Roll:No:225229101

ANNAPOORNIMA S

Lab3. Pandas Indexing and Selection

Simple Series and DataFrames

Import necessary modules

```
In [12]: import pandas as pd
```

Create a Series to store Temperature values for 1 week

```
In [13]: temperature_trichy = pd.Series([40.2, 39.8, 36.3, 39.1, 41.3, 32.9, 36.6])
```

show temperature values

```
In [14]: temperature_trichy
```

```
Out[14]: 0    40.2
         1    39.8
         2    36.3
         3    39.1
         4    41.3
         5    32.9
         6    36.6
         dtype: float64
```

What is the weather on 2nd day?

```
In [5]: temperature_trichy[1]
```

```
Out[5]: 39.8
```

Find all days and temperatures where temperature over 40.0 degree Celsius

In [11]:
```
temperature_trichy[temperature_trichy>40.0]
```

Out[11]:
```
0    40.2
4    41.3
dtype: float64
```

Find only day, not temperature where temperature over 40.0 degree Celsius

In [8]:
```
temperature_trichy[temperature_trichy>40.0].keys()
```

Out[8]:
```
Int64Index([0, 4], dtype='int64')
```

Create a Dataframe for student details from List

In [9]:
```
students = [['DS01', 'Rex', '1msc'], ['DS02', 'peter', '2msc'], ['CS01', 'ann'
df_stud = pd.DataFrame(students, columns=['rollno', 'name', 'class'])
```

show df_stud dataframe

In [10]:
```
df_stud
```

Out[10]:

	rollno	name	class
0	DS01	Rex	1msc
1	DS02	peter	2msc
2	CS01	ann	3bsc

Display all column names of df_stud

In [11]:
```
df_stud.columns
```

Out[11]:
```
Index(['rollno', 'name', 'class'], dtype='object')
```

Add a new column "address" with values ['Delhi', 'Bangalore', 'Chennai'] to df_stud

In [12]:

```
address= ['Delhi', 'Bangalore', 'Chennai']
df_stud['address']=address
```

In [13]:

```
df_stud
```

Out[13]:

	rollno	name	class	address
0	DS01	Rex	1msc	Delhi
1	DS02	peter	2msc	Bangalore
2	CS01	ann	3bsc	Chennai

Create a Dataframe for Phone book from Dictionary

In [14]:

```
phonebook = {'rex':[9942002764, 'rex@abc.com'], 'sam':[9932176542, 'sam@xyz.co
df_phonebook = pd.DataFrame.from_dict(phonebook, orient='index',columns=['mobi
```

Display df_phonebook

In [16]:

```
df_phonebook
```

Out[16]:

	mobile	email
rex	9942002764	rex@abc.com
sam	9932176542	sam@xyz.com
peter	9865323645	ann@bhc.com

Exploratory Data Analysis on Video Game Review Dataset

Import ign.csv dataset

In [17]:

```
reviews = pd.read_csv("ign.csv")
```

In [18]:
```
reviews
```

Out[18]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre
0	0	Amazing	LittleBigPlanet PS Vita	/games/littlebigplanet-vita/vita-98907	PlayStation Vita	9.0	Platformer
1	1	Amazing	LittleBigPlanet PS Vita -- Marvel Super Hero E...	/games/littlebigplanet-ps-vita-marvel-super-he...	PlayStation Vita	9.0	Platformer
2	2	Great	Splice: Tree of Life	/games/splice/ipad-141070	iPad	8.5	Puzzle
3	3	Great	NHL 13	/games/nhl-13/xbox-360-128182	Xbox 360	8.5	Sports
4	4	Great	NHL 13	/games/nhl-13/ps3-128181	PlayStation 3	8.5	Sports
...	...	...	...	...	...	...	...
18620	18620	Good	Tokyo Mirage Sessions #FE	/games/fire-emblem-x-shin-megami-tensei/wii-u-...	Wii U	7.6	RPG
18621	18621	Amazing	LEGO Star Wars: The Force Awakens	/games/lego-star-wars-the-force-awakens/ps4-20...	PlayStation 4	9.0	Action, Adventure
18622	18622	Mediocre	Star Ocean: Integrity and Faithlessness	/games/star-ocean-5/ps4-20035681	PlayStation 4	5.8	RPG
18623	18623	Masterpiece	Inside	/games/inside-playdead/xbox-one-121435	Xbox One	10.0	Adventure
18624	18624	Masterpiece	Inside	/games/inside-playdead/pc-20055740	PC	10.0	Adventure

