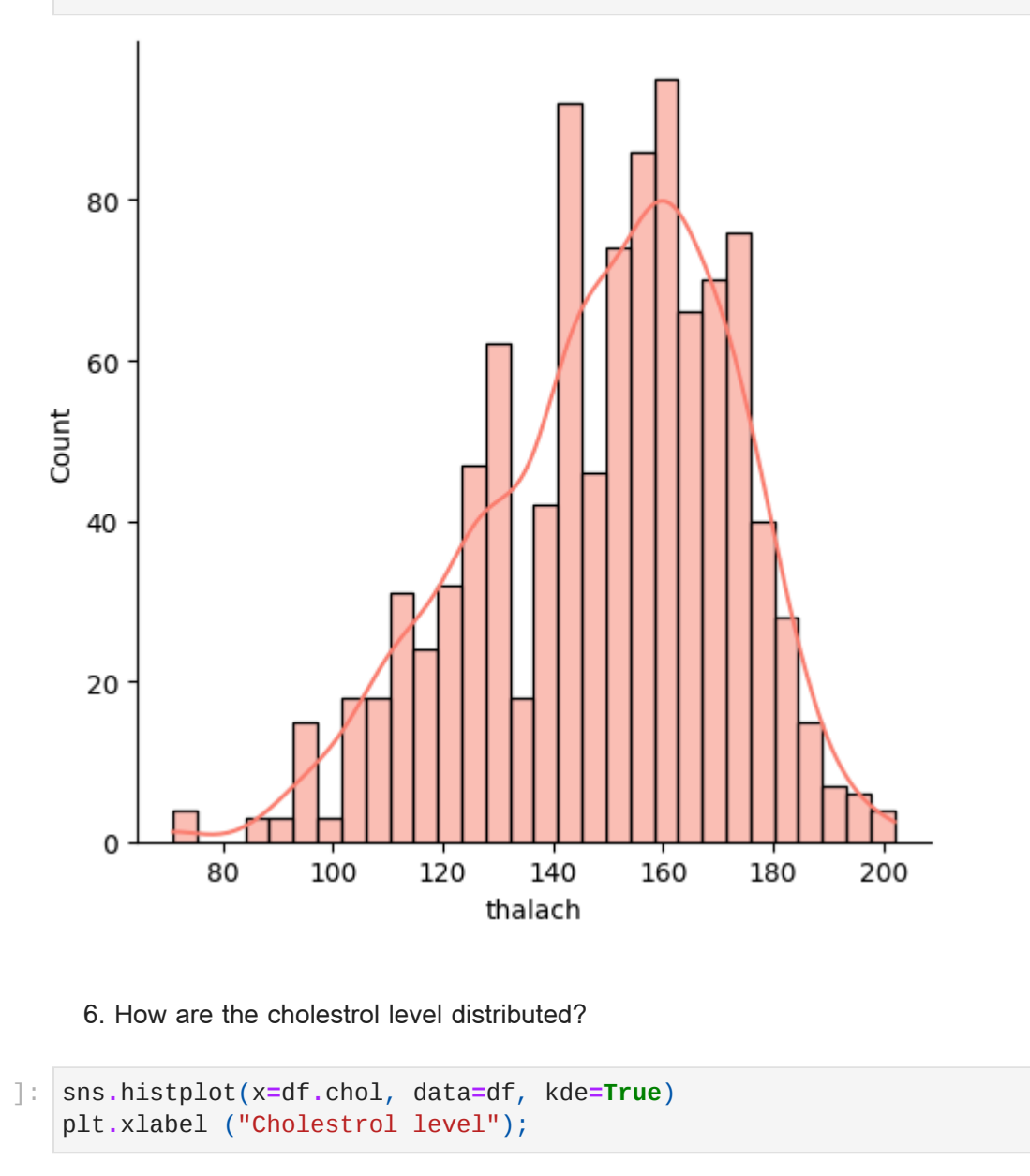
5. How the age is distributed in dataset?

```python
sns.displot(x='age', data=df, bins=40, kde= True);
```



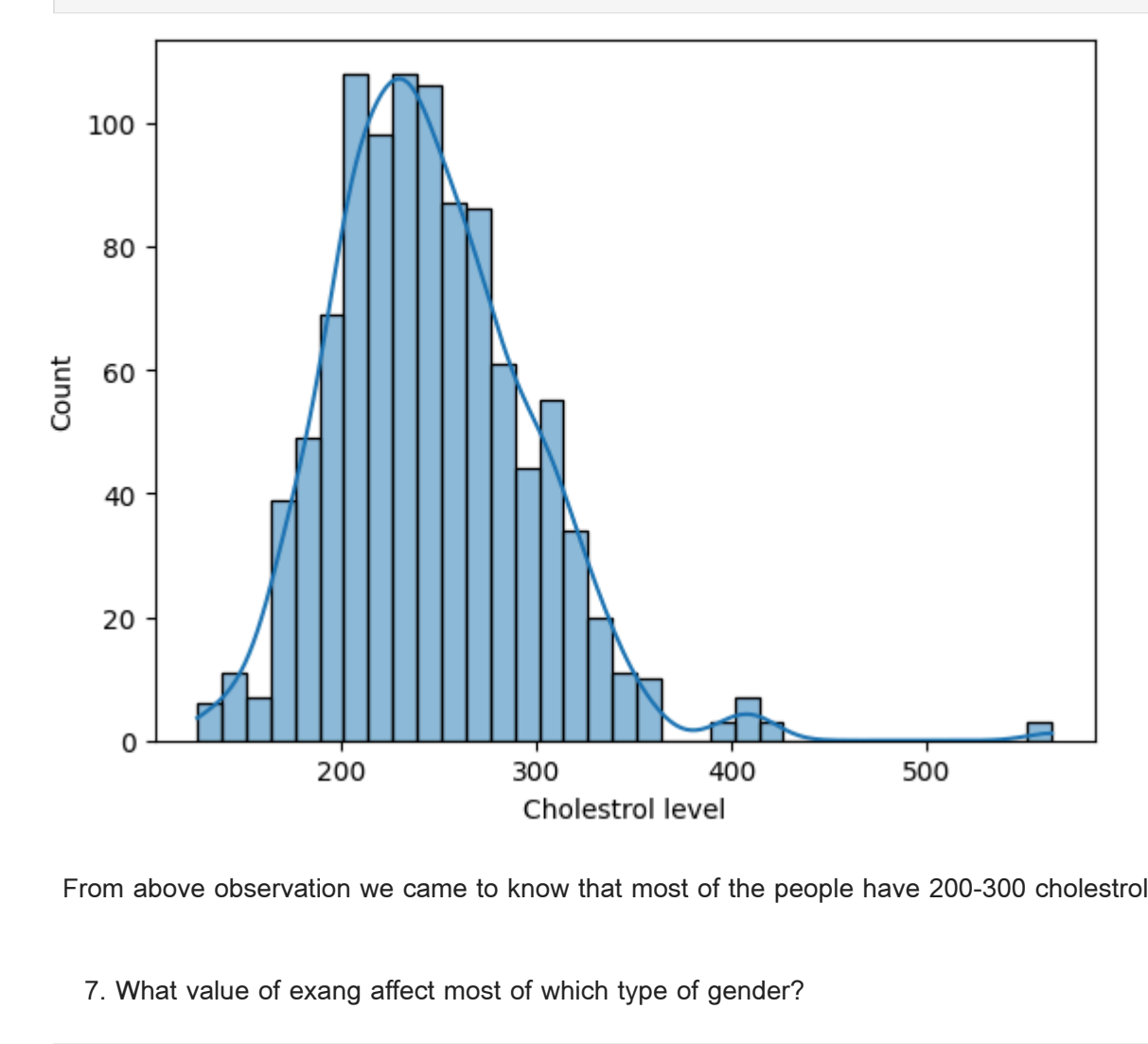
From above distribution plot we came to know that 50-60 year old people are most in the dataset.

```python
#distribution plot for 'Maximum heart rate'
sns.displot(x='thalach', data= df, bins=30, kde= True, color= 'salmon');
```



