In [1]:

```python
from mpl_toolkits.mplot3d import Axes3D
from sklearn.preprocessing import StandardScaler
import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
import seaborn as sns
sns.set_style('darkgrid')
%matplotlib inline
import warnings
warnings.filterwarnings('ignore')
plt.rcParams["figure.figsize"] = (12,7)
```

In [2]:

```python
data = pd.read_csv('income_evaluation.csv')
```

In [3]:

```python
data.head(1)
```

Out[3]:

| | age | workclass | fnlwgt | education | education-num | marital-status | occupation | relationship | race | sex |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 39 | State-gov | 77516 | Bachelors | 13 | Never-married | Adm-clerical | Not-in-family | White | Male |

In [4]:

```python
data.shape
```

Out[4]:

```
(32561, 15)
```

In [5]:

```python
data.columns
```

Out[5]:

```
Index(['age', ' workclass', ' fnlwgt', ' education', ' education-num',
       ' marital-status', ' occupation', ' relationship', ' race', ' sex',
       ' capital-gain', ' capital-loss', ' hours-per-week', ' native-countr
y',
       ' income'],
      dtype='object')
```

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 32561 entries, 0 to 32560
Data columns (total 15 columns):
age                   32561 non-null int64
 workclass            32561 non-null object
 fnlwgt               32561 non-null int64
 education            32561 non-null object
 education-num        32561 non-null int64
 marital-status       32561 non-null object
 occupation           32561 non-null object
 relationship         32561 non-null object
 race                 32561 non-null object
 sex                  32561 non-null object
 capital-gain         32561 non-null int64
 capital-loss         32561 non-null int64
 hours-per-week       32561 non-null int64
 native-country       32561 non-null object
 income               32561 non-null object
dtypes: int64(6), object(9)
memory usage: 3.7+ MB
```

In [7]:
```
del data[' fnlwgt']
del data[' education-num']
del data[' relationship']
```

In [8]:
```
data.columns
```

Out[8]:
```
Index(['age', ' workclass', ' education', ' marital-status', ' occupation',
       ' race', ' sex', ' capital-gain', ' capital-loss', ' hours-per-week',
       ' native-country', ' income'],
      dtype='object')
```

In [9]:
```
data.columns=['age', 'workclass', 'education', 'married', 'occupation',\
              'race', 'sex', 'gain', 'loss', 'hours', 'country',  'income']
```

In [10]:
```
data.columns
```

Out[10]:
```
Index(['age', 'workclass', 'education', 'married', 'occupation', 'race', 'se
x',
       'gain', 'loss', 'hours', 'country', 'income'],
      dtype='object')
```

In [11]:
```
data = data[data.country == ' United-States']
del data['country']
```

In [12]:
```
data = data[data.gain == 0]
del data['gain']
```

In [13]:
```
data = data[data.loss == 0]
del data['loss']
```

In [14]:
```
data.count()
```

Out[14]:
```
age           25320
workclass     25320
education     25320
married       25320
occupation    25320
race          25320
sex           25320
hours         25320
income        25320
dtype: int64
```

In [15]:
```
data.head(1)
```

Out[15]:

| | age | workclass | education | married | occupation | race | sex | hours | income |
|---|---|---|---|---|---|---|---|---|---|
| **1** | 50 | Self-emp-not-inc | Bachelors | Married-civ-spouse | Exec-managerial | White | Male | 13 | <=50K |

In [16]:
```
data.shape
```

Out[16]:
```
(25320, 9)
```

In [17]:
```
data = data[data.workclass != ' ?']
data = data[data.occupation != ' ?']
```

In [18]:
```
data.shape
```

Out[18]:
```
(23816, 9)
```

In [19]:
```
data.head(3)
```

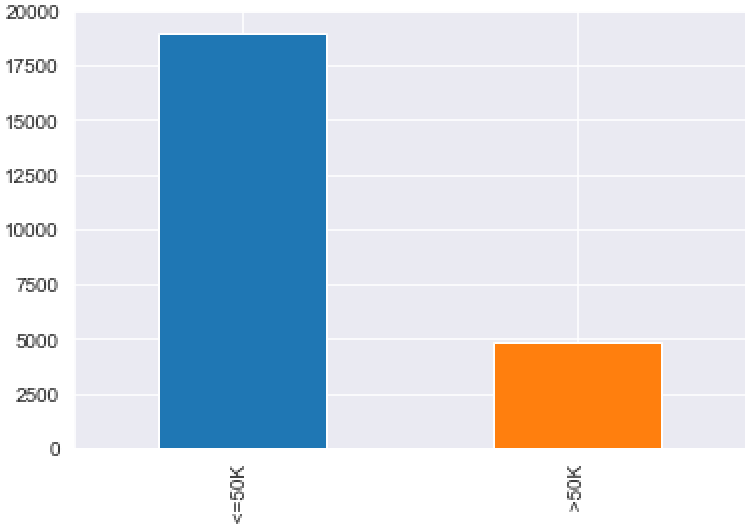
Out[19]:

| | age | workclass | education | married | occupation | race | sex | hours | income |
|---|---|---|---|---|---|---|---|---|---|
| **1** | 50 | Self-emp-not-inc | Bachelors | Married-civ-spouse | Exec-managerial | White | Male | 13 | <=50K |
| **2** | 38 | Private | HS-grad | Divorced | Handlers-cleaners | White | Male | 40 | <=50K |
| **3** | 53 | Private | 11th | Married-civ-spouse | Handlers-cleaners | Black | Male | 40 | <=50K |

# Under 5,000 people make 50K from the dataset

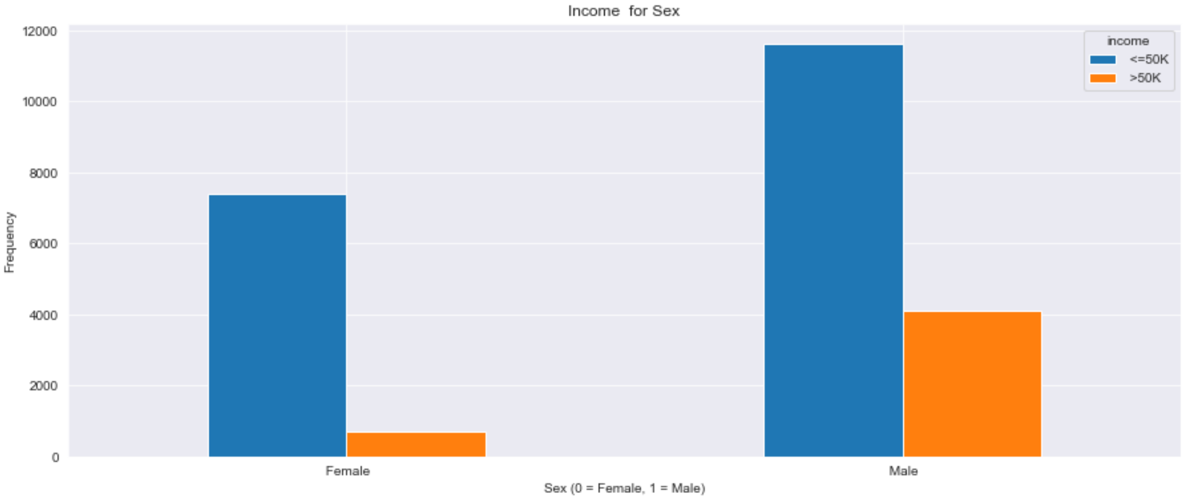
```
In [20]: data.income.value_counts().plot.bar()
```