18625 rows × 11 columns

show top 5 rows

In [19]:
```
reviews.head(5)
```

Out[19]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	edi
0	0	Amazing	LittleBigPlanet PS Vita	/games/littlebigplanet-vita/vita-98907	PlayStation Vita	9.0	Platformer	
1	1	Amazing	LittleBigPlanet PS Vita -- Marvel Super Hero E...	/games/littlebigplanet-ps-vita-marvel-super-he...	PlayStation Vita	9.0	Platformer	
2	2	Great	Splice: Tree of Life	/games/splice/ipad-141070	iPad	8.5	Puzzle	
3	3	Great	NHL 13	/games/nhl-13/xbox-360-128182	Xbox 360	8.5	Sports	
4	4	Great	NHL 13	/games/nhl-13/ps3-128181	PlayStation 3	8.5	Sports	

Show bottom 3 rows

In [20]:
```
reviews.tail(3)
```

Out[20]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	edito
18622	18622	Mediocre	Star Ocean: Integrity and Faithlessness	/games/star-ocean-5/ps4-20035681	PlayStation 4	5.8	RPG	
18623	18623	Masterpiece	Inside	/games/inside-playdead/xbox-one-121435	Xbox One	10.0	Adventure	
18624	18624	Masterpiece	Inside	/games/inside-playdead/pc-20055740	PC	10.0	Adventure	

How many rows and columns here?

In [23]:
```
reviews.shape
```

Out[23]:
```
(18625, 11)
```

What are the datatypes?

```
In [22]: reviews.dtypes
```

```
Out[22]: Unnamed: 0          int64
         score_phrase       object
         title              object
         url                object
         platform           object
         score             float64
         genre              object
         editors_choice     object
         release_year        int64
         release_month       int64
         release_day         int64
         dtype: object
```

Selecting Columns

Select a single column, say title and print head

```
In [24]: reviews.title.tail()
```

```
Out[24]: 18620                   Tokyo Mirage Sessions #FE
         18621             LEGO Star Wars: The Force Awakens
         18622     Star Ocean: Integrity and Faithlessness
         18623                                      Inside
         18624                                      Inside
         Name: title, dtype: object
```

Select multiple columns, title and genre and print head

In [25]:
```
reviews[['title','genre']].head(10)
```

Out[25]:

	title	genre
0	LittleBigPlanet PS Vita	Platformer
1	LittleBigPlanet PS Vita -- Marvel Super Hero E...	Platformer
2	Splice: Tree of Life	Puzzle
3	NHL 13	Sports
4	NHL 13	Sports
5	Total War Battles: Shogun	Strategy
6	Double Dragon: Neon	Fighting
7	Guild Wars 2	RPG
8	Double Dragon: Neon	Fighting
9	Total War Battles: Shogun	Strategy

Selection using Positions

Select top-5 rows and all columns, same as head() using iloc

In [26]:
```
reviews.iloc[0:5,:]
```

Out[26]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	edi
0	0	Amazing	LittleBigPlanet PS Vita	/games/littlebigplanet-vita/vita-98907	PlayStation Vita	9.0	Platformer	
1	1	Amazing	LittleBigPlanet PS Vita -- Marvel Super Hero E...	/games/littlebigplanet-ps-vita-marvel-super-he...	PlayStation Vita	9.0	Platformer	
2	2	Great	Splice: Tree of Life	/games/splice/ipad-141070	iPad	8.5	Puzzle	
3	3	Great	NHL 13	/games/nhl-13/xbox-360-128182	Xbox 360	8.5	Sports	
4	4	Great	NHL 13	/games/nhl-13/ps3-128181	PlayStation 3	8.5	Sports	

Select rows from position 5 onwards, and columns from position 5 onwards

In [27]:
```
reviews.iloc[4:,4:].head()
```

Out[27]:

	platform	score	genre	editors_choice	release_year	release_month	release_day
4	PlayStation 3	8.5	Sports	N	2012	9	11
5	Macintosh	7.0	Strategy	N	2012	9	11
6	Xbox 360	3.0	Fighting	N	2012	9	11
7	PC	9.0	RPG	Y	2012	9	11
8	PlayStation 3	3.0	Fighting	N	2012	9	11

Select the first column, and all of the rows for the column

In [28]:
```
reviews.iloc[:,0].head()
```

Out[28]:
```
0    0
1    1
2    2
3    3
4    4
Name: Unnamed: 0, dtype: int64
```

the 10th row, and all of the columns for that row.

In [29]:
```
reviews.iloc[9,:]
```

Out[29]:
```
Unnamed: 0                                                 9
score_phrase                                            Good
title                                Total War Battles: Shogun
url               /games/total-war-battles-shogun/pc-142564
platform                                                  PC
score                                                      7
genre                                               Strategy
editors_choice                                             N
release_year                                            2012
release_month                                              9
release_day                                               11
Name: 9, dtype: object
```

First column is not useful. So remove it

In [30]:
```
reviews=reviews.drop("Unnamed: 0",axis=1)
```

Selection using Row and Column Labels

In [39]:

```
students=[['DS01','rex','1msc'],['DS02','peter','2msc'],['CS01','ann','3bsc']]
df_stud=pd.DataFrame(students,columns=['rollno','name','class'])
```

In [40]:

```
df_stud
```

Out[40]:

	rollno	name	class
0	DS01	rex	1msc
1	DS02	peter	2msc
2	CS01	ann	3bsc

Print all names using loc

In [41]:

```
df_stud.loc[:,'name']
```

Out[41]:

```
0      rex
1    peter
2      ann
Name: name, dtype: object
```

Let us come back to our reviews. Display the first five rows of reviews using the loc method

In [42]:

```
reviews.loc[:4,:]
```

Out[42]:

	score_phrase	title	url	platform	score	genre	editors_choice
0	Amazing	LittleBigPlanet PS Vita	/games/littlebigplanet-vita/vita-98907	PlayStation Vita	9.0	Platformer	Y
1	Amazing	LittleBigPlanet PS Vita -- Marvel Super Hero E...	/games/littlebigplanet-ps-vita-marvel-super-he...	PlayStation Vita	9.0	Platformer	Y
2	Great	Splice: Tree of Life	/games/splice/ipad-141070	iPad	8.5	Puzzle	N
3	Great	NHL 13	/games/nhl-13/xbox-360-128182	Xbox 360	8.5	Sports	N
4	Great	NHL 13	/games/nhl-13/ps3-128181	PlayStation 3	8.5	Sports	N

Select score_phrase column using loc and print head

In [43]:

```
reviews.loc[:4,'score_phrase']
```

Out[43]:

```
0    Amazing
1    Amazing
2      Great
3      Great
4      Great
Name: score_phrase, dtype: object
```

Print top 10 values of column label "score_phrase"

In [44]:

```
reviews.loc[:9,'score_phrase']
```

Out[44]:

```
0    Amazing
1    Amazing
2      Great
3      Great
4      Great
5       Good
6      Awful
7    Amazing
8      Awful
9       Good
Name: score_phrase, dtype: object
```

Select from reviews of rows from 5 to 15

In [45]:

```
some_reviews=reviews.loc[5:15,:]
```

In [46]:
```
some_reviews.head()
```

Out[46]:

	score_phrase	title	url	platform	score	genre	editors_choice	release_yea
5	Good	Total War Battles: Shogun	/games/total-war-battles-shogun/mac-142565	Macintosh	7.0	Strategy	N	201
6	Awful	Double Dragon: Neon	/games/double-dragon-neon/xbox-360-131320	Xbox 360	3.0	Fighting	N	201
7	Amazing	Guild Wars 2	/games/guild-wars-2/pc-896298	PC	9.0	RPG	Y	201
8	Awful	Double Dragon: Neon	/games/double-dragon-neon/ps3-131321	PlayStation 3	3.0	Fighting	N	201
9	Good	Total War Battles: Shogun	/games/total-war-battles-shogun/pc-142564	PC	7.0	Strategy	N	201

Select score of first 3 rows some_reviews

In [47]:
```
some_reviews.loc[:,'score'].head(3)
```

Out[47]:
```
5    7.0
6    3.0
7    9.0
Name: score, dtype: float64
```

Select "score", "genre", and "release_year" columns from reviews dataframe and print head

In [48]:
```
reviews.loc[:,['score','genre','release_year']].head()
```

Out[48]:

	score	genre	release_year
0	9.0	Platformer	2012
1	9.0	Platformer	2012
2	8.5	Puzzle	2012
3	8.5	Sports	2012
4	8.5	Sports	2012

What is the datatype of "score" column?

```
In [50]: a=reviews.loc[:,'score']
         type(a)

Out[50]: pandas.core.series.Series
```

Aggregate Columns

Find average value of score column in reviews dataframe

```
In [51]: reviews.score.mean()

Out[51]: 6.950459060402666
```

Find average value of all numeric columns

```
In [53]: reviews.mean()

Out[53]: score               6.950459
         release_year     2006.515329
         release_month       7.138470
         release_day        15.603866
         dtype: float64
```

Find average value for each row containing numeric values and print head

```
In [55]: reviews.mean(axis=1).head()

Out[55]: 0    510.500
         1    510.500
         2    510.375
         3    510.125
         4    510.125
         dtype: float64
```

Find lowest, highest, median, standard deviation of score column of reviews dataframe

show median of "score" column of reviews dataframe

```
In [56]: reviews.score.median()
```

```
Out[56]: 7.3
```

show minimum of "score" column of reviews dataframe

```
In [59]: reviews.score.min()
```

```
Out[59]: 0.5
```

show maximum of "score" column of reviews dataframe

```
In [58]: reviews.score.max()
```

```
Out[58]: 10.0
```

show standard deviation of "score" column of reviews dataframe

```
In [60]: reviews['score'].std()
```

```
Out[60]: 1.7117358608045874
```

How many non-null values in "score" column of reviews dataframe?

```
In [61]: reviews['score'].notnull().sum()
```

```
Out[61]: 18625
```

Show the summary of reviews dataframe

In [62]:
```
reviews.describe()
```

Out[62]:

	score	release_year	release_month	release_day
count	18625.000000	18625.000000	18625.00000	18625.000000
mean	6.950459	2006.515329	7.13847	15.603866
std	1.711736	4.587529	3.47671	8.690128
min	0.500000	1970.000000	1.00000	1.000000
25%	6.000000	2003.000000	4.00000	8.000000
50%	7.300000	2007.000000	8.00000	16.000000
75%	8.200000	2010.000000	10.00000	23.000000
max	10.000000	2016.000000	12.00000	31.000000

Check if review score has any correlation with other columns of reviews

In [64]:
```
reviews.corr()
```

Out[64]:

	score	release_year	release_month	release_day
score	1.000000	0.062716	0.007632	0.020079
release_year	0.062716	1.000000	-0.115515	0.016867
release_month	0.007632	-0.115515	1.000000	-0.067964
release_day	0.020079	0.016867	-0.067964	1.000000

Math Operations on DF columns

Divide the values of "score" column in reviews dataframe by 2. There will be too many values, so just print head

In [65]:
```
(reviews.score/2).head()
```

Out[65]:
```
0    4.50
1    4.50
2    4.25
3    4.25
4    4.25
Name: score, dtype: float64
```

Boolean Indexing in Pandas

Select all video games whose review score > 7, call it score_filter

In [66]:
```
score_filter=(reviews.score>7)
```

Print head of score_filter

In [67]:
```
score_filter.head()
```

Out[67]:
```
0    True
1    True
2    True
3    True
4    True
Name: score, dtype: bool
```

