Census_income

June 5, 2024

[159]:
```
#Importing Libraries

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

[160]:
```
#Reading data
data = pd.read_csv('/content/drive/MyDrive/Computers/Python/Datasets for data␣
 ↪analysis/Census + Income/Data/adult.data')
```

[161]:
```
#Checking the head
data.head(10)
```

[161]:

	39	State-gov	77516	Bachelors	13	Never-married	\
0	50	Self-emp-not-inc	83311	Bachelors	13	Married-civ-spouse	
1	38	Private	215646	HS-grad	9	Divorced	
2	53	Private	234721	11th	7	Married-civ-spouse	
3	28	Private	338409	Bachelors	13	Married-civ-spouse	
4	37	Private	284582	Masters	14	Married-civ-spouse	
5	49	Private	160187	9th	5	Married-spouse-absent	
6	52	Self-emp-not-inc	209642	HS-grad	9	Married-civ-spouse	
7	31	Private	45781	Masters	14	Never-married	
8	42	Private	159449	Bachelors	13	Married-civ-spouse	
9	37	Private	280464	Some-college	10	Married-civ-spouse	

	Adm-clerical	Not-in-family	White	Male	2174	0	40	\
0	Exec-managerial	Husband	White	Male	0	0	13	
1	Handlers-cleaners	Not-in-family	White	Male	0	0	40	
2	Handlers-cleaners	Husband	Black	Male	0	0	40	
3	Prof-specialty	Wife	Black	Female	0	0	40	
4	Exec-managerial	Wife	White	Female	0	0	40	
5	Other-service	Not-in-family	Black	Female	0	0	16	
6	Exec-managerial	Husband	White	Male	0	0	45	
7	Prof-specialty	Not-in-family	White	Female	14084	0	50	
8	Exec-managerial	Husband	White	Male	5178	0	40	
9	Exec-managerial	Husband	Black	Male	0	0	80	

```
    United-States   <=50K
0   United-States   <=50K
1   United-States   <=50K
2   United-States   <=50K
3            Cuba   <=50K
4   United-States   <=50K
5         Jamaica   <=50K
6   United-States    >50K
7   United-States    >50K
8   United-States    >50K
9   United-States    >50K
```

1 Cleaning the data

[162]:
```
#Checking the total rows and columns
data.shape
#There are a total of 32560 rows and 15 columns
```

[162]:
```
(32560, 15)
```

[163]:
```
#Checking the datatype of tthe columns
data.dtypes
```

[163]:
```
39                int64
 State-gov       object
 77516            int64
 Bachelors       object
 13               int64
 Never-married   object
 Adm-clerical    object
 Not-in-family   object
 White           object
 Male            object
 2174             int64
 0                int64
 40               int64
 United-States   object
 <=50K           object
dtype: object
```

[164]:
```
#Getting the column names
data.columns
```

[164]:
```
Index(['39', ' State-gov', ' 77516', ' Bachelors', ' 13', ' Never-married',
       ' Adm-clerical', ' Not-in-family', ' White', ' Male', ' 2174', ' 0',
```

```
       ' 40', ' United-States', ' <=50K'],
      dtype='object')
```

[165]:
```
#Dropping unwanted columns
data.drop(['39',' 77516',' 13',' 40',' 2174',' 0',' White','␣
 ↪Not-in-family'],axis = 1,inplace=True)
```

[166]:
```
#Renaming the columns
data.rename(columns = {' State-gov':'Job_Type',
                       ' Bachelors':'Education',
                       ' Never-married':'Martial_status',
                       ' Adm-clerical':'Job_role',
                       ' United-States' : 'Country',
                       ' Male' : 'Gender',
                       ' <=50K' : 'Income'},inplace = True)
```

[167]:
```
#Shape
data.shape
```

[167]:
```
(32560, 7)
```

[168]:
```
#Checking for duplicate values
data.duplicated().sum()
#There are 26319 duplicates
```

[168]:
```
26319
```

[169]:
```
#Checking for null values
data.isnull().sum()
```

[169]:
```
Job_Type          0
Education         0
Martial_status    0
Job_role          0
Gender            0
Country           0
Income            0
dtype: int64
```

[170]:
```
#Getting unique items from Job_Type
data['Job_Type'].unique()
```

[170]:
```
array([' Self-emp-not-inc', ' Private', ' State-gov', ' Federal-gov',
       ' Local-gov', ' ?', ' Self-emp-inc', ' Without-pay',
       ' Never-worked'], dtype=object)
```

[171]:
```
#Calculating the number of rows in job_type with '?'
data[data['Job_Type'] == ' ?'].shape[0]
```

[171]:
```
1836
```

[172]:
```
#Deleting rows with '?' from the entire dataset
data = data[data != ' ?'].dropna()
```

[173]:
```
data.shape
```

[173]:
```
(30161, 7)
```

[174]:
```
#Checking if there are any null values
data[data['Country'] == ' ?' ].shape[0]
```

[174]:
```
0
```

[175]:
```
data.columns
```

[175]:
```
Index(['Job_Type', 'Education', 'Martial_status', 'Job_role', 'Gender',
       'Country', 'Income'],
      dtype='object')
```

[176]:
```
#Getting unique values from Martial_status
data['Education'].unique()
```

[176]:
```
array([' Bachelors', ' HS-grad', ' 11th', ' Masters', ' 9th',
       ' Some-college', ' Assoc-acdm', ' 7th-8th', ' Doctorate',
       ' Assoc-voc', ' Prof-school', ' 5th-6th', ' 10th', ' Preschool',
       ' 12th', ' 1st-4th'], dtype=object)
```

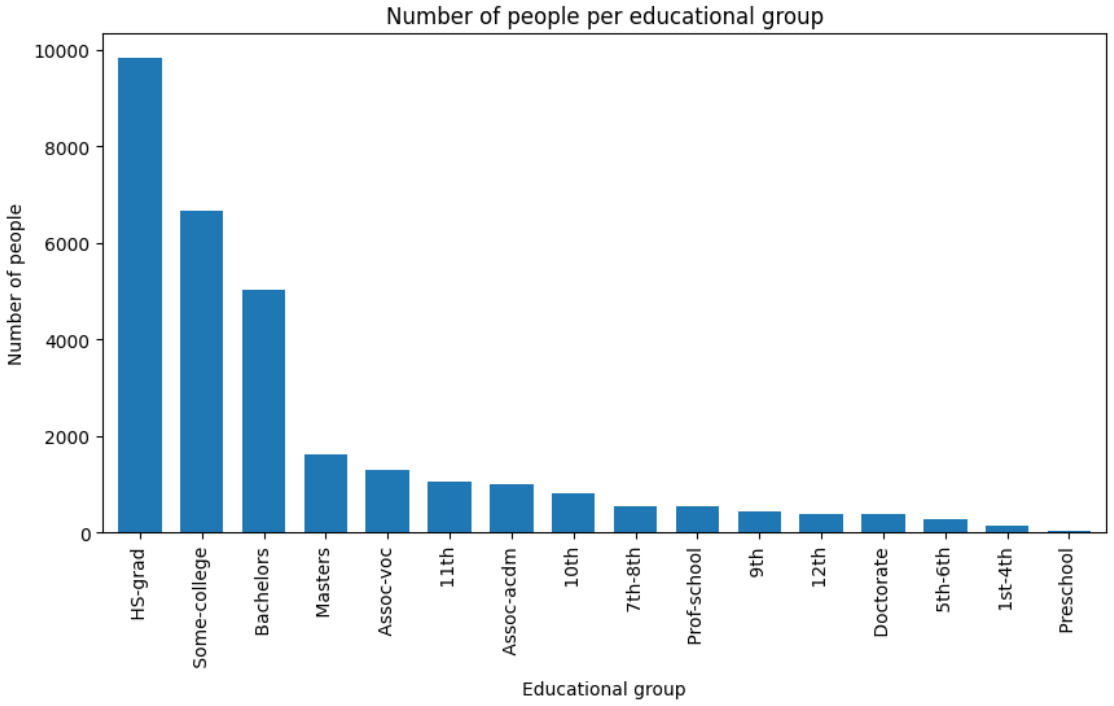
2 Analysis and Visualisation

[177]:
```
#Getting the number of people in each educational value
data['Education'].value_counts()
```

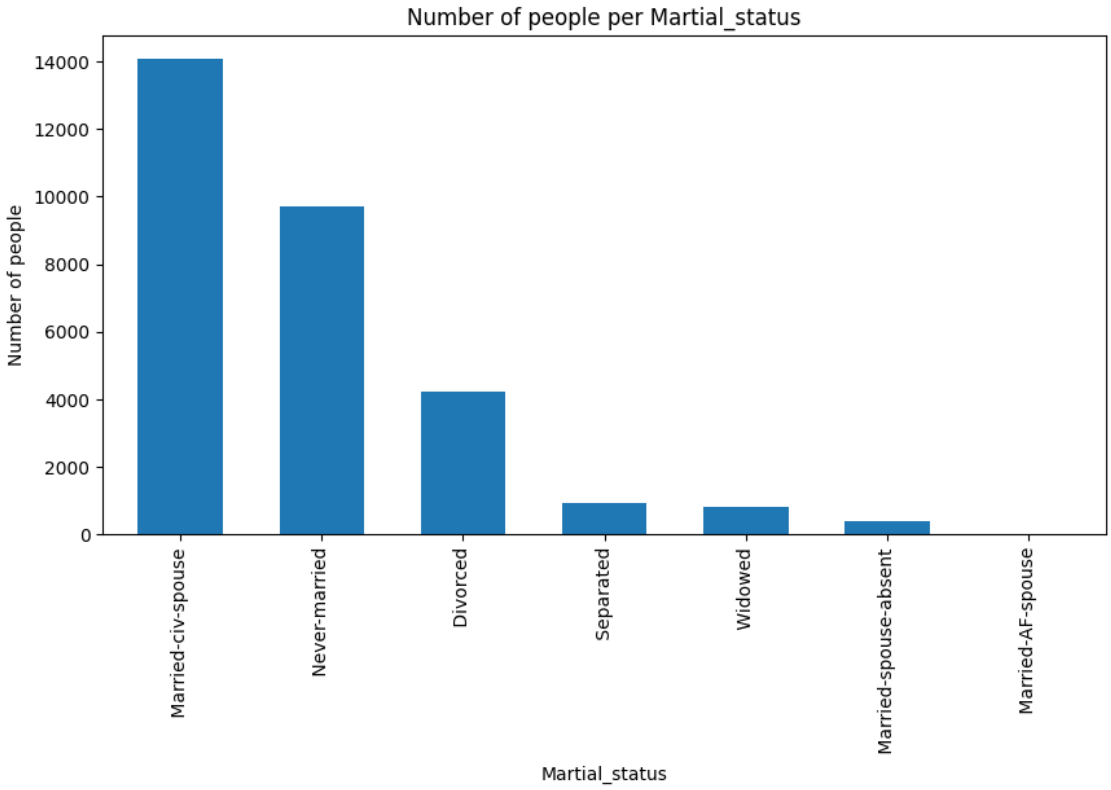
[177]:
```
Education
 HS-grad         9840
 Some-college    6678
 Bachelors       5043
 Masters         1627
 Assoc-voc       1307
 11th            1048
 Assoc-acdm      1008
 10th             820
 7th-8th          557
```

```
 Prof-school      542
 9th              455
 12th             377
 Doctorate        375
 5th-6th          288
 1st-4th          151
 Preschool         45
Name: count, dtype: int64
```

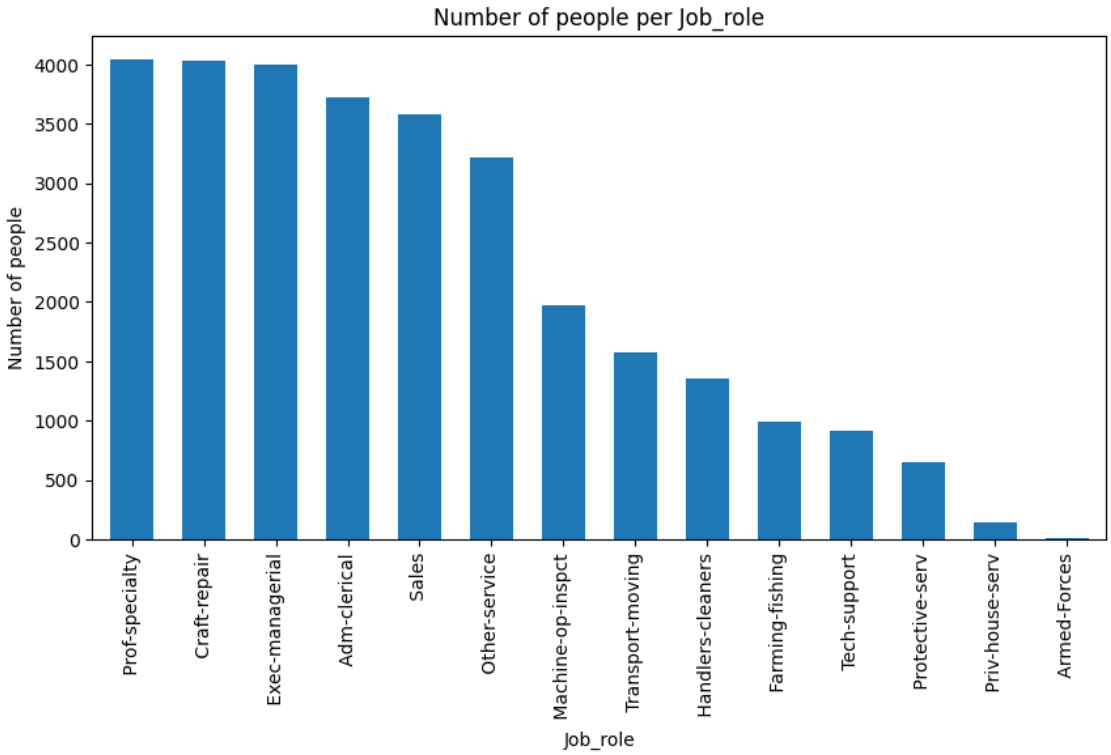
[178]:
```
#Plotting a graph for the above
plt.figure(figsize = (10,5))
data['Education'].value_counts().plot(kind = 'bar',width = 0.7)
plt.title('Number of people per educational group')
plt.xlabel('Educational group')
plt.ylabel('Number of people')
plt.show()
```



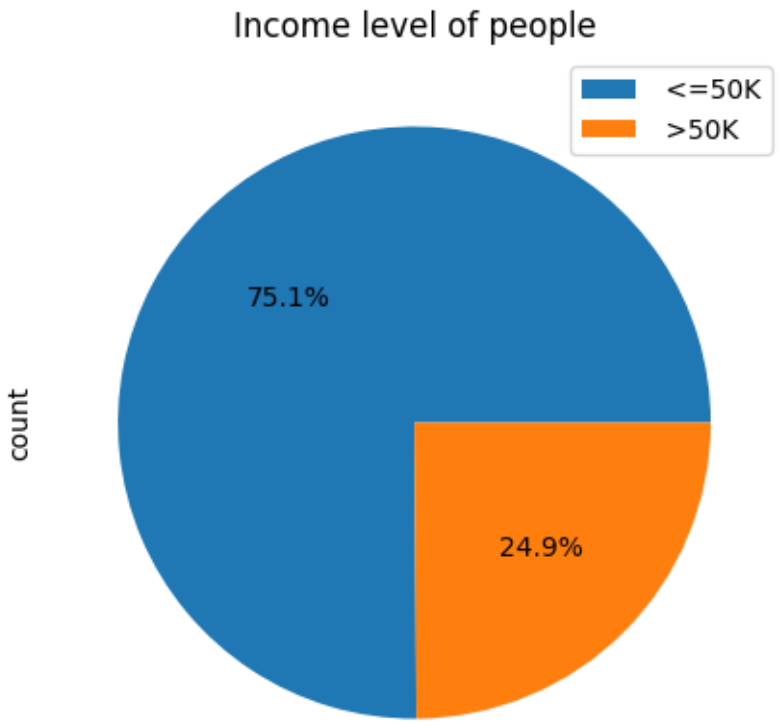
[179]:
```
#Plotting the number of people per Martial_status
plt.figure(figsize = (10,5))
data['Martial_status'].value_counts().plot(kind ='bar',width = 0.6)
plt.title('Number of people per Martial_status')
plt.xlabel('Martial_status')
plt.ylabel('Number of people')
plt.show()
```



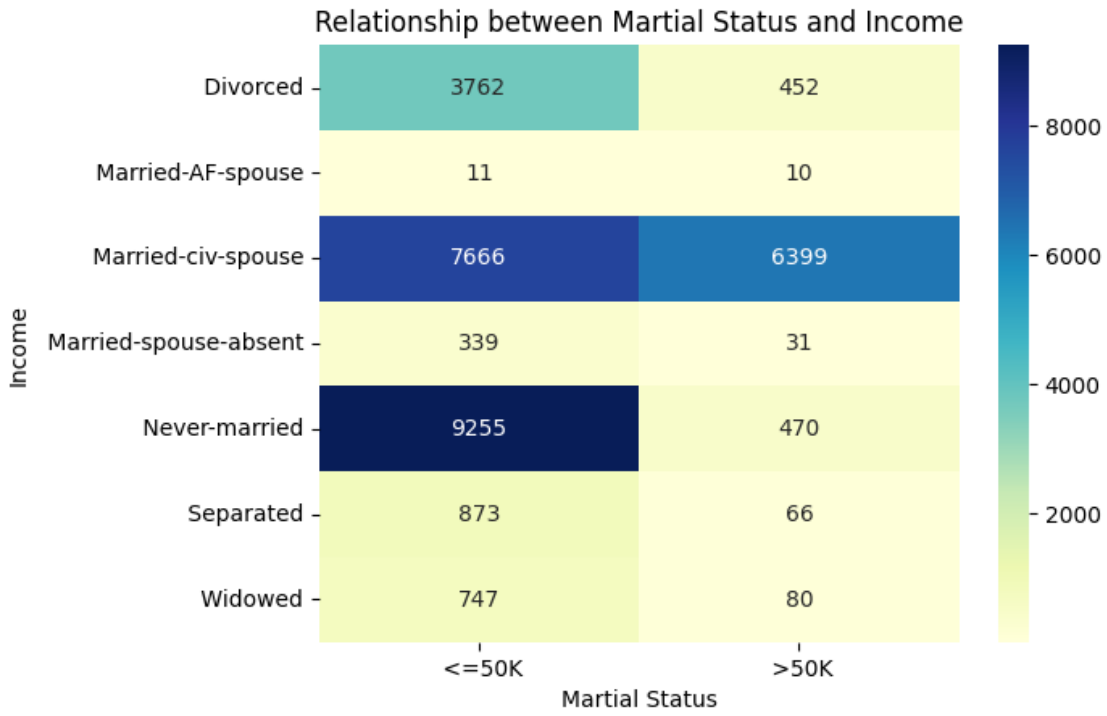
[180]:
```
#Plotting the number of people per Job_role
plt.figure(figsize = (10,5))
data['Job_role'].value_counts().plot(kind ='bar',width = 0.6)
plt.title('Number of people per Job_role')
plt.xlabel('Job_role')
plt.ylabel('Number of people')
plt.show()
```



[181]:
```
#Plotting the number of people per Income
plt.figure(figsize = (10,5))
data['Income'].value_counts().plot(kind ='pie',autopct='%1.1f%%',labels=None)
plt.legend(labels=data['Income'].value_counts().index,loc='upper right')
plt.title('Income level of people')
plt.show()
```



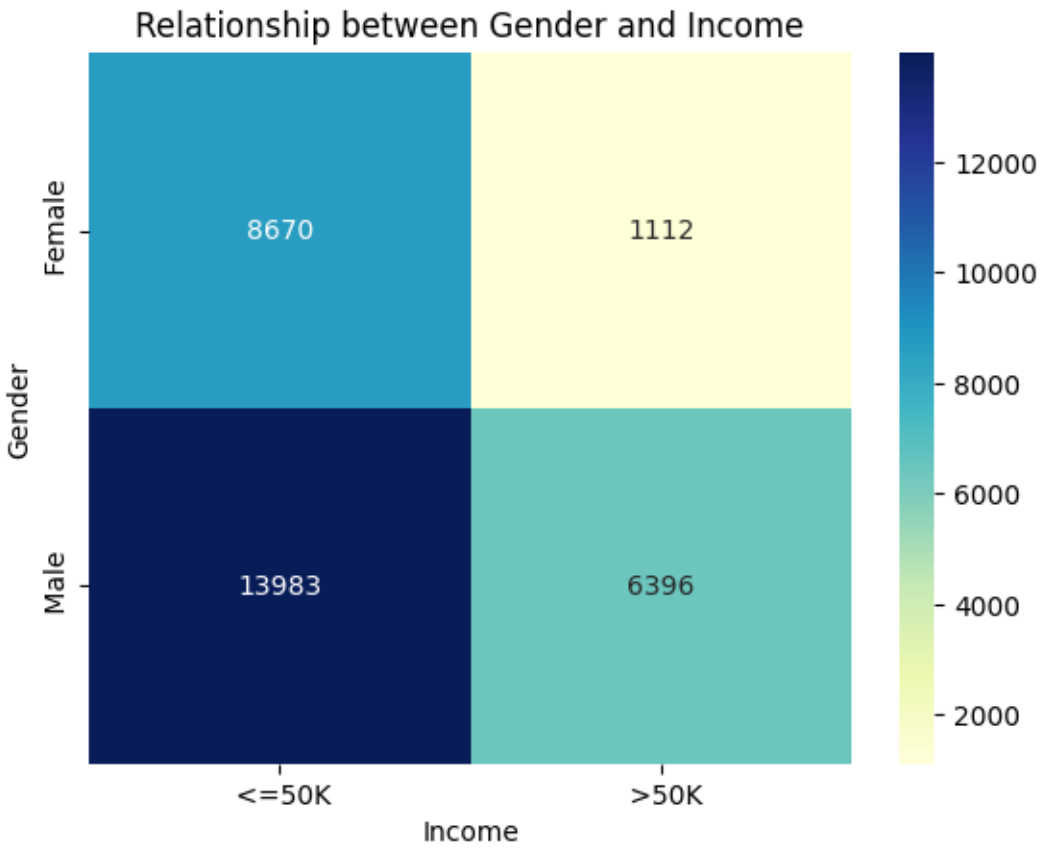
[182]:
```
#Getting the relationship between Martial_status and Income
martial_vs_income = pd.crosstab(data['Martial_status'],data['Income'])
sns.heatmap(martial_vs_income, annot=True, cmap="YlGnBu", fmt="g")
plt.title("Relationship between Martial Status and Income")
plt.xlabel("Martial Status")
plt.ylabel("Income")
plt.show()
```



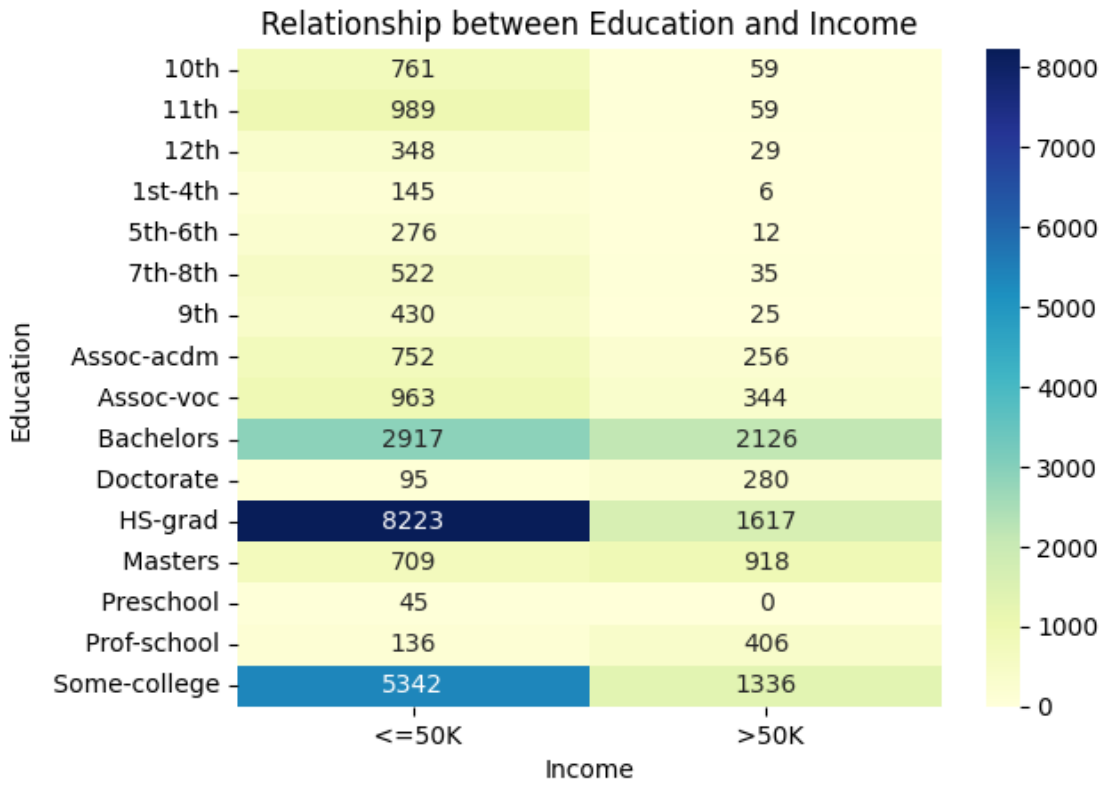
[183]:
```
data.columns
```

[183]:
```
Index(['Job_Type', 'Education', 'Martial_status', 'Job_role', 'Gender',
       'Country', 'Income'],
      dtype='object')
```

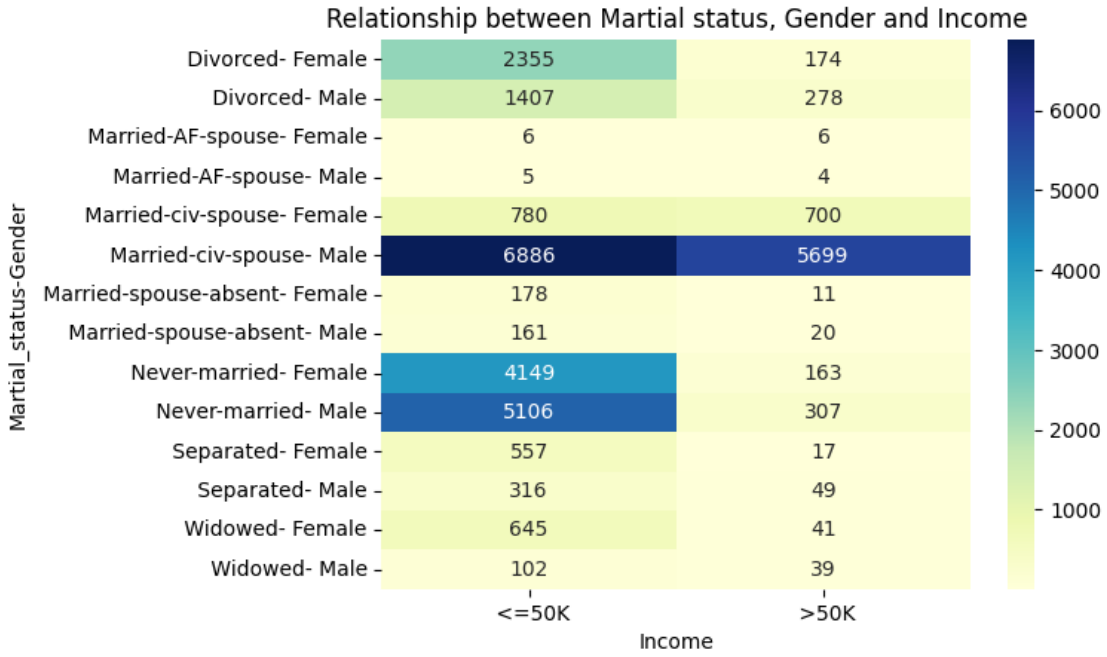
[184]:
```
#Getting the relationship between Gender and Income
sns.heatmap(pd.crosstab(data['Gender'],data['Income']),annot = True,␣
 ↪cmap="YlGnBu",fmt = 'g')
plt.title('Relationship between Gender and Income')
plt.show()
```



[185]:
```
#Relationship between Education and Income
sns.heatmap(pd.crosstab(data['Education'],data['Income']),annot =␣
 ↪True,cmap="YlGnBu", fmt = 'g')
plt.title('Relationship between Education and Income')
plt.show()
```



[186]:
```
#Getting the relationship between Martial_status, Gender and Income
sns.heatmap(pd.
  ↪crosstab([data['Martial_status'],data['Gender']],data['Income']),annot =␣
  ↪True,cmap="YlGnBu", fmt = 'g')
plt.title('Relationship between Martial status, Gender and Income')
plt.show()
```



[187]:
```
#Visualising the relationship between job_type and income
plt.figure(figsize = (10,5))
sns.countplot(x = 'Job_Type',hue = 'Income',data = data)
plt.title('Relationship between Job Type and Income')
plt.show()
```