```
Out[20]: <matplotlib.axes._subplots.AxesSubplot at 0x12862e35fd0>
```



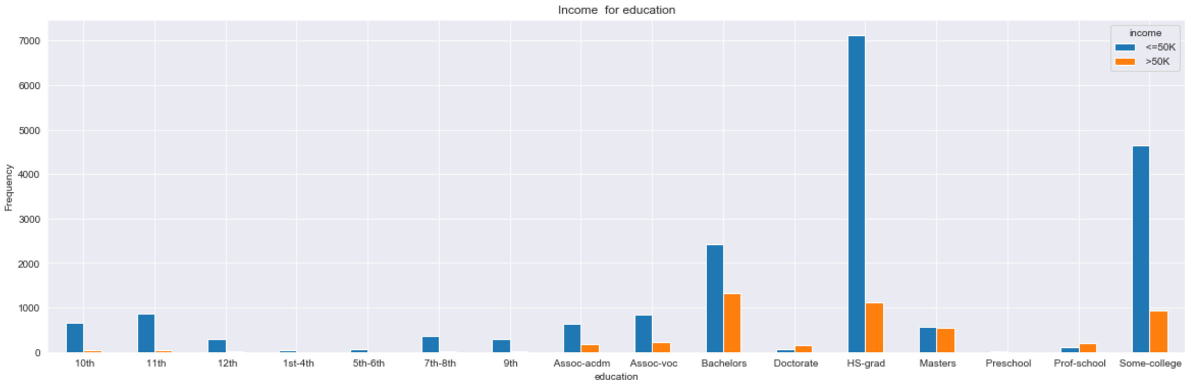
## A greator ratio of men make above 50K

```
In [21]: pd.crosstab(data.sex,data.income).plot(kind="bar",figsize=(15,6))
         plt.title('Income  for Sex')
         plt.xlabel('Sex (0 = Female, 1 = Male)')
         plt.xticks(rotation=0)
         plt.ylabel('Frequency')
         plt.show()
```



## A Masters degree gives almost a 50% chance of making more than 50K

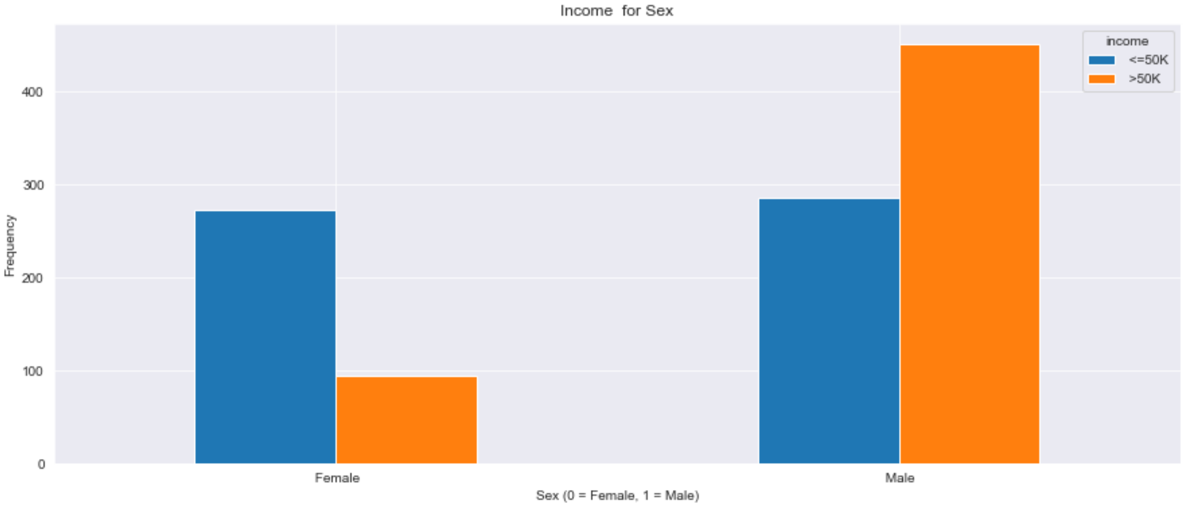
In [22]:
```
pd.crosstab(data.education,data.income).plot(kind="bar",figsize=(20,6))
plt.title('Income  for education')
plt.xticks(rotation=0)
plt.ylabel('Frequency')
plt.show()
```



# Even with a Masters degree a male is still 4x more likely to make over 50K

In [23]:
```
m = data[data.education == ' Masters' ]
```

In [24]:
```
pd.crosstab(m.sex,data.income).plot(kind="bar",figsize=(15,6))
plt.title('Income  for Sex')
plt.xlabel('Sex (0 = Female, 1 = Male)')
plt.xticks(rotation=0)
plt.ylabel('Frequency')
plt.show()
```



In [25]:
```
m[m.sex == ' Female'].income.value_counts()
```

Out[25]:
```
 <=50K    273
 >50K      94
Name: income, dtype: int64
```

