

### 13. PANDAS – iLOC AND LOC

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### 13. PANDAS – iLOC AND LOC

#### 1. Selecting single column

- ✓ Based on requirement we can select columns from the DataFrame.
  - If we select a single column then it returns the Series

**Program Name**      Selecting single column from the DataFrame  
**demo1.py**  
**Input file**        sales1.csv

```
import pandas as pd

df = pd.read_csv("sales1.csv")
print(df.Product)
```

#### Output

```
0      34in Ultrawide Monitor
1           Samsung m10
2      20in Monitor
3           iPhone 11
4      Macbook Pro Laptop
...
595      Macbook Pro Laptop
596      ThinkPad Laptop
597      Flatscreen TV
598           Samsung m20
599      LG Washing Machine
Name: Product, Length: 600, dtype: object
```

**Program** Selecting single column from the DataFrame  
**Name** demo2.py  
**Input file** sales1.csv

```
import pandas as pd

df = pd.read_csv("sales1.csv")
s = df["Product"]
print(s)
```

**Output**

```
0      34in Ultrawide Monitor
1           Samsung m10
2           20in Monitor
3           iPhone 11
4      Macbook Pro Laptop
...
595      Macbook Pro Laptop
596      ThinkPad Laptop
597      Flatscreen TV
598      Samsung m20
599      LG Washing Machine
Name: Product, Length: 600, dtype: object
```

### 2. Selecting multiple columns

- ✓ Based on requirement we can select columns from the DataFrame.
  - If we select more than one column then it returns the DataFrame.

**Program** Selecting multiple columns from the DataFrame  
**Name** demo3.py  
**Input file** sales1.csv

```
import pandas as pd

df1 = pd.read_csv("sales1.csv")
cols = ["Customer Name", "Product"]
df2 = df1[cols]

print(df2)
```

#### Output

```
   Customer Name  Product
0         Veeru  34in Ultrawide Monitor
1         Tarun   Samsung m10
2         Kedar   20in Monitor
3        Lavanya   iPhone 11
4         Venu   Macbook Pro Laptop
..          ...          ...
595        Balaji  Macbook Pro Laptop
596        Lavanya  ThinkPad Laptop
597         Venu   Flatscreen TV
598        Siddhu   Samsung m20
599        Tarun   LG Washing Machine

[600 rows x 2 columns]
```

**Program Name**      Selecting single column from the DataFrame, apply total  
**Input file**      demo4.py  
                         sales1.csv

```
import pandas as pd

df = pd.read_csv("sales1.csv")
total = df['Quantity'].sum()
print(total)
```

**Output**

889

### 3. Selecting specific column values

- ✓ Based on requirement we can select specific column values from the DataFrame
  - By using Boolean condition we can select the data from DataFrame.

**Program** Creating a DataFrame by loading csv file  
**Name** demo5.py  
**Input file** sales1.csv

```
import pandas as pd

df1 = pd.read_csv("sales1.csv")

print(df1)
```

#### Output

```
   Order ID Customer Name      Product  Quantity
0    166837      Veeru  34in Ultrawide Monitor      2
1    166838      Tarun      Samsung m10      3
2    166839      Kedar      20in Monitor      1
3    166840    Lavanya      iPhone 11      3
4    166841      Venu  Macbook Pro Laptop      2
..      ...      ...      ...      ...
595  167403    Balaji  Macbook Pro Laptop      1
596  167404    Lavanya  ThinkPad Laptop      1
597  167405      Venu  Flatscreen TV      1
598  167406    Siddhu      Samsung m20      2
599  167407      Tarun  LG Washing Machine      1

[600 rows x 4 columns]
```

**Program** Select specific customer from existing DataFrame  
**Name** demo6.py  
**Input file** sales1.csv

```
import pandas as pd

df1 = pd.read_csv("sales1.csv")

cust_name = df1["Customer Name"] == "Veeru"

print(df1[cust_name])
```

**Output**

	Order ID	Customer Name	Product	Quantity
0	166837	Veeru	34in Ultrawide Monitor	2
25	166861	Veeru	Wired Headphones	1
34	166870	Veeru	Wired Headphones	2
61	166897	Veeru	USB-C Charging Cable	2
65	166901	Veeru	Samsung m10	2
77	166913	Veeru	iPhone 9	1
85	166920	Veeru	iPhone 9	2
88	166923	Veeru	27in FHD Monitor	1
113	166948	Veeru	Samsung m10	1
117	166952	Veeru	LG Washing Machine	2
129	166964	Veeru	Samsung m10	1
130	166965	Veeru	Bose SoundSport Headphones	1
134	166968	Veeru	iPhone 7	2
190	167019	Veeru	Macbook Pro Laptop	2
283	167105	Veeru	LG Washing Machine	1
315	167135	Veeru	LG Washing Machine	1
322	167142	Veeru	iPhone 7s	1
326	167146	Veeru	Samsung m20	2

**Program** Select specific customer from existing DataFrame  
**Name** demo7.py  
**Input file** sales1.csv

```
import pandas as pd

df1 = pd.read_csv("sales1.csv")

prod_name = df1["Product"] == "Macbook Pro Laptop"

print(df1[prod_name])
```

**Output**

	Order ID	Customer Name	Product	Quantity
4	166841	Venu	Macbook Pro Laptop	2
11	166848	Karteek	Macbook Pro Laptop	1
15	166851	Jaya Chandra	Macbook Pro Laptop	1
71	166907	Karteek	Macbook Pro Laptop	1
122	166957	Harsha	Macbook Pro Laptop	2
136	166970	Tarun	Macbook Pro Laptop	2
156	166986	Pradhan	Macbook Pro Laptop	1
184	167013	Sumanth	Macbook Pro Laptop	1
190	167019	Veeru	Macbook Pro Laptop	2
192	167021	Mallikarjun	Macbook Pro Laptop	1
199	167027	Balaji	Macbook Pro Laptop	1
225	167050	Venu	Macbook Pro Laptop	2
242	167067	Madhurima	Macbook Pro Laptop	2
251	167074	Lavanya	Macbook Pro Laptop	1
261	167084	Shahid	Macbook Pro Laptop	1
285	167107	Jaya Chandra	Macbook Pro Laptop	1
302	167123	Karteek	Macbook Pro Laptop	1
310	167130	Partha	Macbook Pro Laptop	2
332	167152	Venki	Macbook Pro Laptop	1
348	167167	Kedar	Macbook Pro Laptop	2
353	167172	Balaji	Macbook Pro Laptop	1
357	167176	Shahid	Macbook Pro Laptop	2



### 4. **iloc** and **loc** indexers

- ✓ We can select columns from the DataFrame by using **iloc** and **loc**.
- ✓ **iloc** and **loc** are called as indexers in DataFrame
- ✓ By using these indexers we can get,
  - Rows and columns of DataFrame
  - Slice of DataFrame

### 5. `iloc[]` indexer

- ✓ The `iloc` is used for indexed-based selection method.
- ✓ We have to pass only integer index to select specific row/column.
- ✓ By using this we can get rows or columns at particular positions in the index (so it only takes integers).
- ✓ This does not include the last element in DataFrame

#### 5.1. `iloc[]` syntax

##### `iloc[]` syntax

- ✓ `df.iloc[<row selection>]`

##### `iloc[]` syntax

- ✓ `df.iloc[<row selection>, <column selection>]`

#### Note on syntax

- ✓ So, according the syntax there are two arguments,
  - Row selection
  - Column selection

### 5.2. Creating a DataFrame

- ✓ Whenever we load a csv file then pandas returns the DataFrame

**Program** Loading csv file by using pandas  
**Name** demo8.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
print(df1)
```

#### Output

```
   Order id Customer name Customer id Product name Product cost
0    192837      Partha         8      Apple iPad 10.2-inch    59000
1    192838      Vinay        10  Flatscreen TV             65999
2    192839    Lavanya        16    20in Monitor           75000
3    192840      Mohan        24  Bose SoundSport Headphones  55000
4    192841      Kedar         2      Google Phone          59000
..      ...      ...      ...      ...      ...
895  193732    Balaji        12    Samsung Galaxy S20        60000
896  193733    Neelima        19    27in 4K Gaming Monitor  75999
897  193734    Siddhu        18      Google Phone          69999
898  193735      Vinay        10    20in Monitor           69999
899  193736  Madhurima         7    27in FHD Monitor        55999

[900 rows x 5 columns]
```

### 5.3. Selecting single column

- ✓ We can select single or multiple rows by using iloc indexer.
  - If we select **one row or column** then it returns a Series.

**Program** First **row** of the dataframe  
**Name** demo9.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
s = df1.iloc[0]

print(s)
```

**Output**

```
Order id      192837
Customer name  Partha
Customer id    8
Product name   Apple iPad 10.2-inch
Product cost   59000
Name: 0, dtype: object
```

**Program Name** Second **row** of the dataframe  
demo10.py

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
s = df1.iloc[1]

print(s)
```

**Output**

```
Order id      192838
Customer name  Vinay
Customer id    10
Product name   Flatscreen TV
Product cost   65999
Name: 1, dtype: object
```

**Program** Last **row** of the dataframe  
**Name** demo11.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
s = df1.iloc[-1]

print(s)
```

**Output**

```
Order id      193736
Customer name  Madhurima
Customer id    7
Product name   27in FHD Monitor
Product cost   55999
Name: 899, dtype: object
```

**Program** First **row** of the dataframe

**Name** demo12.py

**Input file** sales2.csv

```
import pandas as pd
```

```
df = pd.read_csv('sales2.csv')
```

```
s = df.iloc["Order id"]
```

```
print(s)
```

**Output**

**TypeError:** Cannot index by location index with a non-integer key

**Program Name** First **column** of the dataframe  
**demo13.py**  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[:, 0]

print(df2)
```

**Output**

```
0      192837
1      192838
2      192839
3      192840
4      192841
...
895    193732
896    193733
897    193734
898    193735
899    193736
Name: Order id, Length: 900, dtype: int64
```



**Program** Second **column** of the dataframe  
**Name** demo14.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[:, 1]

print(df2)
```

**Output**

```
0      Partha
1      Vinay
2    Lavanya
3      Mohan
4      Kedar
...
895    Balaji
896    Neelima
897    Siddhu
898    Vinay
899    Madhurima
Name: Customer name, Length: 900, dtype: object
```

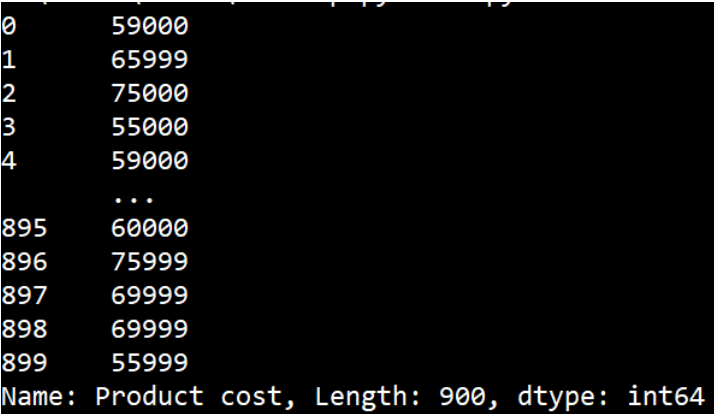
**Program Name** Last **column** of the dataframe  
**demo15.py**  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[:, -1]

print(df2)
```

**Output**



```
0      59000
1      65999
2      75000
3      55000
4      59000
...
895    60000
896    75999
897    69999
898    69999
899    55999
Name: Product cost, Length: 900, dtype: int64
```

### 5.4. Selecting multiple rows and columns

- ✓ We can select single or multiple rows by using iloc indexer.
  - If we select **multiple rows and columns** by using iloc indexer then returns a DataFrame.

**Program** First five rows from dataframe  
**Name** demo16.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[0:5]

print(df2)
```

#### Output

	Order id	Customer name	Customer id	Product name	Product cost
0	192837	Partha	8	Apple iPad 10.2-inch	59000
1	192838	Vinay	10	Flatscreen TV	65999
2	192839	Lavanya	16	20in Monitor	75000
3	192840	Mohan	24	Bose SoundSport Headphones	55000
4	192841	Kedar	2	Google Phone	59000

**Program** First two columns of the dataframe with all rows  
**Name** demo17.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[:, 0:2]

print(df2)
```

**Output**

```
Order id Customer name
0      192837      Partha
1      192838      Vinay
2      192839    Lavanya
3      192840      Mohan
4      192841      Kedar
..      ...      ...
895    193732    Balaji
896    193733    Neelima
897    193734    Siddhu
898    193735      Vinay
899    193736  Madhurima

[900 rows x 2 columns]
```

**Program** First three columns of the dataframe with all rows  
**Name** demo18.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[:, 0:3]

print(df2)
```

**Output**

```
Order id Customer name Customer id
0      192837      Partha           8
1      192838      Vinay          10
2      192839    Lavanya          16
3      192840      Mohan          24
4      192841      Kedar           2
..      ...      ...      ...
895    193732    Balaji           12
896    193733    Neelima          19
897    193734    Siddhu          18
898    193735      Vinay          10
899    193736  Madhurima           7

[900 rows x 3 columns]
```

**Program Name** first 5 rows and first 2 columns of the DataFrame  
**Input file** demo19.py  
sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[0:5, 0:2]

print(df1)
print()
print(df2)
```

### Output

```
   Order id Customer name Customer id Product name Product cost
0    192837         Partha           8  Apple iPad 10.2-inch    59000
1    192838         Vinay          10  Flatscreen TV         65999
2    192839        Lavanya          16    20in Monitor        75000
3    192840         Mohan          24 Bose SoundSport Headphones  55000
4    192841         Kedar           2    Google Phone         59000
..      ...           ...         ...      ...           ...
895  193732        Balaji          12  Samsung Galaxy S20     60000
896  193733        Neelima          19  27in 4K Gaming Monitor  75999
897  193734         Siddhu          18    Google Phone         69999
898  193735         Vinay          10    20in Monitor         69999
899  193736      Madhurima           7    27in FHD Monitor     55999

[900 rows x 5 columns]
   Order id Customer name
0    192837         Partha
1    192838         Vinay
2    192839        Lavanya
3    192840         Mohan
4    192841         Kedar
```

**Program Name** first 5 rows and first 3 columns of the DataFrame  
**Input file** demo20.py  
 sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df2 = df1.iloc[0:5, 0:3]

print(df1)
print()
print(df2)
```

**Output**

```
Order id Customer name ... Product name Product cost
0 192837 Partha ... Apple iPad 10.2-inch 59000
1 192838 Vinay ... Flatscreen TV 65999
2 192839 Lavanya ... 20in Monitor 75000
3 192840 Mohan ... Bose SoundSport Headphones 55000
4 192841 Kedar ... Google Phone 59000
.. ... ..
895 193732 Balaji ... Samsung Galaxy S20 60000
896 193733 Neelima ... 27in 4K Gaming Monitor 75999
897 193734 Siddhu ... Google Phone 69999
898 193735 Vinay ... 20in Monitor 69999
899 193736 Madhurima ... 27in FHD Monitor 55999

[900 rows x 5 columns]
```

	Order id	Customer name	Customer id
0	192837	Partha	8
1	192838	Vinay	10
2	192839	Lavanya	16
3	192840	Mohan	24
4	192841	Kedar	2

### 6. loc[] indexer

- ✓ This indexer used to get rows or columns with particular labels from the index.
- ✓ The loc indexer is label based data selection means we have to pass the name of the row or column which we want to select.
- ✓ The loc indexer can also do boolean selection
- ✓ This includes the last element in DataFrame

### Usage

- ✓ We can use loc[] indexer for two purposes,
  - Selecting rows by label/index
  - Selecting rows with a boolean/conditional lookup

### Syntax

- ✓ `df.loc[<row selection>, <column selection>]`



### 6.1. loc[] - Selecting rows by label/index

- ✓ We can set index for the DataFrame by using `set_index(p)` method.
- ✓ The `loc[]` indexer directly selects based on index values of any rows.
  - For example, if we set index as Product then we can select the specific product directly.

### 6.2. Creating a dataframe

- ✓ If we load a csv file in pandas then it returns DataFrame

**Program** Loading csv file  
**Name** demo21.py  
**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv("sales2.csv")
print(df1)
```

#### Output

```
   Order id Customer name Customer id Product name Product cost
0    192837      Partha         8    Apple iPad 10.2-inch    59000
1    192838      Vinay        10  Flatscreen TV            65999
2    192839    Lavanya        16    20in Monitor            75000
3    192840      Mohan        24  Bose SoundSport Headphones    55000
4    192841      Kedar         2    Google Phone            59000
..      ...      ...      ...      ...      ...
895  193732    Balaji        12    Samsung Galaxy S20        60000
896  193733    Neelima        19  27in 4K Gaming Monitor    75999
897  193734    Siddhu        18    Google Phone            69999
898  193735      Vinay        10    20in Monitor            69999
899  193736  Madhurima         7    27in FHD Monitor        55999

[900 rows x 5 columns]
```

**Program Name** Setting index as a Product name and selecting DataFrame  
**Input file** demo22.py  
sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

print(df1)
```

**Output**

```
Product name  Order id  Customer name  Customer id  Product cost
Apple iPad 10.2-inch  192837      Partha           8          59000
Flatscreen TV      192838      Vinay          10         65999
20in Monitor       192839      Lavanya        16         75000
Bose SoundSport Headphones  192840      Mohan         24         55000
Google Phone       192841      Kedar          2          59000
...            ...      ...            ...            ...
Samsung Galaxy S20  193732      Balaji         12         60000
27in 4K Gaming Monitor  193733      Neelima        19         75999
Google Phone       193734      Siddhu         18         69999
20in Monitor       193735      Vinay          10         69999
27in FHD Monitor   193736      Madhurima       7          55999
[900 rows x 4 columns]
```

**Program Name**      Setting index as a Product name and selecting Product  
**Input file**        demo23.py  
                         sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = 'iPhone 9'
df2 = df1.loc[a]
print(df2.head(10))
```

**Output**

	Order id	Customer name	Customer id	Product cost
Product name				
iPhone 9	192861	Sagar	6	60000
iPhone 9	192867	Shafi	3	65000
iPhone 9	192891	Sagar	6	50000
iPhone 9	192902	Balaji	12	69999
iPhone 9	192914	Jaya Chandra	21	59000
iPhone 9	192921	Venki	15	50000
iPhone 9	192939	Tarun	11	55999
iPhone 9	192969	Siddhu	18	65000
iPhone 9	192984	Neelima	19	69000
iPhone 9	192998	Vinay	10	75999

**Program Name**      Setting index as a Product name and selecting Product  
**Input file**        demo24.py  
                         sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = 'ThinkPad Laptop'
df2 = df1.loc[a]
print(df2.head(10))
```