6. How are the cholestrol level distributed?

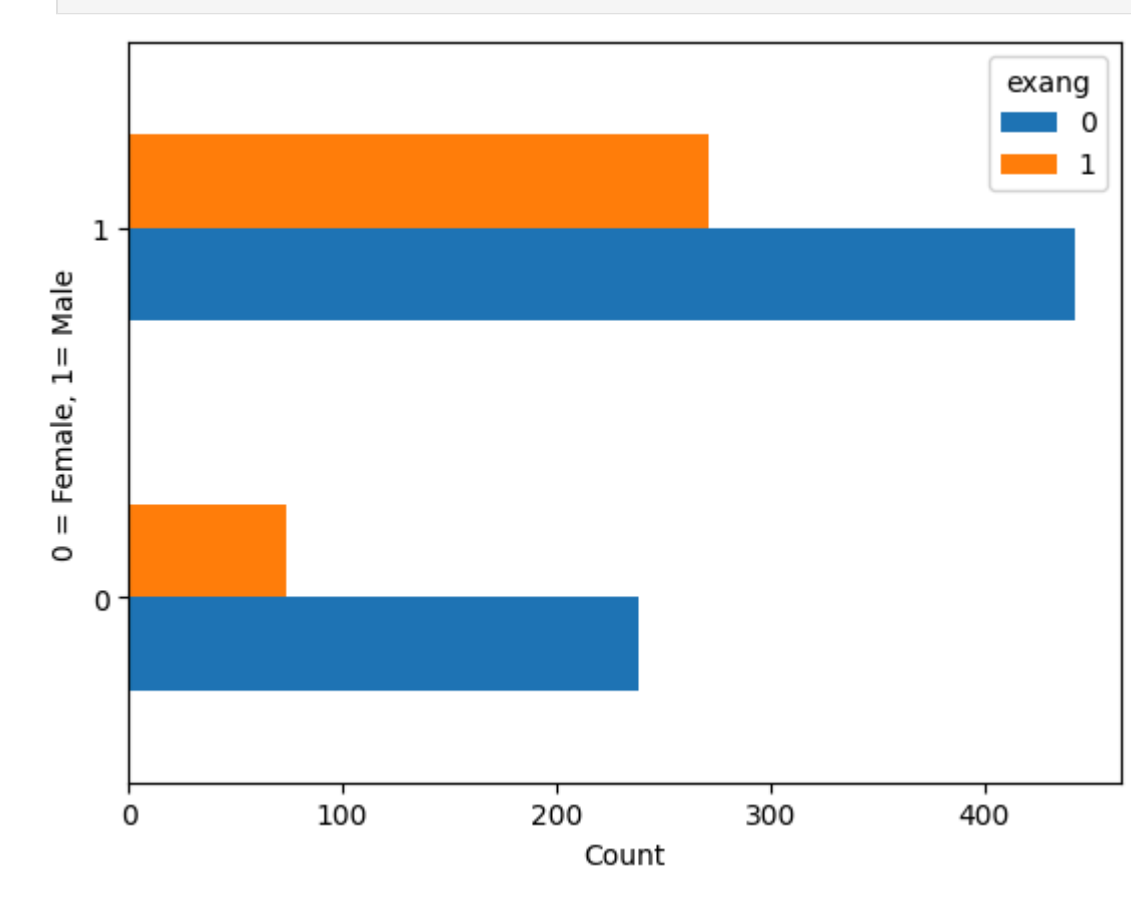
```python
sns.histplot(x=df.chol, data=df, kde=True)
plt.xlabel ("Cholestrol level");
```



From above observation we came to know that most of the people have 200-300 cholestrol level.

7. What value of exang affect most of which type of gender?

```python
pd.crosstab(df.sex, df.exang).plot(kind='barh')
plt.xlabel('Count')
plt.ylabel('0 = Female, 1= Male');
```



8. What is the distribution of 'trestbps' among dataset?

```python
sns.displot(x='trestbps', data= df, kde=True, bins=30)
plt.xlabel('Trestbps')
plt.ylabel('Count');
```