# 24th Feb Assignment

March 9, 2023

## 1 Assignment 23

**Q1. List any five functions of the pandas library with execution.**

**Ans.Five functions of pandas library are:**

### 1.0.1 1.read_csv():

[148]:
```
import pandas as pd
```

[149]:
```
df=pd.read_csv("./services.csv")
```

[150]:
```
df
```

[150]:

| | id | location_id | program_id | accepted_payments |
|---|---|---|---|---|
| 0 | 1 | 1 | NaN | NaN |
| 1 | 2 | 2 | NaN | NaN |
| 2 | 3 | 3 | NaN | NaN |
| 3 | 4 | 4 | NaN | NaN |
| 4 | 5 | 5 | NaN | NaN |
| 5 | 6 | 6 | NaN | NaN |
| 6 | 7 | 7 | NaN | NaN |
| 7 | 8 | 8 | NaN | NaN |
| 8 | 9 | 9 | NaN | NaN |
| 9 | 10 | 10 | NaN | NaN |
| 10 | 11 | 11 | NaN | NaN |
| 11 | 12 | 12 | NaN | NaN |
| 12 | 13 | 13 | NaN | NaN |
| 13 | 14 | 14 | NaN | NaN |
| 14 | 15 | 15 | NaN | NaN |
| 15 | 16 | 16 | NaN | NaN |
| 16 | 17 | 17 | NaN | NaN |
| 17 | 18 | 18 | NaN | NaN |
| 18 | 19 | 19 | NaN | NaN |
| 19 | 20 | 20 | NaN | NaN |
| 20 | 21 | 21 | NaN | NaN |
| 21 | 22 | 22 | NaN | Cash, Check, Credit Card |
| 22 | 23 | 22 | NaN | NaN |

```
           alternate_name                                application_process  \
0                     NaN                          Walk in or apply by phone.
1                     NaN                 Apply by phone for an appointment.
2                     NaN        Phone for information (403-4300 Ext. 4322).
3                     NaN                                     Apply by phone.
4                     NaN                                Phone for information.
5                     NaN  Walk in or apply by phone for membership appli…
6                     NaN  Apply by phone or be referred by a doctor, soc…
7                     NaN                                     Apply by phone.
8                     NaN  Walk in. Proof of residency in California requ…
9                     NaN  Walk in. Proof of California residency to rece…
10                    NaN  Walk in. Proof of California residency require…
11                    NaN  Walk in or apply by phone, email or webpage re…
12                    NaN  Walk in. Proof of California residency require…
13                    NaN  Call for appointment. Referral from human serv…
14                    NaN          Walk in or through other agency referral.
15                    NaN  Walk in. Written application, identification r…
16                    NaN                               Call for information.
17                    NaN  Call for screening appointment. Medical visits…
18                    NaN     Call for screening appointment (650-347-3648).
19                    NaN                                             Walk in.
20                    NaN                   By phone during business hours.
21  Fotos para pasaportes                 Walk in or apply by phone or mail
22                    NaN                 Walk in or apply by phone or mail

                                          audience  \
0   Older adults age 55 or over, ethnic minorities…
1        Residents of San Mateo County age 55 or over
2   Older adults age 55 or over who can benefit fr…
3   Parents, children, families with problems of c…
4   Low-income working families with children tran…
5                                          Any age
6   Older adults who have memory or sensory loss, …
7   Senior citizens age 60 or over, disabled indiv…
8      Ethnic minorities, especially Spanish speaking
9                                                NaN
10                                               NaN
11  Adults, parents, children in 1st-12th grades i…
12                                               NaN
13  Individuals or families with low or no income …
14  Adult alcoholic/drug addictive men and women w…
15                                               NaN
16                                               NaN
17                                               NaN
18                                               NaN
19                                               NaN
```

```
20                                                 NaN
21  Profit and nonprofit businesses, the public, m…
22  Second service and nonprofit businesses, the p…

                                           description  \
0   A walk-in center for older adults that provide…
1   Provides training and job placement to eligibl…
2   Offers supportive counseling services to San M…
3   Provides supervised visitation services and a …
4   Provides fixed 8% short term loans to eligible…
5   A multipurpose center offering a wide variety …
6   Rosener House is a day center for older adults…
7   Delivers a hot meal to the home of persons age…
8   Provides general reading material, including b…
9   Provides general reading and media materials, …
10  Provides general reading materials, including …
11  Offers an intergenerational literacy program f…
12  Provides general reading materials, including …
13  Provides food, clothing, bus tokens and shelte…
14  Provides a long-term (6-12 month) residential …
15  Provides emergency assistance including food a…
16  Provides emergency food, clothing and furnitur…
17  By appointment only, Project Smile provides a …
18  Provides free medical and dental care to those…
19              no unrequired fields for this service
20                                 just a test service
21  [NOTE THIS IS NOT A REAL SERVICE--THIS IS FOR …
22  [NOTE THIS IS NOT A REAL ORGANIZATION--THIS IS…

                                           eligibility                email  \
0   Age 55 or over for most programs, age 60 or ov…                    NaN
1   Age 55 or over, county resident and willing an…                    NaN
2         Resident of San Mateo County age 55 or over                    NaN
3                                                 None                   NaN
4   Eligibility: Low-income family with legal cust…                    NaN
5                                                 None                   NaN
6                                      Age 18 or over                    NaN
7              Homebound person unable to cook or shop                   NaN
8     Resident of California to obtain a library card                    NaN
9              Resident of California to obtain a card                   NaN
10  Resident of California to obtain a library car…                    NaN
11  English-speaking adult reading at or below 7th…                    NaN
12    Resident of California to obtain a library card                    NaN
13  None for most services. For emergency assistan…                    NaN
14  Age 21-60, detoxed, physically able and willin…                    NaN
15                     None for emergency assistance                   NaN
16                                 Low-income families                 NaN
```

```
17    Low-income person without access to health care                    NaN
18    Low-income person without access to health care                    NaN
19                                                  NaN                 NaN
20                                                  NaN                 NaN
21                                                 None  passports@example.org
22                                                 None                 NaN

    …                            interpretation_services  \
0   …                                                NaN
1   …                                                NaN
2   …                                                NaN
3   …                                                NaN
4   …                                                NaN
5   …                                                NaN
6   …                                                NaN
7   …                                                NaN
8   …                                                NaN
9   …                                                NaN
10  …                                                NaN
11  …                                                NaN
12  …                                                NaN
13  …                                                NaN
14  …                                                NaN
15  …                                                NaN
16  …                                                NaN
17  …                                                NaN
18  …                                                NaN
19  …                                                NaN
20  …                                                NaN
21  …  We offer 3-way interpretation services over th…
22  …                                                NaN

                                            keywords languages  \
0   ADULT PROTECTION AND CARE SERVICES, Meal Sites…       NaN
1   EMPLOYMENT/TRAINING SERVICES, Job Development,…       NaN
2   Geriatric Counseling, Older Adults, Gay, Lesbi…       NaN
3   INDIVIDUAL AND FAMILY DEVELOPMENT SERVICES, Gr…       NaN
4      COMMUNITY SERVICES, Speakers, Automobile Loans       NaN
5   ADULT PROTECTION AND CARE SERVICES, In-Home Su…       NaN
6   ADULT PROTECTION AND CARE SERVICES, Adult Day …       NaN
7   ADULT PROTECTION AND CARE SERVICES, Meal Sites…       NaN
8   EDUCATION SERVICES, Library, Libraries, Public…       NaN
9   EDUCATION SERVICES, Library, Libraries, Public…       NaN
10  EDUCATION SERVICES, Library, Libraries, Public…       NaN
11  EDUCATION SERVICES, Adult, Alternative, Litera…       NaN
12  EDUCATION SERVICES, Library, Libraries, Public…       NaN
13  COMMUNITY SERVICES, Interpretation/Translation…       NaN
```

```
14  ALCOHOLISM SERVICES, Residential Care, DRUG AB…       NaN
15  COMMODITY SERVICES, Clothing/Personal Items, C…       NaN
16  COMMODITY SERVICES, Clothing/Personal Items, C…       NaN
17  HEALTH SERVICES, Outpatient Care, Community Cl…       NaN
18  HEALTH SERVICES, Outpatient Care, Community Cl…       NaN
19                                                NaN       NaN
20                                                NaN       NaN
21                                  Salud, Medicina   Spanish
22         Ruby on Rails/Postgres/Redis, testing, wic       NaN

                                    name  \
0        Fair Oaks Adult Activity Center
1       Second Career Employment Program
2                  Senior Peer Counseling
3                Family Visitation Center
4      Economic Self-Sufficiency Program
5   Little House Recreational Activities
6       Rosener House Adult Day Services
7         Meals on Wheels - South County
8                       Fair Oaks Branch
9                           Main Library
10                       Schaberg Branch
11                          Project Read
12                  Redwood Shores Branch
13                     Redwood City Corps
14            Adult Rehabilitation Center
15                       Sunnyvale Corps
16      South San Francisco Citadel Corps
17                          Project Smile
18          San Mateo Free Medical Clinic
19              Service with blank fields
20        Service for Admin Test Location
21                       Passport Photos
22                  Example Service Name

                         required_documents  \
0                                       NaN
1                                       NaN
2                                       NaN
3                                       NaN
4                                       NaN
5                                       NaN
6                                       NaN
7                                       NaN
8                                       NaN
9                                       NaN
10                                      NaN
```

```
11                                    NaN
12                                    NaN
13                                    NaN
14                                    NaN
15                                    NaN
16                                    NaN
17                                    NaN
18                                    NaN
19                                    NaN
20                                    NaN
21  Government-issued picture identification
22                                    NaN

                          service_areas    status  \
0                                 Colma    active
1                       San Mateo County    active
2                       San Mateo County    active
3                       San Mateo County    active
4                       San Mateo County    active
5                       San Mateo County    active
6     Belmont, Burlingame, East Palo Alto    active
7                 Belmont, East Palo Alto    active
8                       San Mateo County    active
9                       San Mateo County    active
10                      San Mateo County    active
11                             Daly City    active
12                      San Mateo County    active
13    Belmont, Burlingame, East Palo Alto    active
14       Alameda County, San Mateo County    active
15                                   NaN    active
16  Colma, Daly City, South San Francisco    active
17                         East Palo Alto    active
18                    Belmont, Burlingame    active
19                                   NaN   defunct
20                      San Mateo County  inactive
21       Alameda County, San Mateo County    active
22       San Mateo County, Alameda County    active

                                          wait_time                website  \
0                                         No wait.                    NaN
1                                          Varies.                    NaN
2                                          Varies.                    NaN
3                                         No wait.                    NaN
4                                              NaN                    NaN
5                                         No wait.                    NaN
6                                         No wait.                    NaN
7                                         No wait.                    NaN
```

| | | | |
|---|---|---|---|
| 8 | | No wait. | NaN |
| 9 | | No wait. | NaN |
| 10 | | No wait. | NaN |
| 11 | Depends on availability of tutors for small gr… | | NaN |
| 12 | | No wait. | NaN |
| 13 | | Up to 20 minutes. | NaN |
| 14 | Varies according to available beds for men and… | | NaN |
| 15 | | No wait. | NaN |
| 16 | | NaN | NaN |
| 17 | | Varies. | NaN |
| 18 | | Varies. | NaN |
| 19 | | NaN | NaN |
| 20 | | NaN | NaN |
| 21 | | No wait to 2 weeks. | http://www.example.com |
| 22 | | No wait to 2 weeks | http://www.example.com |

| | taxonomy_ids |
|---|---|
| 0 | NaN |
| 1 | NaN |
| 2 | NaN |
| 3 | NaN |
| 4 | NaN |
| 5 | NaN |
| 6 | NaN |
| 7 | NaN |
| 8 | NaN |
| 9 | NaN |
| 10 | NaN |
| 11 | NaN |
| 12 | NaN |
| 13 | NaN |
| 14 | NaN |
| 15 | NaN |
| 16 | NaN |
| 17 | NaN |
| 18 | NaN |
| 19 | NaN |
| 20 | NaN |
| 21 | 105, 108, 108-05, 108-05-01, 111, 111-05 |
| 22 | NaN |

[23 rows x 22 columns]

### 1.0.2 2.head()

[151]:
```
df.head()
```

[151]:
```
   id  location_id  program_id accepted_payments alternate_name  \
0   1            1         NaN               NaN            NaN
1   2            2         NaN               NaN            NaN
2   3            3         NaN               NaN            NaN
3   4            4         NaN               NaN            NaN
4   5            5         NaN               NaN            NaN

                          application_process  \
0                  Walk in or apply by phone.
1           Apply by phone for an appointment.
2  Phone for information (403-4300 Ext. 4322).
3                              Apply by phone.
4                      Phone for information.

                                        audience  \
0  Older adults age 55 or over, ethnic minorities…
1       Residents of San Mateo County age 55 or over
2  Older adults age 55 or over who can benefit fr…
3  Parents, children, families with problems of c…
4  Low-income working families with children tran…

                                     description  \
0  A walk-in center for older adults that provide…
1  Provides training and job placement to eligibl…
2  Offers supportive counseling services to San M…
3  Provides supervised visitation services and a …
4  Provides fixed 8% short term loans to eligible…

                                     eligibility email  …  \
0  Age 55 or over for most programs, age 60 or ov…   NaN  …
1  Age 55 or over, county resident and willing an…   NaN  …
2        Resident of San Mateo County age 55 or over   NaN  …
3                                               None   NaN  …
4  Eligibility: Low-income family with legal cust…   NaN  …

  interpretation_services                                          keywords  \
0                     NaN  ADULT PROTECTION AND CARE SERVICES, Meal Sites…
1                     NaN  EMPLOYMENT/TRAINING SERVICES, Job Development,…
2                     NaN  Geriatric Counseling, Older Adults, Gay, Lesbi…
3                     NaN  INDIVIDUAL AND FAMILY DEVELOPMENT SERVICES, Gr…
4                     NaN     COMMUNITY SERVICES, Speakers, Automobile Loans

  languages                              name required_documents  \
```

```
0       NaN    Fair Oaks Adult Activity Center                NaN
1       NaN   Second Career Employment Program                NaN
2       NaN             Senior Peer Counseling                NaN
3       NaN           Family Visitation Center                NaN
4       NaN  Economic Self-Sufficiency Program                NaN

      service_areas  status wait_time website taxonomy_ids
0             Colma  active  No wait.     NaN          NaN
1  San Mateo County  active   Varies.     NaN          NaN
2  San Mateo County  active   Varies.     NaN          NaN
3  San Mateo County  active  No wait.     NaN          NaN
4  San Mateo County  active       NaN     NaN          NaN

[5 rows x 22 columns]
```

### 1.0.3 3.tail()

[152]:
```
df.tail()
```

[152]:
```
    id  location_id  program_id         accepted_payments  \
18  19           19         NaN                       NaN
19  20           20         NaN                       NaN
20  21           21         NaN                       NaN
21  22           22         NaN  Cash, Check, Credit Card
22  23           22         NaN                       NaN

          alternate_name                            application_process  \
18                   NaN  Call for screening appointment (650-347-3648).
19                   NaN                                        Walk in.
20                   NaN                  By phone during business hours.
21  Fotos para pasaportes                Walk in or apply by phone or mail
22                   NaN                Walk in or apply by phone or mail

                                        audience  \
18                                           NaN
19                                           NaN
20                                           NaN
21  Profit and nonprofit businesses, the public, m…
22  Second service and nonprofit businesses, the p…

                                      description  \
18  Provides free medical and dental care to those…
19             no unrequired fields for this service
20                                just a test service
21  [NOTE THIS IS NOT A REAL SERVICE--THIS IS FOR …
22  [NOTE THIS IS NOT A REAL ORGANIZATION--THIS IS…
```

```
                                       eligibility                   email  \
18  Low-income person without access to health care                     NaN
19                                              NaN                     NaN
20                                              NaN                     NaN
21                                             None  passports@example.org
22                                             None                     NaN

    …                            interpretation_services  \
18  …                                                NaN
19  …                                                NaN
20  …                                                NaN
21  …  We offer 3-way interpretation services over th…
22  …                                                NaN

                                          keywords languages  \
18  HEALTH SERVICES, Outpatient Care, Community Cl…       NaN
19                                              NaN       NaN
20                                              NaN       NaN
21                                  Salud, Medicina   Spanish
22         Ruby on Rails/Postgres/Redis, testing, wic       NaN

                               name                          required_documents  \
18    San Mateo Free Medical Clinic                                         NaN
19        Service with blank fields                                         NaN
20  Service for Admin Test Location                                         NaN
21                  Passport Photos  Government-issued picture identification
22             Example Service Name                                         NaN

                      service_areas    status            wait_time  \
18               Belmont, Burlingame    active               Varies.
19                               NaN   defunct                   NaN
20                  San Mateo County  inactive                   NaN
21  Alameda County, San Mateo County    active  No wait to 2 weeks.
22  San Mateo County, Alameda County    active   No wait to 2 weeks

                   website                                taxonomy_ids
18                     NaN                                         NaN
19                     NaN                                         NaN
20                     NaN                                         NaN
21  http://www.example.com  105, 108, 108-05, 108-05-01, 111, 111-05
22  http://www.example.com                                      NaN

[5 rows x 22 columns]
```

### 1.0.4 4.describe()

[153]:
```
df.describe()
```

[153]:

| | id | location_id | program_id |
|---|---|---|---|
| count | 23.00000 | 23.000000 | 0.0 |
| mean | 12.00000 | 11.956522 | NaN |
| std | 6.78233 | 6.711444 | NaN |
| min | 1.00000 | 1.000000 | NaN |
| 25% | 6.50000 | 6.500000 | NaN |
| 50% | 12.00000 | 12.000000 | NaN |
| 75% | 17.50000 | 17.500000 | NaN |
| max | 23.00000 | 22.000000 | NaN |

### 1.0.5 5.groupby()

[154]:
```
grouped=df.groupby('status').mean()
```

```
/tmp/ipykernel_98/4160609927.py:1: FutureWarning: The default value of
numeric_only in DataFrameGroupBy.mean is deprecated. In a future version,
numeric_only will default to False. Either specify numeric_only or select only
columns which should be valid for the function.
  grouped=df.groupby('status').mean()
```

[155]:
```
print(grouped)
```

```
                id  location_id  program_id
status
active    11.190476    11.142857         NaN
defunct   20.000000    20.000000         NaN
inactive  21.000000    21.000000         NaN
```

**Q2. Given a Pandas DataFrame df with columns 'A', 'B', and 'C', write a Python function to re-index the DataFrame with a new index that starts from 1 and increments by 2 for each row.**

**Ans. Python function to reindex dataframe is:**

[156]:
```
data={'A':[1,2,3],'B':[2,3,4],'C':[3,4,5]}
```

[157]:
```
df=pd.DataFrame(data)
```

[158]:
```
df
```

[158]:

| | A | B | C |
|---|---|---|---|
| 0 | 1 | 2 | 3 |
| 1 | 2 | 3 | 4 |
| 2 | 3 | 4 | 5 |

[159]:
```
def reindex_df(df):
    new_index=pd.RangeIndex(start=1,stop=6,step=2)
    df=df.set_index(new_index)
    return df
```

[160]:
```
reindex_df(df)
```

[160]:

| | A | B | C |
|---|---|---|---|
| 1 | 1 | 2 | 3 |
| 3 | 2 | 3 | 4 |
| 5 | 3 | 4 | 5 |

**Q3. You have a Pandas DataFrame df with a column named 'Values'. Write a Python function that iterates over the DataFrame and calculates the sum of the first three values in the 'Values' column. The function should print the sum to the console.**