**Output**

	Order id	Customer name	Customer id	Product cost
Product name				
ThinkPad Laptop	192859	Vijay	9	75000
ThinkPad Laptop	192862	Harsha	5	55000
ThinkPad Laptop	192868	Balaji	12	75999
ThinkPad Laptop	192888	Jaya Chandra	21	75000
ThinkPad Laptop	192915	Balaji	12	50000
ThinkPad Laptop	192974	Siddhu	18	69000
ThinkPad Laptop	192983	Sagar	6	63999
ThinkPad Laptop	192989	Venki	15	65000
ThinkPad Laptop	192999	Mallikarjun	13	69999
ThinkPad Laptop	193014	Sumanth	22	55999

**Program Name**      Setting index as a Product name and selecting two products  
**Input file**        demo25.py  
                          sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['iPhone 9', 'iPhone 11']
df2 = df1.loc[a]
print(df2)
```

**Output**

```

      Order id Customer name Customer id Product cost
Product name
iPhone 9      192861         Sagar          6      60000
iPhone 9      192867         Shafi          3      65000
iPhone 9      192891         Sagar          6      50000
iPhone 9      192902         Balaji         12      69999
iPhone 9      192914  Jaya Chandra         21      59000
...          ...          ...          ...          ...
iPhone 11     193615         Venki         15      69999
iPhone 11     193700         Venki         15      63999
iPhone 11     193706     Madhurima          7      60000
iPhone 11     193716         Harsha          5      69000
iPhone 11     193727     Nireekshan          1      59000

[90 rows x 4 columns]
```

**Program Name**      Setting index as a Product name and selecting two products  
**Input file**        demo26.py  
                         sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['ThinkPad Laptop', '27in FHD Monitor']
df2 = df1.loc[a]
print(df2)
```

**Output**

```
Product name  Order id  Customer name  Customer id  Product cost
ThinkPad Laptop    192859      Vijay           9         75000
ThinkPad Laptop    192862      Harsha          5         55000
ThinkPad Laptop    192868      Balaji         12         75999
ThinkPad Laptop    192888  Jaya Chandra        21         75000
ThinkPad Laptop    192915      Balaji         12         50000
...
...
27in FHD Monitor    193587  Jaya Chandra        21         59000
27in FHD Monitor    193631      Karteek          4         55000
27in FHD Monitor    193679  Jaya Chandra        21         63000
27in FHD Monitor    193680      Madhurima         7         63000
27in FHD Monitor    193736      Madhurima         7         55999

[71 rows x 4 columns]
```

### Program

Setting index as a Product name and selecting a couple of product names with Product cost and Customer id

Name demo27.py

Input file sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['iPhone 9', 'ThinkPad Laptop']
b = ['Product cost', 'Customer id']

df2 = df1.loc[a, b]
print(df2)
```

### Output

```
Product name    Product cost    Customer id
iPhone 9        60000           6
iPhone 9        65000           3
iPhone 9        50000           6
iPhone 9        69999          12
iPhone 9        59000          21
...            ...           ...
ThinkPad Laptop  63000          17
ThinkPad Laptop  50000          18
ThinkPad Laptop  63000          13
ThinkPad Laptop  65999          15
ThinkPad Laptop  59000          17

[82 rows x 2 columns]
```

### Program

Setting index as a Product name and selecting a couple of product names with Product cost and Customer name

**Name** demo28.py

**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['iPhone 9', 'ThinkPad Laptop']
b = ['Product cost', 'Customer name']

df2 = df1.loc[a, b]

print(df2)
```

### Output

```

Product name      Product cost Customer name
iPhone 9          60000          Sagar
iPhone 9          65000          Shafi
iPhone 9          50000          Sagar
iPhone 9          69999          Balaji
iPhone 9          59000  Jaya Chandra
...              ...              ...
ThinkPad Laptop   63000          Pradhan
ThinkPad Laptop   50000          Siddhu
ThinkPad Laptop   63000  Mallikarjun
ThinkPad Laptop   65999          Venki
ThinkPad Laptop   59000          Pradhan

[82 rows x 2 columns]
```



## Program

Setting index as a Product name and selecting a couple of product names with all columns between Order id and Product cost

**Name** demo29.py

**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['iPhone 8', 'Google Phone']
df2 = df1.loc[a, 'Order id' : 'Product cost']

print(df2)
```

## Output

```

      Order id Customer name Customer id Product cost
Product name
iPhone 8      192865      Siddhu         18      59000
iPhone 8      192874      Sumanth        22      69999
iPhone 8      192878  Jaya Chandra        21      69000
iPhone 8      192881      Lavanya        16      65000
iPhone 8      192897  Chaithanya         14      69999
...          ...          ...          ...          ...
Google Phone  193666      Karteek          4      50000
Google Phone  193672      Karteek          4      75000
Google Phone  193725  Mallikarjun         13      75999
Google Phone  193729  Chaithanya         14      65000
Google Phone  193734      Siddhu         18      69999

[93 rows x 4 columns]
```

## Program

Setting index as a Product name and selecting a couple of product names with all columns between Order id and Customer id

**Name** demo30.py

**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')
df1.set_index("Product name", inplace = True)

a = ['iPhone 8', 'Google Phone']
df2 = df1.loc[a, 'Order id' : 'Customer id']

print(df2)
```

## Output

```

      Order id Customer name  Customer id
Product name
iPhone 8      192865      Siddhu          18
iPhone 8      192874      Sumanth          22
iPhone 8      192878  Jaya Chandra          21
iPhone 8      192881      Lavanya          16
iPhone 8      192897  Chaithanya          14
...          ...          ...          ...
Google Phone  193666      Karteek           4
Google Phone  193672      Karteek           4
Google Phone  193725  Mallikarjun          13
Google Phone  193729  Chaithanya          14
Google Phone  193734      Siddhu          18

[93 rows x 3 columns]
```

### 6.3. Boolean / Logical indexing

- ✓ Based on conditions we can get rows and columns from Dataframe
- ✓ This is the most commonly used data analysis
- ✓ In most use cases, you will make selections based on the values of different columns in your data set.

#### Program

Select rows with specific product with all columns between Order id and Product cost

Name demo31.py

Input file sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')

a = df1['Product name'] == 'LG Washing Machine'

df2 = df1.loc[a]

print(df2.head())
```

#### Output

	Order id	Customer name	Customer id	Product name	Product cost
5	192842	Karteeek	4	LG Washing Machine	75000
70	192907	Balaji	12	LG Washing Machine	65999
111	192948	Sagar	6	LG Washing Machine	63000
117	192954	Sagar	6	LG Washing Machine	61000
173	193010	Madhurima	7	LG Washing Machine	65000

### Program

Select rows with specific product with all columns between Order id and Product cost

**Name** demo32.py

**Input file** sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')

a = df1['Product name'] == 'LG Washing Machine'

df2 = df1.loc[a, 'Order id' : 'Product cost']

print(df2.head())
```

### Output

	Order id	Customer name	Customer id	Product name	Product cost
5	192842	Karteeek	4	LG Washing Machine	75000
70	192907	Balaji	12	LG Washing Machine	65999
111	192948	Sagar	6	LG Washing Machine	63000
117	192954	Sagar	6	LG Washing Machine	61000
173	193010	Madhurima	7	LG Washing Machine	65000

### Program

Select rows with specific Customer with Product name and Product cost columns

Name demo33.py

Input file sales2.csv

```
import pandas as pd

df1 = pd.read_csv('sales2.csv')

a = df1['Customer name'] == 'Sagar'

df2 = df1.loc[a, 'Product name' : 'Product cost']

print(df2.head())
```

### Output

```
      Product name  Product cost
24         iPhone 9         60000
50      Google Phone         60000
54         iPhone 9         50000
111  LG Washing Machine         63000
117  LG Washing Machine         61000
```