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LAB3 :PANDAS INDEXING AND SELECTION

Import necessary modules

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

Create a Series to store Temperature values for 1 week

```
In [3]: temperature_trichy=pd.Series([40.2,39.8,36.3,39.1,41.3,32.9,36.6])
```

Show temperature values

```
In [4]: temperature_trichy
```

```
Out[4]: 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

```
In [6]: temperature_trichy[[0,4]]
```

```
Out[6]: 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 [15]:
```
phonebook = {'rex':[9942002764, 'rex@abc.com'], 'sam':[9932176542, 'sam@xyz.com']
df_phonebook = pd.DataFrame.from_dict(phonebook, orient='index')
```

Display df_phonebook

In [16]:
```
df_phonebook
```

Out[16]:

	0	1
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.head()
```

Out[18]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	edito
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 [19]:
```
reviews.tail(3)
```

Out[19]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	editors
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 [20]:
```
reviews.shape
```

Out[20]:
```
(18625, 11)
```

What are the datatypes?

In [21]:
```
reviews.dtypes
```

Out[21]:
```
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 [22]:
```
reviews.title.tail()
```

Out[22]:
```
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 [23]:
```
reviews[['title','genre']].head(10)
```

Out[23]:

	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 [24]:
```
reviews.iloc[0:5,:]
```

Out[24]:

	Unnamed: 0	score_phrase	title	url	platform	score	genre	edito
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 [25]:
```
reviews.iloc[4:,4:].head()
```

Out[25]:

	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 [26]:
```
reviews.iloc[:,0].head()
```

Out[26]:
```
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 [27]:
```
reviews.iloc[9,:]
```

Out[27]:
```
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 [28]:
```
reviews=reviews.drop("Unnamed: 0",axis=1)
```

Selection using Row and Column Labels

In [29]:
```
df_stud
```

Out[29]:

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

Print all names using loc

In [30]:
```
df_stud.loc[:,'name']
```

Out[30]:
```
0      Rex
1    peter
2      ann
Name: name, dtype: object
```

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

In [31]:
```
reviews.loc[:4,:]
```

Out[31]:

	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 [32]:
```
reviews.loc[:4,'score_phrase']
```

Out[32]:
```
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 [34]:
```
reviews.loc[:9,'score_phrase']
```

Out[34]:
```
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 [35]:
```
some_reviews=reviews.loc[5:15,:]
```

In [36]:
```
some_reviews.head()
```

Out[36]:

	score_phrase	title	url	platform	score	genre	editors_choice	release_year
5	Good	Total War Battles: Shogun	/games/total-war-battles-shogun/mac-142565	Macintosh	7.0	Strategy	N	2012
6	Awful	Double Dragon: Neon	/games/double-dragon-neon/xbox-360-131320	Xbox 360	3.0	Fighting	N	2012
7	Amazing	Guild Wars 2	/games/guild-wars-2/pc-896298	PC	9.0	RPG	Y	2012
8	Awful	Double Dragon: Neon	/games/double-dragon-neon/ps3-131321	PlayStation 3	3.0	Fighting	N	2012
9	Good	Total War Battles: Shogun	/games/total-war-battles-shogun/pc-142564	PC	7.0	Strategy	N	2012

Select score of first 3 rows some_reviews

In [37]:
```
some_reviews.loc[:,'score'].head(3)
```

Out[37]:
```
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 [38]:
```
reviews.loc[:,['score','genre','release_year']].head()
```

Out[38]:

	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 [39]:
```
a=reviews.loc[:,'score']
type(a)
```

Out[39]:
```
pandas.core.series.Series
```

Aggregate Columns

Find average value of score column in reviews dataframe

In [40]:
```
reviews.score.mean()
```

Out[40]:
```
6.950459060402666
```

Find average value of all numeric columns

In [41]:
```
reviews.mean()
```

Out[41]:
```
score               6.950459
release_year     2006.515329
release_month       7.138470
release_day        15.603866
dtype: float64
```

Find average value for each numeric column

In [42]:
```
reviews.mean()
```

Out[42]:
```
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 [43]:
```
reviews.mean(axis=1).head()
```

Out[43]:
```
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 [44]: reviews.score.median()
Out[44]: 7.3
```

Show minimum of "score" column of reviews dataframe

```
a=reviews.score
min(a)
```

Show maximum of "score" column of reviews dataframe

```
In [46]: max(a)
Out[46]: 10.0
```

Show standard deviation of "score" column of reviews dataframe

```
In [47]: reviews['score'].std()
Out[47]: 1.7117358608045874
```

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

```
In [48]: reviews['score'].notnull().sum()
Out[48]: 18625
```

Show the summary of reviews dataframe

In [49]:
```
reviews.describe()
```

Out[49]:

	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 [50]:
```
reviews.corr()
```

Out[50]:

	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 [51]:
```
(reviews.score/2).head()
```

Out[51]:
```
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 [52]:
```
score_filter=(reviews.score>7)
```

Print head of score_filter

In [53]:
```
score_filter.head()
```

Out[53]:
```
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 [54]:
```
filtered_reviews=reviews[reviews.score>7]
```

In [55]:
```
filtered_reviews.head()
```

Out[55]:

	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 [56]:
```
filtered_reviews.shape
```

Out[56]:
```
(9800, 10)
```

Show top 10 "title" from filtered_reviews

In [57]:
```
(filtered_reviews.title).head(10)
```

Out[57]:
```
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 [58]:
```
xbox_one_filter = (reviews["score"] > 7) & (reviews["platform"] == "Xbox One")
```

SELECT THOSE ROWS FROM REVIEWS OF XBOX_ONE_FILTER AND PRINT HEAD

In [59]:
```
filtered_reviews2 = reviews[xbox_one_filter]
filtered_reviews2.head()
```

Out[59]:

	score_phrase	title	url	platform	score	genre	editors_choice	release_
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 [60]: filtered_reviews2.shape
```

```
Out[60]: (140, 10)
```

SELECT ALL VIDEO GAMES WHICH ARE 'ACTION'

```
In [61]: action_reviews = reviews[reviews.genre == 'Action']
```

```
In [62]: action_reviews.head()
```

Out[62]:

	score_phrase	title	url	platform	score	genre	editors_choice	release_year
17	Great	Avengers Initiative	/games/avengers-initiative/iphone-141579	iPhone	8.0	Action	N	2012
34	Good	War of the Roses	/games/war-of-the-roses-140577/pc-115849	PC	7.3	Action	N	2012
45	Amazing	Bad Piggies	/games/bad-piggies/iphone-141455	iPhone	9.2	Action	Y	2012
49	Okay	Demon's Score	/games/demons-score/iphone-118050	iPhone	6.9	Action	N	2012
69	Great	Hotline Miami	/games/hotline-miami/pc-139657	PC	8.8	Action	Y	2012

```
In [63]: action_reviews.shape
```

```
Out[63]: (3797, 10)
```

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

Now that we know how to filter, We can create plots to observe the review distribution for the Xbox one vs the review distributionfor the PlayStation 4 . This will help us figure out which console has better games. We can do this via a histogram, which will plot the frequencies for different score ranges

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

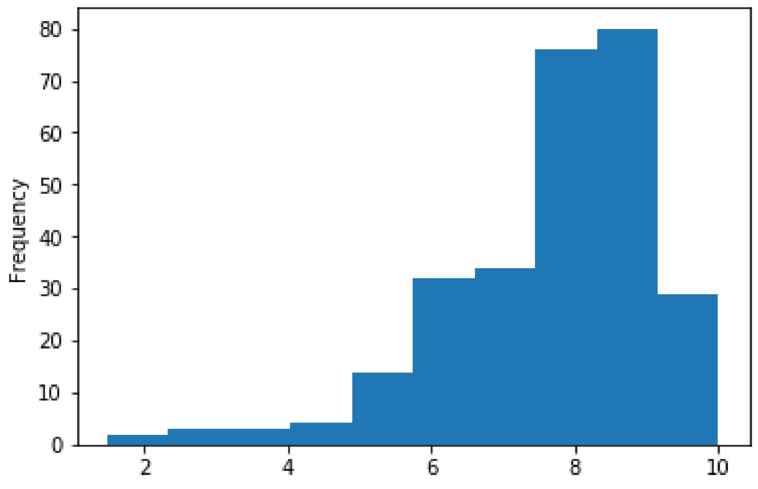
```
In [65]: import matplotlib.pyplot as plt
         reviews[reviews["platform"] == "Xbox One"]["score"].plot(kind="hist")
```

```
Out[65]: <matplotlib.axes._subplots.AxesSubplot at 0x1c7116a1c50>
```

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

In [66]:
```
reviews[reviews["platform"] == "PlayStation 4"]["score"].plot(kind="hist")
```

Out[66]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1c712f98240>
```



Therefore, it appears from our histograms that the PlayStation4 has many more highly rated games than the Xbox One.

In [ ]: