Roll No:225229110

Lab4. Pandas Grouping and Aggregation

IMPORT NECESSARY MODULES

In [1]:
```
import pandas as pd
```

In [2]:
```
df=pd.read_csv("thanksgiving-2015-poll-data.csv",encoding='Latin-1')
```

In [4]:
```
df.head(5)
```

Out[4]:

	RespondentID	Do you celebrate Thanksgiving?	What is typically the main dish at your Thanksgiving dinner?	What is typically the main dish at your Thanksgiving dinner? - Other (please specify)	How is the main dish typically cooked?	How is the main dish typically cooked? - Other (please specify)	What kind of stuffing/dressing do you typically have?	What kind of stuffing/dressing do you typically have? - Other (please specify)	What type of cranberry saucedo you typically have?	What type of cranberry saucedo you typically have? - Other (please specify)	...	Have you ever tried to meet up with hometown friends on Thanksgiving night?
0	4337954960	Yes	Turkey	NaN	Baked	NaN	Bread-based	NaN	None	NaN	...	Yes
1	4337951949	Yes	Turkey	NaN	Baked	NaN	Bread-based	NaN	Other (please specify)	Homemade cranberry gelatin ring	...	No
2	4337935621	Yes	Turkey	NaN	Roasted	NaN	Rice-based	NaN	Homemade	NaN	...	Yes
3	4337933040	Yes	Turkey	NaN	Baked	NaN	Bread-based	NaN	Homemade	NaN	...	Yes
4	4337931983	Yes	Tofurkey	NaN	Baked	NaN	Bread-based	NaN	Canned	NaN	...	Yes

5 rows × 65 columns

In [4]:
```
df.shape
```

Out[4]:
```
(1058, 65)
```

WHAT ARE UNIQUE VALUES OF"DO YOU THANKSGIVING?"COLUMNS

In [5]:
```
df['Do you celebrate Thanksgiving?'].unique()
```

Out[5]:
```
array(['Yes', 'No'], dtype=object)
```

VIEW ALL COLUMN NAMES(TOP 5)

In [6]:
```
df.columns[1:5]
```

Out[6]:
```
Index(['Do you celebrate Thanksgiving?',
       'What is typically the main dish at your Thanksgiving dinner?',
       'What is typically the main dish at your Thanksgiving dinner? - Other (please specify)',
       'How is the main dish typically cooked?'],
      dtype='object')
```

Apply function to Series

How many male,female and NaN in "What is your gender?" columns

In [7]:
```
df["What is your gender?"].value_counts(dropna=False)
```

Out[7]:
```
Female    544
Male      481
NaN        33
Name: What is your gender?, dtype: int64
```

In [8]:

```
import math
def gender_code(gender_string):
    if isinstance(gender_string,float)and math.isnan(gender_string):
        return gender_string
    return int(gender_string=="Female")
```

Apply gender_code()to What is your gender? column

In [9]:

```
df["gender"]=df["What is your gender?"].apply(gender_code)
df["gender"].value_counts(dropna=False)
```

Out[9]:

```
1.0    544
0.0    481
NaN     33
Name: gender, dtype: int64
```

Applying function to DataFrames

check the data type of each column in data using a lambda function.just visualize data types of first 5 columns

In [10]:

```
df.apply(lambda x:x.dtype)[0:5]
```

Out[10]:

```
RespondentID                                                                        int64
Do you celebrate Thanksgiving?                                                     object
What is typically the main dish at your Thanksgiving dinner?                       object
What is typically the main dish at your Thanksgiving dinner? - Other (please specify)    object
How is the main dish typically cooked?                                             object
dtype: object
```

DATA CLEANNING - Let us clean up income column

In [11]:

```
df["How much total combined money did all members of your HOUSEHOLD earn last year?"].value_counts(dropna=False)
```

Out[11]:

```
$25,000 to $49,999      180
Prefer not to answer    136
$50,000 to $74,999      135
$75,000 to $99,999      133
$100,000 to $124,999    111
$200,000 and up          80
$10,000 to $24,999       68
$0 to $9,999             66
$125,000 to $149,999     49
$150,000 to $174,999     40
NaN                      33
$175,000 to $199,999     27
Name: How much total combined money did all members of your HOUSEHOLD earn last year?, dtype: int64
```

In [23]:

```
import numpy as np
def clean_income(value):
    if value == "$200,000 and up":
        return 200000
    elif value == "Prefer not to answer":
        return np.nan
    elif isinstance(value , float)and math.isnan(value):
        return np.nan
    value = value.replace("$", "").replace(",","")

    income_high, income_low = value.split(" to ")
    return (int(income_high) + int(income_low)) / 2
```

Now apply this fuction to the "How much total combined money did all member of your HOUSRHOLD earn last year?" columns and put it in new column "income"

In [24]:

```
df["income"] = df["How much total combined money did all members of your HOUSEHOLD earn last year?"].apply(clean_income)
df["income"].head()
```

Out[24]:

```
0     87499.5
1     62499.5
2      4999.5
3    200000.0
4    112499.5
Name: income, dtype: float64
```

Grouping Data with Pandas

```
In [25]: df["What type of cranberry saucedo you typically have?"].value_counts()
```

```
Out[25]: Canned                       502
         Homemade                     301
         None                         146
         Other (please specify)        25
         Name: What type of cranberry saucedo you typically have?, dtype: int64
```

```
In [28]: homemade = df[df["What type of cranberry saucedo you typically have?"] == "Homemade"]
         canned = df[df["What type of cranberry saucedo you typically have?"] == "Canned"]
```

```
In [29]: print(homemade["income"].mean())
         print(canned["income"].mean())
```

```
         94878.1072874494
         83823.40340909091
```

```
In [30]: grouped = df.groupby("What type of cranberry saucedo you typically have?")
         grouped
```

```
Out[30]: <pandas.core.groupby.generic.DataFrameGroupBy object at 0x0000018721AF4610>
```

```
In [31]: dict(grouped.groups)
```

```
Out[31]: {'Canned': Int64Index([   4,    6,    8,   11,   12,   15,   18,   19,   26,   27,
                      ...
                      1040, 1041, 1042, 1044, 1045, 1046, 1047, 1051, 1054, 1057],
                     dtype='int64', length=502),
          'Homemade': Int64Index([   2,    3,    5,    7,   13,   14,   16,   20,   21,   23,
                      ...
                      1016, 1017, 1025, 1027, 1030, 1034, 1048, 1049, 1053, 1056],
                     dtype='int64', length=301),
          'None': Int64Index([   0,   17,   24,   29,   34,   36,   40,   47,   49,   51,
                      ...
                       980,  981,  997, 1015, 1018, 1031, 1037, 1043, 1050, 1055],
                     dtype='int64', length=146),
          'Other (please specify)': Int64Index([   1,    9,  154,  216,  221,  233,  249,  265,  301,  336,  380,
                       435,  444,  447,  513,  550,  749,  750,  784,  807,  860,  872,
                       905, 1000, 1007],
                     dtype='int64')}
```

```
In [32]: grouped.size()
```

```
Out[32]: What type of cranberry saucedo you typically have?
         Canned                       502
         Homemade                     301
         None                         146
         Other (please specify)        25
         dtype: int64
```

```
In [34]: for name,group in grouped:
             print(name)
             print(group.shape)
             print(type(group))
```

```
         Canned
         (502, 67)
         <class 'pandas.core.frame.DataFrame'>
         Homemade
         (301, 67)
         <class 'pandas.core.frame.DataFrame'>
         None
         (146, 67)
         <class 'pandas.core.frame.DataFrame'>
         Other (please specify)
         (25, 67)
         <class 'pandas.core.frame.DataFrame'>
```

```
In [35]: grouped["income"]
```

```
Out[35]: <pandas.core.groupby.generic.SeriesGroupBy object at 0x0000018721B183D0>
```

```
In [36]: grouped["income"].size()
```

```
Out[36]: What type of cranberry saucedo you typically have?
         Canned                    502
         Homemade                  301
         None                      146
         Other (please specify)     25
         Name: income, dtype: int64
```

Aggregating values in groups

```
In [37]: grouped["income"].agg(np.mean)
```

```
Out[37]: What type of cranberry saucedo you typically have?
         Canned                    83823.403409
         Homemade                  94878.107287
         None                      78886.084034
         Other (please specify)    86629.978261
         Name: income, dtype: float64
```

```
In [38]: grouped.agg(np.mean)
```

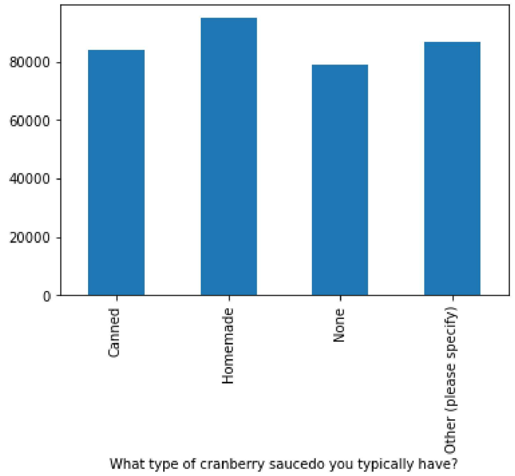
Out[38]:

	RespondentID	gender	income
What type of cranberry saucedo you typically have?			
Canned	4.336699e+09	0.552846	83823.403409
Homemade	4.336792e+09	0.533101	94878.107287
None	4.336765e+09	0.517483	78886.084034
Other (please specify)	4.336763e+09	0.640000	86629.978261

Plotting the results of aggregation

```
In [39]: sauce = grouped.agg(np.mean)
         sauce["income"].plot(kind="bar")
```

```
Out[39]: <AxesSubplot:xlabel='What type of cranberry saucedo you typically have?'>
```



Aggregation with multiple columns

```
In [45]: grouped = df.groupby(["What type of cranberry saucedo you typically have?" ,"What type of cranberry saucedo you typically have?"]
         grouped.agg(np.mean)
```

Out[45]:

		RespondentID	gender	income
What type of cranberry saucedo you typically have?	**What type of cranberry saucedo you typically have?**			
Canned	**Canned**	4.336699e+09	0.552846	83823.403409
Homemade	**Homemade**	4.336792e+09	0.533101	94878.107287
None	**None**	4.336765e+09	0.517483	78886.084034
Other (please specify)	**Other (please specify)**	4.336763e+09	0.640000	86629.978261

Aggregating with multiple functions

In [49]:
```
grouped=df.groupby("How would you describe where you live?")["What is typically the main dish at your Thanksgiving dinner?"]
grouped.apply(lambda x:x.value_counts())
```

Out[49]:
```
How would you describe where you live?
Rural                                   Turkey                    189
                                        Other (please specify)      9
                                        Ham/Pork                    7
                                        Tofurkey                    3
                                        I don't know                3
                                        Turducken                   2
                                        Chicken                     2
                                        Roast beef                  1
Suburban                                Turkey                    449
                                        Ham/Pork                   17
                                        Other (please specify)     13
                                        Tofurkey                    9
                                        Chicken                     3
                                        Roast beef                  3
                                        Turducken                   1
                                        I don't know                1
Urban                                   Turkey                    198
                                        Other (please specify)     13
```