Select all rows for score_filter column and print its head

In [68]:
```
filtered_reviews=reviews[reviews.score>7]
```

In [69]:
```
filtered_reviews.head()
```

Out[69]:

	score_phrase	title	url	platform	score	genre	editors_choice
0	Amazing	LittleBigPlanet PS Vita	/games/littlebigplanet-vita/vita-98907	PlayStation Vita	9.0	Platformer	Y
1	Amazing	LittleBigPlanet PS Vita -- Marvel Super Hero E...	/games/littlebigplanet-ps-vita-marvel-super-he...	PlayStation Vita	9.0	Platformer	Y
2	Great	Splice: Tree of Life	/games/splice/ipad-141070	iPad	8.5	Puzzle	N
3	Great	NHL 13	/games/nhl-13/xbox-360-128182	Xbox 360	8.5	Sports	N
4	Great	NHL 13	/games/nhl-13/ps3-128181	PlayStation 3	8.5	Sports	N

Show the size of filtered_reviews

In [70]:
```
filtered_reviews.shape
```

Out[70]:
```
(9800, 10)
```

Show top 10 "title" from filtered_reviews

In [71]:
```
(filtered_reviews.title).head(10)
```

Out[71]:
```
0                               LittleBigPlanet PS Vita
1     LittleBigPlanet PS Vita -- Marvel Super Hero E...
2                                  Splice: Tree of Life
3                                                NHL 13
4                                                NHL 13
7                                          Guild Wars 2
10                              Tekken Tag Tournament 2
11                              Tekken Tag Tournament 2
13                                    Mark of the Ninja
14                                    Mark of the Ninja
Name: title, dtype: object
```

Find games released for the Xbox One platform that have a score of more than 7

FIND CREATE A FILTER, CALLED XBOX_ONE_FILTER FOR THE CONDITIONS

In [72]:
```
xbox_one_filter = (reviews["score"] > 7) & (reviews["platform"] == "Xbox One")
```

SELECT THOSE ROWS FROM REVIEWS OF XBOX_ONE_FILTER AND PRINT HEAD

In [73]:
```
filtered_reviews2 = reviews[xbox_one_filter]
filtered_reviews2.head()
```

Out[73]:

	score_phrase	title	url	platform	score	genre	editors_choice	releas
17137	Amazing	Gone Home	/games/gone-home/xbox-one-20014361	Xbox One	9.5	Simulation	Y	
17197	Amazing	Rayman Legends	/games/rayman-legends/xbox-one-20008449	Xbox One	9.5	Platformer	Y	
17295	Amazing	LEGO Marvel Super Heroes	/games/lego-marvel-super-heroes/xbox-one-20000826	Xbox One	9.0	Action	Y	
17313	Great	Dead Rising 3	/games/dead-rising-3/xbox-one-124306	Xbox One	8.3	Action	N	
17317	Great	Killer Instinct	/games/killer-instinct-2013/xbox-one-20000538	Xbox One	8.4	Fighting	N	

WHAT IS THE SIZE OF FILTERED_REVIEWS 2

In [74]:
```
filtered_reviews2.shape
```

Out[74]:
```
(140, 10)
```

SELECT ALL VIDEO GAMES WHICH ARE 'ACTION'

In [75]:
```
action_reviews = reviews[reviews.genre == 'Action']
```

In [76]:
```
action_reviews
```

Out[76]:

	score_phrase	title	url	platform	score	genre	editors_choice
17	Great	Avengers Initiative	/games/avengers-initiative/iphone-141579	iPhone	8.0	Action	N
34	Good	War of the Roses	/games/war-of-the-roses-140577/pc-115849	PC	7.3	Action	N
45	Amazing	Bad Piggies	/games/bad-piggies/iphone-141455	iPhone	9.2	Action	Y
49	Okay	Demon's Score	/games/demons-score/iphone-118050	iPhone	6.9	Action	N
69	Great	Hotline Miami	/games/hotline-miami/pc-139657	PC	8.8	Action	Y
...	...	...	...	...	...	...	...
18577	Good	Attack on Titan	/games/attack-on-titan-wings-of-freedom/ps4-20...	PlayStation 4	7.3	Action	N
18595	Bad	Ghostbusters	/games/ghostbusters-the-movie/pc-20052317	PC	4.4	Action	N
18598	Okay	Furi	/games/furi/pc-20044439	PC	6.8	Action	N
18609	Great	Monster Hunter Generations	/games/monster-hunter-generations/3ds-20037986	Nintendo 3DS	8.0	Action	N
18618	Amazing	Starbound	/games/starbound-2016/pc-128879	PC	9.1	Action	Y