```
In [26]: m[m.sex == ' Male'].income.value_counts()
```

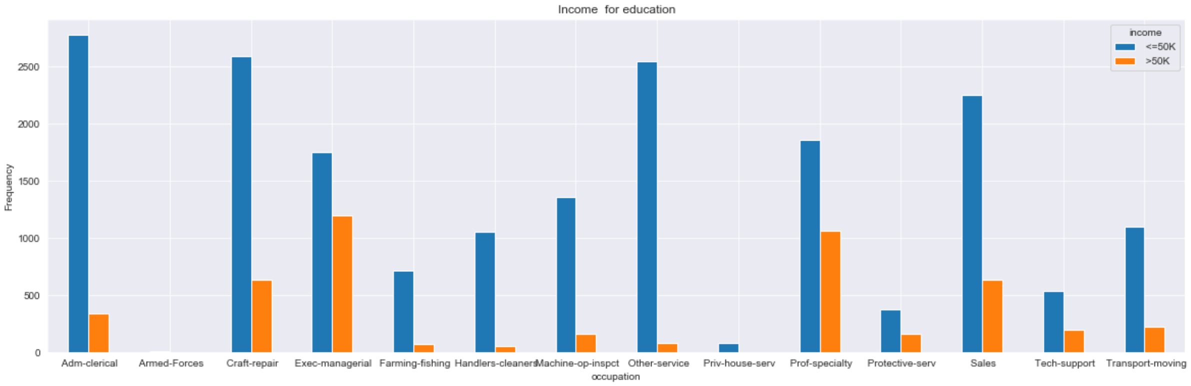
```
Out[26]:  >50K     451
          <=50K    286
         Name: income, dtype: int64
```

```
In [27]: data[data.education != ' Masters'].income.value_counts()
```

```
Out[27]:  <=50K    18450
          >50K      4262
         Name: income, dtype: int64
```

## If you are in management or a Profesional, you have a much better chance of making more than 50K

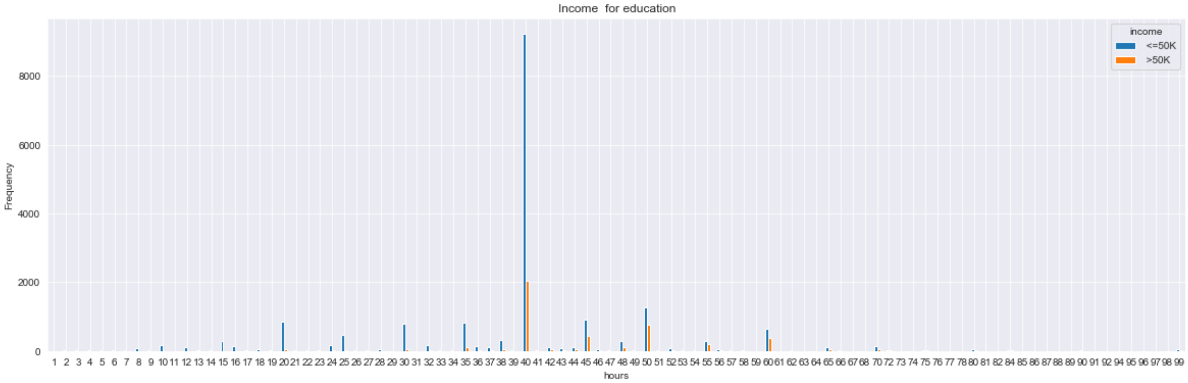
```
In [28]: pd.crosstab(data.occupation,data.income).plot(kind="bar",figsize=(20,6))
         plt.title('Income  for education')
         plt.xticks(rotation=0)
         plt.ylabel('Frequency')
         plt.show()
```



## Working more than 60 hours a week greatly improves your chances.

In [29]:

```
pd.crosstab(data.hours,data.income).plot(kind="bar",figsize=(20,6))
plt.title('Income  for education')
plt.xticks(rotation=0)
plt.ylabel('Frequency')
plt.show()
```



In [ ]:

```

```