Session 13: Analyzing Text Data in Pandas

Setting up

```
[1]: import pandas as pd
     courses=pd.read_excel('Marshall_Course_Enrollment_1516_1617.xlsx')\
         [['Course','First Instructor','First End Time','First Days','First Room','Term','Tit
     courses.columns=['course','instructor','end_time','days','room','term','title']
     courses['end_time']=courses['end_time'].astype(str)
     courses.head()
```

	course	instructor	end_time	days	room	term	title
0	ACCT-370	Hopkins, Merle, W	11:50:00	F	SLH200	20153	External...
1	ACCT-370	Hopkins, Merle, W	09:50:00	MW	ACC303	20153	External...
2	ACCT-370	Hopkins, Merle, W	11:50:00	MW	ACC303	20153	External...
3	ACCT-370	Hopkins, Merle, W	13:50:00	MW	ACC303	20153	External...
4	ACCT-371	NaN	11:50:00	F	SLH200	20153	Introduction...

```
[2]: instructors=courses['instructor'].drop_duplicates().head()
     instructors
```

```
0          Hopkins, Merle, W
4                        NaN
5     Porter, Leslie, Robert
9            Karuna, Christo
13           Layton, Rose, M
Name: instructor, dtype: object
```

1. Applying a Function to an Entire Series

```
[3]: s=instructors[0]
     s
```

```
'Hopkins, Merle, W'
```

```
[4]: s.split(',')
```

```
['Hopkins', ' Merle', ' W']
```

```
[5]: l=s.split(',')
     l[1].strip()
```

```
'Merle'
```

```
[6]: from numpy import nan
     def getFirst(s):
         if type(s)!=str:
             return nan
         l=s.split(',')
         if len(l)<=1:
             return nan
         return l[1].strip()
     getFirst('Shi, Peng')
```

```
'Peng'
```

```
[7]: getFirst(nan)
```

```
nan
```

```
[8]: getFirst('Shi')
```

```
nan
```

```
[9]: instructors.apply(getFirst)
```

```
0       Merle
4         NaN
5      Leslie
9     Christo
13       Rose
Name: instructor, dtype: object
```

Q1: Create the following columns in the DataFrame "courses":

- first_name: the first name of the instructor. Use NaN if not available.
- last_name: the last name of the instructor. Use Nan if not available.

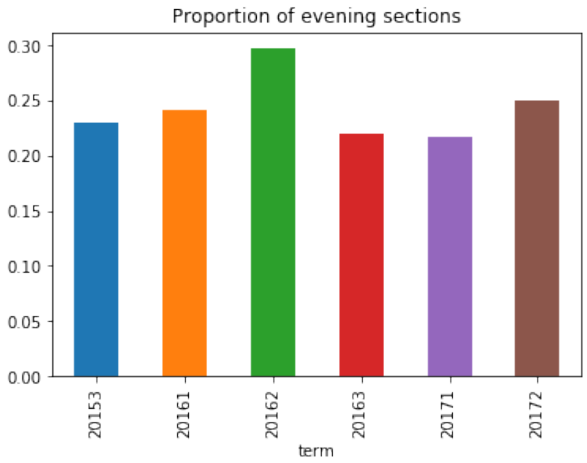
```
[13]: courses[['instructor','first_name','last_name']].head()
```

```
          instructor first_name last_name
0  Hopkins, Merle, W      Merle   Hopkins
1  Hopkins, Merle, W      Merle   Hopkins
2  Hopkins, Merle, W      Merle   Hopkins
3  Hopkins, Merle, W      Merle   Hopkins
4                NaN        NaN       NaN
```

Q2: Extract the hour from the column "end_time", and convert it to integers using "pd.to_numeric" (with errors='coerce'). Then create a columns called "evening" in the DataFrame "courses", corresponding to whether the hour is greater than or equal to 18.

Once you have created the column, you can compute the proportion of evening courses for each term.

```
[38]: courses.groupby('term')['evening'].mean()\
          .plot(kind='bar',title='Proportion of evening sections')
```



2. Vectorized String Methods in Pandas

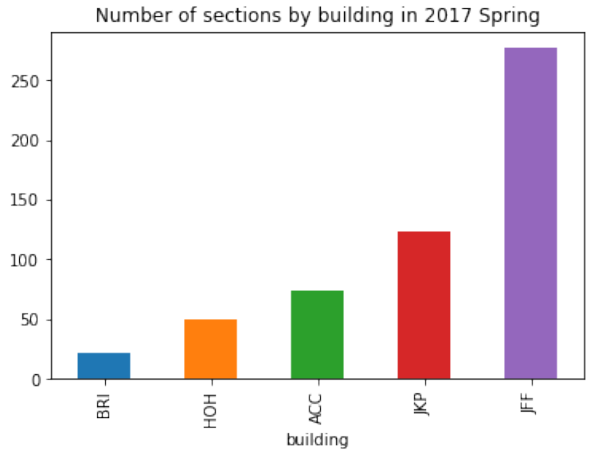
```
[19]: room=courses['room'].drop_duplicates()
      room.head()
```

```
0       SLH200
1       ACC303
8     HOH EDI
9       ACC310
22      HOH305
Name: room, dtype: object
```

```
[20]: room.str[:3].head()
```

```
0     SLH
1     ACC
8     HOH
9     ACC
22    HOH
Name: room, dtype: object
```

```
[21]: courses['building']=courses['room'].str[:3]
      courses[courses['building'].isin(['ACC','HOH','BRI','JKP','JFF'])]\
          .query('term==20171')\
          .groupby('building')['course'].count().sort_values()\
          .plot(kind='bar',title='Number of sections by building in 2017 Spring')
```



List of Available Series.str.XXX methods: https://pandas.pydata.org/pandas-docs/version/0.21/api.html#string-handling

```
[22]: courses['days'].head()
```

```
0     F
1    MW
2    MW
3    MW
4     F
Name: days, dtype: object
```

```
[23]: courses['days'].str.contains('M').head()
```

```
0    False
1     True
2     True
3     True
4    False
Name: days, dtype: object
```

```
[24]: courses.query('term==20171')['days'].str.contains('M').mean()
```

```
0.38487394957983195
```

```
[25]: import re
      courses['days'].str.contains('m',flags=re.IGNORECASE).head()
```

```
0    False
1     True
2     True
3     True
4    False
Name: days, dtype: object
```

```
[26]: courses['course'].head()
```

```
0    ACCT-370
1    ACCT-370
2    ACCT-370
3    ACCT-370
4    ACCT-371
Name: course, dtype: object
```

```
[27]: courses['course'].str.split('-').head()
```

```
0    [ACCT, 370]
1    [ACCT, 370]
2    [ACCT, 370]
3    [ACCT, 370]
4    [ACCT, 371]
Name: course, dtype: object
```

```
[28]: courses['course'].str.split('-').str[0].head()
```

```
0    ACCT
1    ACCT
2    ACCT
3    ACCT
4    ACCT
Name: course, dtype: object
```

```
[29]: courses['course'].str.split('-').str[1].head()
```

```
0    370
1    370
2    370
3    370
4    371
Name: course, dtype: object
```

Q3: Redo Q1 and Q2 using vectorized string methods already in Pandas, rather than writing your own function and calling Series.apply.

```
[31]: # Checking outputs for Q1
      courses[['first_name','last_name']].head()
```

```
  first_name last_name
0      Merle   Hopkins
1      Merle   Hopkins
2      Merle   Hopkins
3      Merle   Hopkins
4        NaN       NaN
```

```
[32]: courses['first_name'][0]
```

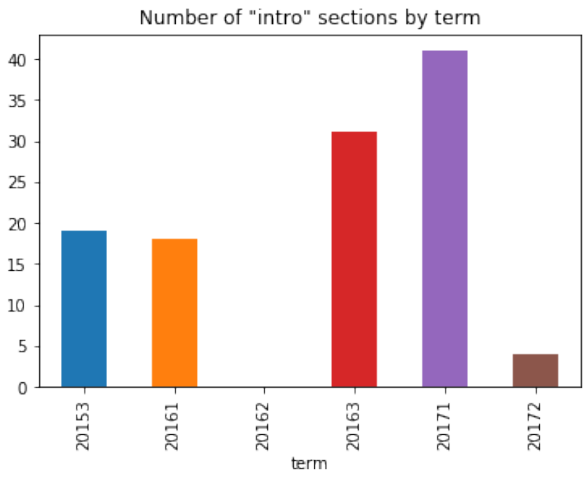
```
'Merle'
```

```
[34]: # Checking outputs for Q2
      courses.groupby('term')['evening'].mean()
```

```
term
20153    0.229814
20161    0.241379
20162    0.297297
20163    0.219911
20171    0.216590
20172    0.250000
Name: evening, dtype: float64
```

Q4: Plot the number of sections by term whose title contains the string "intro" (ignoring cases).

```
[35]:
```



(Optional) Q5: Run the following code to load in professor information, and merge it with the "courses" DataFrame using the "first_name" and "last_name" columns you have created. Then group by the "Role" and "Promotion" of professors and plot the percentage of sections taught by each group scheduled in the evening, as follows.

[36]:
```
professors=pd.read_csv('Professor_information.csv',encoding='latin1')\
    [['First_Name','Last_Name','Role','Promotion']]
professors.head()
```

	First_Name	Last_Name	Role	Promotion
0	Arif	Ansari	Clinical	Full
1	Yehuda	Bassok	Tenure Track	Full
2	Murat	Bayiz	Clinical	Associate
3	Jacob	Bien	Tenure Track	Assistant
4	Sriram	Dasu	Tenure Track	Associate

[37]: