In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [4]:
```
df = pd.read_csv('heart.csv')
```

In [5]:
```
df.head()
```

Out[5]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	tar
0	52	1	0	125	212	0	1	168	0	1.0	2	2	3	
1	53	1	0	140	203	1	0	155	1	3.1	0	0	3	
2	70	1	0	145	174	0	1	125	1	2.6	0	0	3	
3	61	1	0	148	203	0	1	161	0	0.0	2	1	3	
4	62	0	0	138	294	1	1	106	0	1.9	1	3	2	

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

Out[6]:

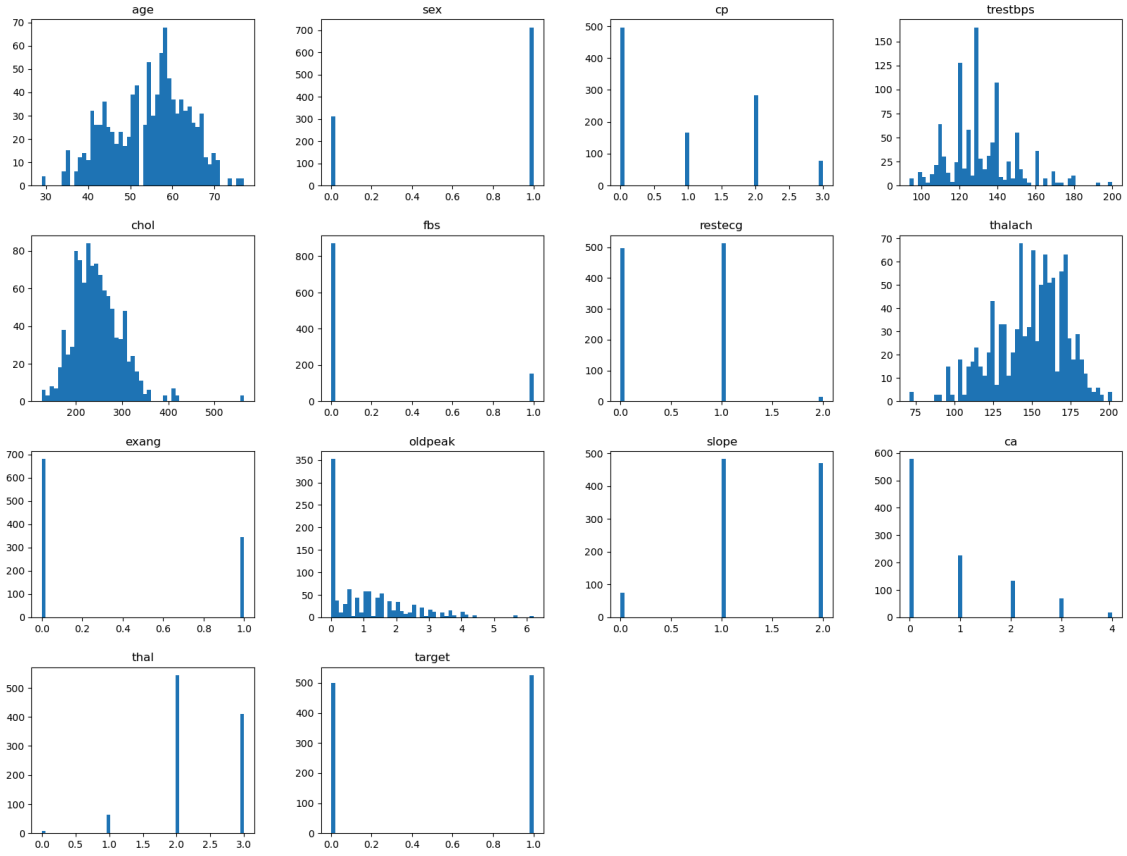
	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal
1020	59	1	1	140	221	0	1	164	1	0.0	2	0	2
1021	60	1	0	125	258	0	0	141	1	2.8	1	1	3
1022	47	1	0	110	275	0	0	118	1	1.0	1	1	2
1023	50	0	0	110	254	0	0	159	0	0.0	2	0	2
1024	54	1	0	120	188	0	1	113	0	1.4	1	1	3