3797 rows × 10 columns

what is the size of action_reviews?

In [77]:
```
action_reviews.shape
```

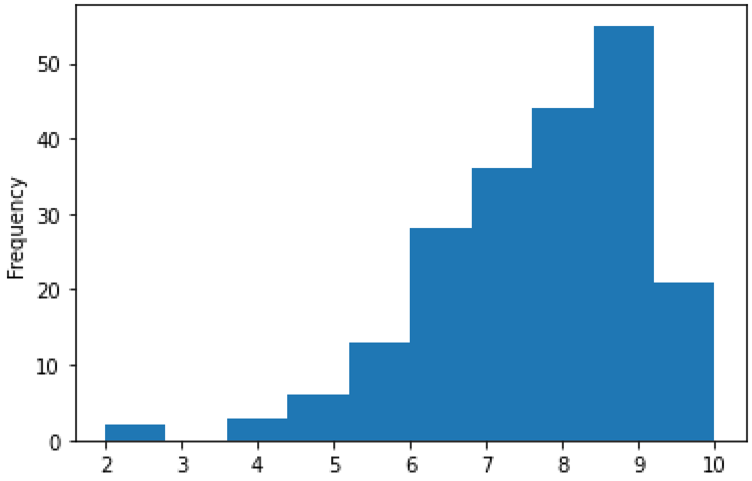
Out[77]:
```
(3797, 10)
```

PLOT REVIEW RATINGS OF TWO PLAY STATIONS AND COMPARE WHICH ONE HAS MORE RATINGS?

PLOT HISTOGRAM FOR THE FREQUENCIES OF DIFFERENT SCORE RANGES OF XBOX ONE PLATFORM

```
In [80]: import matplotlib.pyplot as plt
         reviews[reviews["platform"] == "Xbox One"]["score"].plot(kind="hist")
```

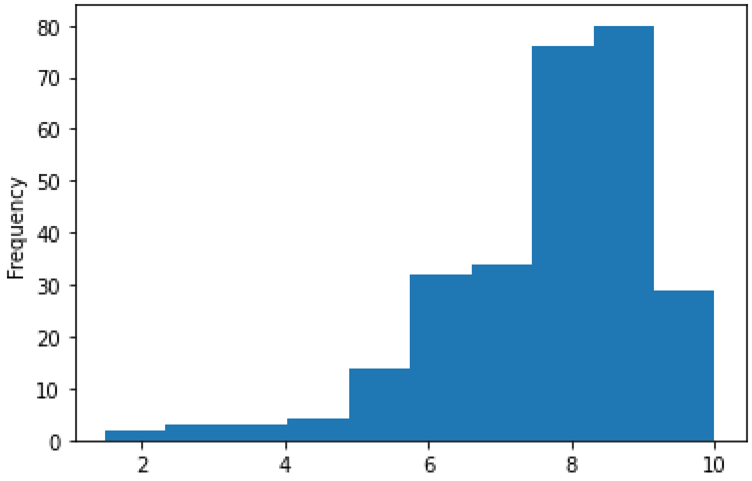
```
Out[80]: <AxesSubplot:ylabel='Frequency'>
```



PLOT HISTOGRAM FOR FREQUENCIES OF THE SCORE OF PLAY STATION 4 PLATFORM

```
In [81]: reviews[reviews["platform"] == "PlayStation 4"]["score"].plot(kind="hist")
```

```
Out[81]: <AxesSubplot:ylabel='Frequency'>
```



```
In [ ]:
```