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]:
```
df.hist(bins=50,grid=False,figsize=(20,15))
```

Out[8]:
```
array([[<Axes: title={'center': 'age'}>, <Axes: title={'center': 'sex'}>,
        <Axes: title={'center': 'cp'}>,
        <Axes: title={'center': 'trestbps'}>],
       [<Axes: title={'center': 'chol'}>,
        <Axes: title={'center': 'fbs'}>,
        <Axes: title={'center': 'restecg'}>,
        <Axes: title={'center': 'thalach'}>],
       [<Axes: title={'center': 'exang'}>,
        <Axes: title={'center': 'oldpeak'}>,
        <Axes: title={'center': 'slope'}>,
        <Axes: title={'center': 'ca'}>],
       [<Axes: title={'center': 'thal'}>,
        <Axes: title={'center': 'target'}>, <Axes: >, <Axes: >]],
      dtype=object)
```



In [9]:
```
df.describe()
```

Out[9]:

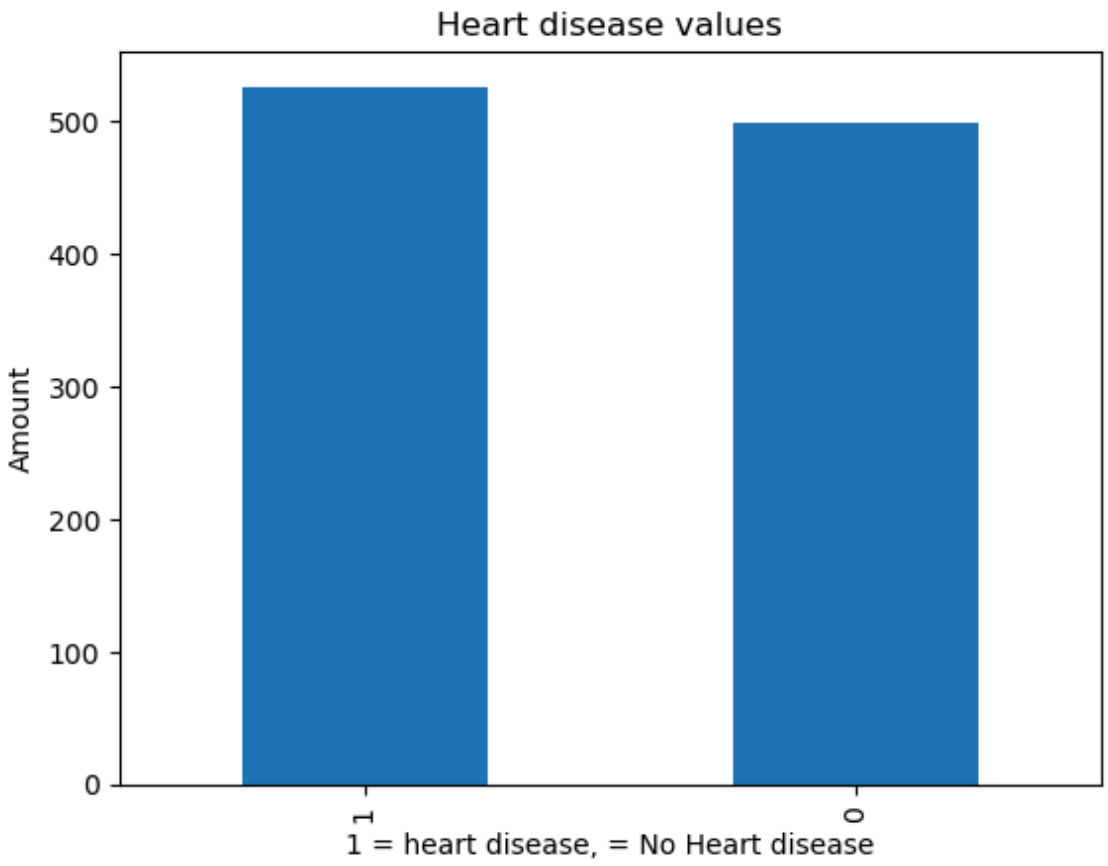
	age	sex	cp	trestbps	chol	fbs	re
count	1025.000000	1025.000000	1025.000000	1025.000000	1025.00000	1025.000000	1025.0
mean	54.434146	0.695610	0.942439	131.611707	246.00000	0.149268	0.5
std	9.072290	0.460373	1.029641	17.516718	51.59251	0.356527	0.5
min	29.000000	0.000000	0.000000	94.000000	126.00000	0.000000	0.0
25%	48.000000	0.000000	0.000000	120.000000	211.00000	0.000000	0.0
50%	56.000000	1.000000	1.000000	130.000000	240.00000	0.000000	1.0
75%	61.000000	1.000000	2.000000	140.000000	275.00000	0.000000	1.0
max	77.000000	1.000000	3.000000	200.000000	564.00000	1.000000	2.0

In [10]:
```
df.target.value_counts()
```

Out[10]:
```
1    526
0    499
Name: target, dtype: int64
```

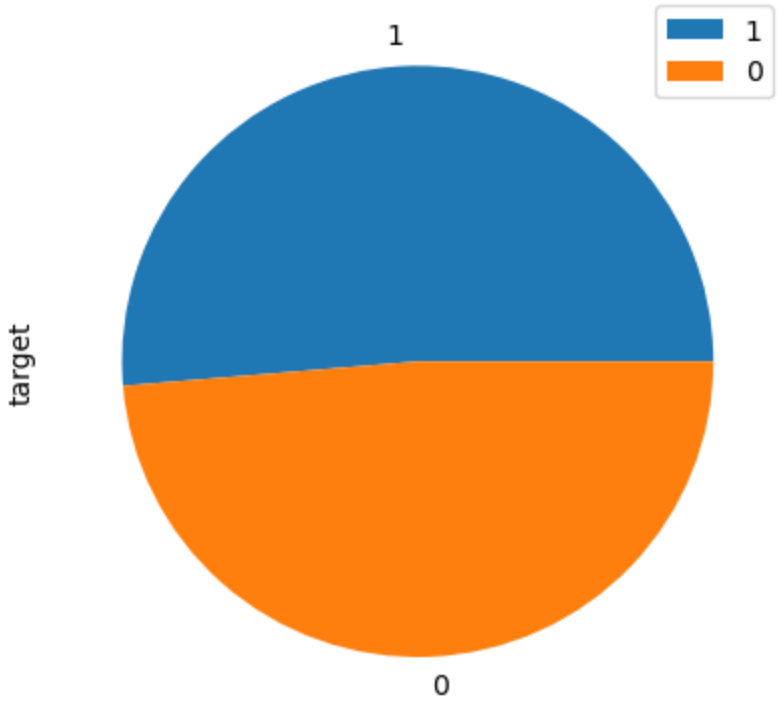
In [11]:
```
df.target.value_counts().plot(kind = 'bar')
plt.title("Heart disease values")
plt.xlabel("1 = heart disease, = No Heart disease")
plt.ylabel("Amount")
```

Out[11]:
```
Text(0, 0.5, 'Amount')
```



In [12]:
```
df.target.value_counts().plot(kind = 'pie')
plt.legend()
```

Out[12]: <matplotlib.legend.Legend at 0x2aaf78c6230>



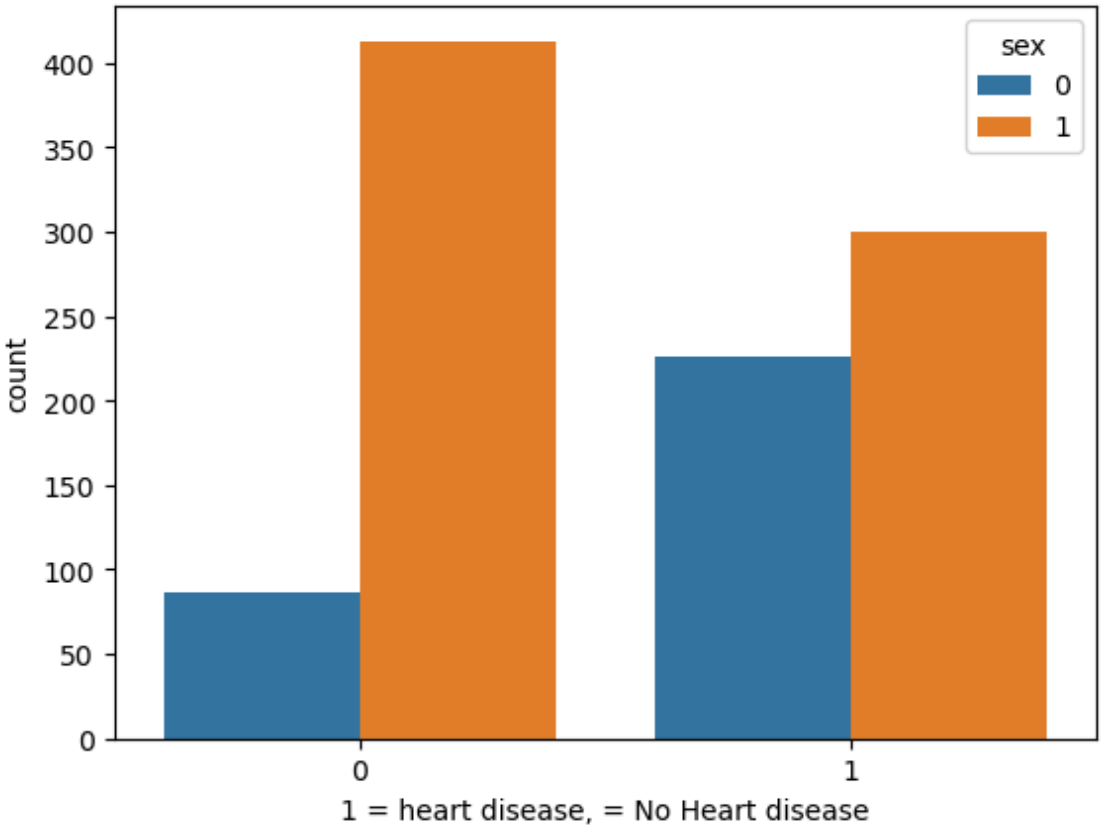
In [13]:
```
pd.crosstab(df.target,df.sex)
```

Out[13]:

sex	0	1
target		
0	86	413
1	226	300

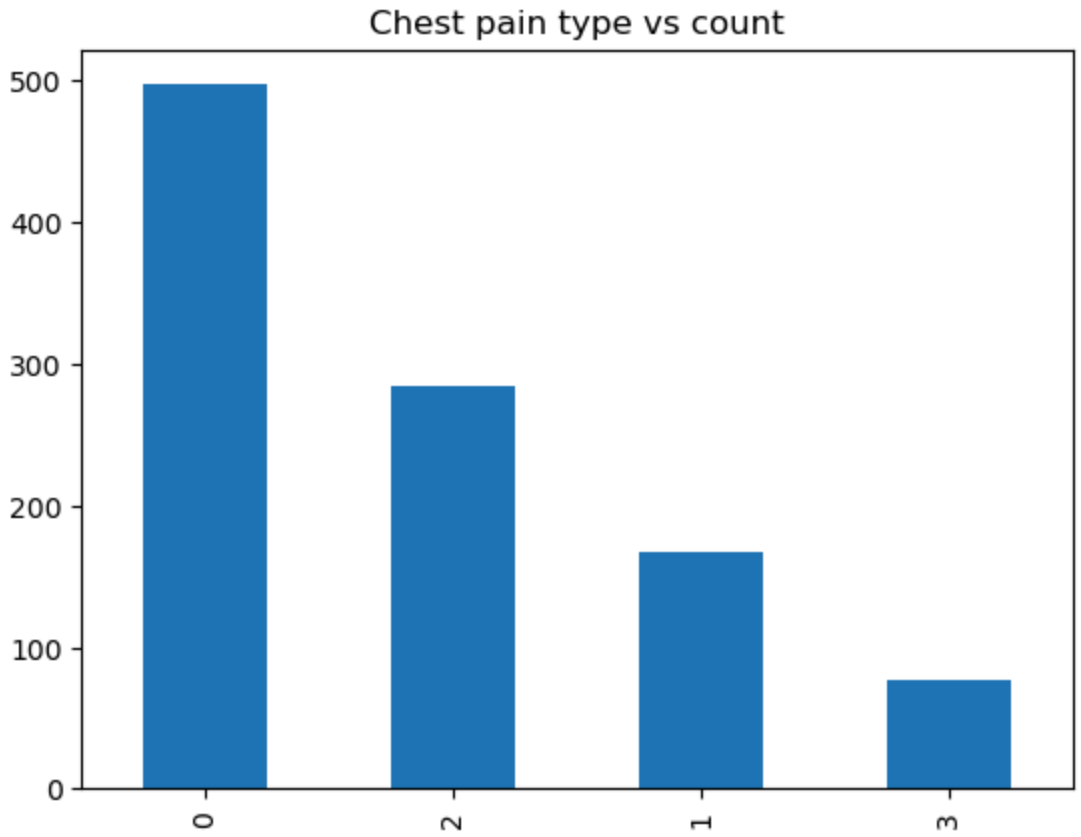
In [14]:
```
sns.countplot(x = 'target',data = df,hue = 'sex')
plt.xlabel("1 = heart disease, = No Heart disease")
```

Out[14]: Text(0.5, 0, '1 = heart disease, = No Heart disease')



In [15]:
```
df.cp.value_counts().plot(kind = 'bar')
plt.title('Chest pain type vs count')
```

Out[15]:
```
Text(0.5, 1.0, 'Chest pain type vs count')
```



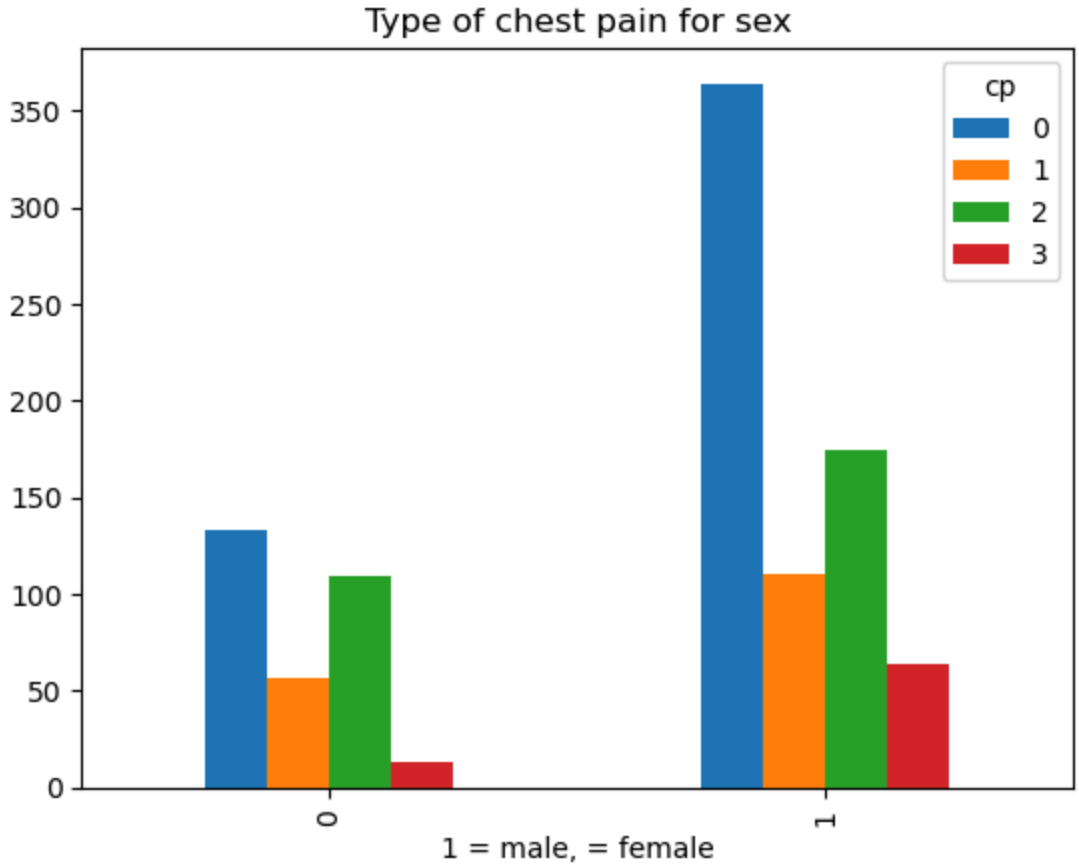
In [16]:
```
pd.crosstab(df.sex,df.cp)
```

Out[16]:

cp	0	1	2	3
sex				
0	133	57	109	13
1	364	110	175	64

In [17]:
```
pd.crosstab(df.sex,df.cp).plot(kind='bar')
plt.title('Type of chest pain for sex')
plt.xlabel("1 = male, = female")
```

Out[17]: Text(0.5, 0, '1 = male, = female')



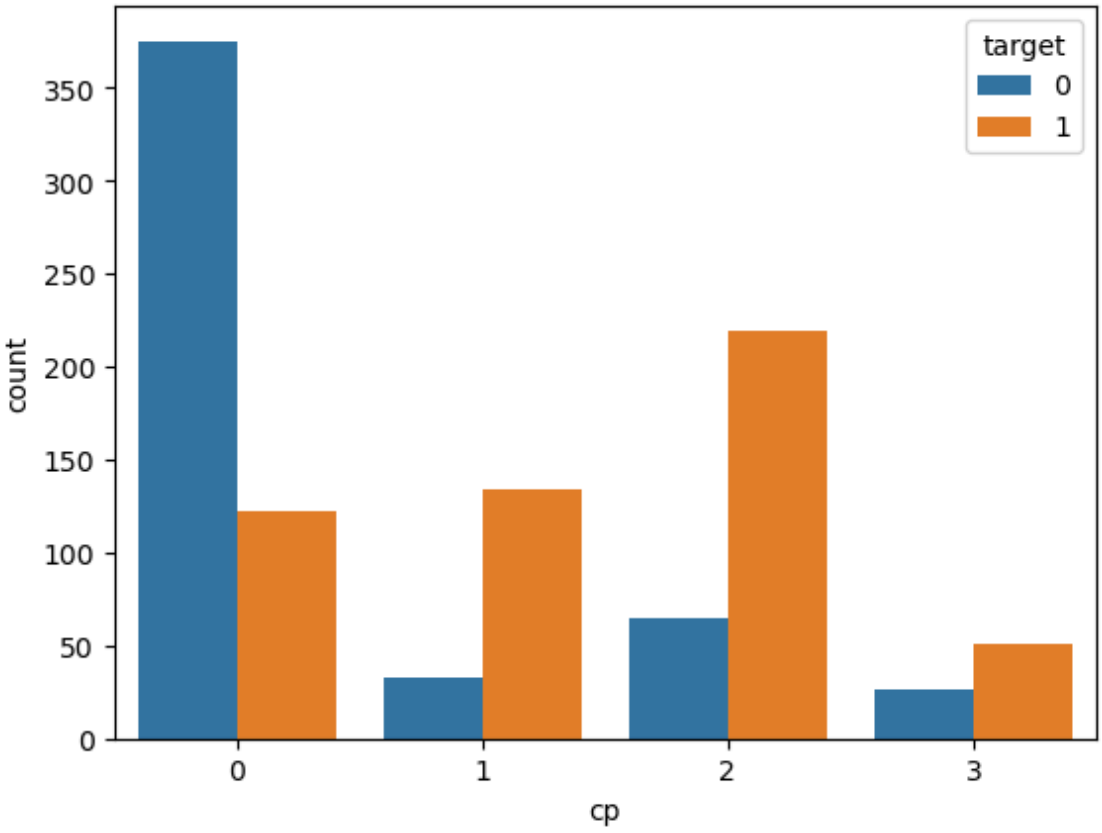
In [18]:
```
pd.crosstab(df.cp,df.target)
```

Out[18]:

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

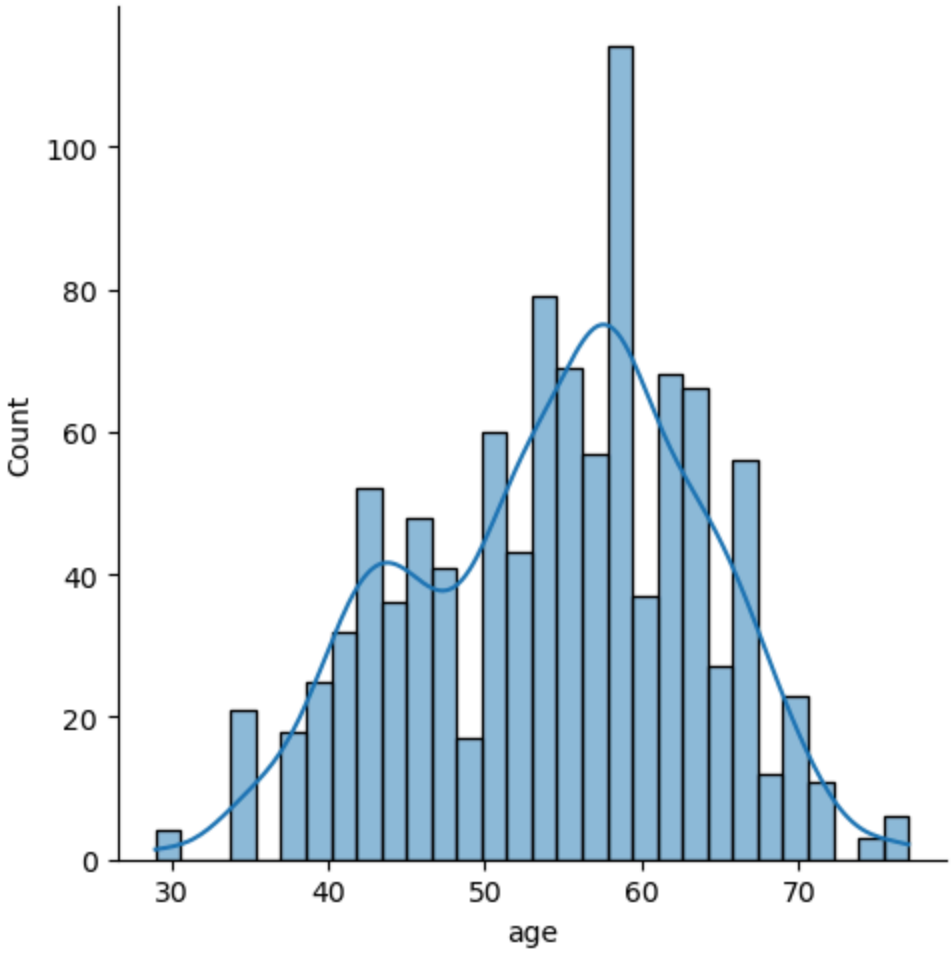
In [19]:
```
sns.countplot(x = 'cp',data = df, hue = 'target')
```

Out[19]: <Axes: xlabel='cp', ylabel='count'>



In [20]:
```
sns.displot(x = 'age',data = df, bins = 30, kde = True)
```

Out[20]: <seaborn.axisgrid.FacetGrid at 0x2aaf5bc1060>



In [21]:
```
sns.displot(x = 'thalach',data = df, bins = 30, kde = True,color='red')
```

Out[21]: <seaborn.axisgrid.FacetGrid at 0x2aaf6722770>