**For example, if the 'Values' column of df contains the values [10, 20, 30, 40, 50], your function should calculate and print the sum of the first three values, which is 60.**

**Ans.**

[161]:
```
data={'Values':[10,20,30,40,50]}
```

[162]:
```
df=pd.DataFrame(data)
```

[163]:
```
df
```

[163]:

| | Values |
|---|---|
| 0 | 10 |
| 1 | 20 |
| 2 | 30 |
| 3 | 40 |
| 4 | 50 |

[164]:
```
df['Values'][:3]
```

[164]:
```
0    10
1    20
2    30
Name: Values, dtype: int64
```

[165]:
```
def sumofthree(df):
    sums=df['Values'][:3].sum()
    return sums
```

[166]:
```
sumofthree(df)
```

[166]: 60

**Q4. Given a Pandas DataFrame df with a column 'Text', write a Python function to create a new column 'Word_Count' that contains the number of words in each row of the 'Text' column.**

**Ans.**

[167]:
```
data={'Text': ['This is a sample sentence', 'Another sentence', 'A third␣
↪sentence with more words']}
```

[168]:
```
df = pd.DataFrame({'Text': ['This is a sample sentence', 'Another sentence', 'A␣
↪third sentence with more words']})
```

[169]:
```
df
```

[169]:

| | Text |
|---|---|
| 0 | This is a sample sentence |
| 1 | Another sentence |
| 2 | A third sentence with more words |

[170]:
```
def addColumn(df):
    df['Word_Count']=df['Text'].apply(lambda x:len(x.split()))
    return df
```

[171]:
```
addColumn(df)
```

[171]:

| | Text | Word_Count |
|---|---|---|
| 0 | This is a sample sentence | 5 |
| 1 | Another sentence | 2 |
| 2 | A third sentence with more words | 6 |

**Q5. How are DataFrame.size() and DataFrame.shape() different?**

**Ans.DataFrame.size() returns the total number of elements in a DataFrame, i.e., the product of the number of rows and columns. It returns a scalar value that represents the size of the DataFrame.**

**DataFrame.shape() returns a tuple of two elements that represent the dimensions of the DataFrame, i.e., the number of rows and columns. The first element of the tuple represents the number of rows, and the second element represents the number of columns.**

[172]:
```
# Creating a sample DataFrame
df = pd.DataFrame({'A': [1, 2, 3], 'B': [4, 5, 6], 'C': [7, 8, 9]})

# Printing the size of the DataFrame
print(df.size)
```

```
# Printing the shape of the DataFrame
print(df.shape)
```

```
9
(3, 3)
```

**Q6. Which function of pandas do we use to read an excel file?**

**Ans. read_excel() is function to read an excel file**

**Q7. You have a Pandas DataFrame df that contains a column named 'Email' that contains email addresses in the format 'username@domain.com'. Write a Python function that creates a new column 'Username' in df that contains only the username part of each email address. The username is the part of the email address that appears before the '@' symbol.**

**For example, if the email address is 'john.doe@example.com', the 'Username' column should contain 'john.doe'. Your function should extract the username from each email address and store it in the new 'Username' column.**

**Ans.**

[173]:
```
data={'Email': ['john.doe@example.com', 'bob@example.com', 'claire@example.
↪com']}
```

[174]:
```
df=pd.DataFrame(data)
```

[175]:
```
df
```

[175]:

| | Email |
|---|---|
| 0 | john.doe@example.com |
| 1 | bob@example.com |
| 2 | claire@example.com |

[176]:
```
def extract_username(df):
    split_df=df['Email'].str.split('@',expand=True)
    df['Username']=split_df[0]
    return df
```

[177]:
```
extract_username(df)
```

[177]:

| | Email | Username |
|---|---|---|
| 0 | john.doe@example.com | john.doe |
| 1 | bob@example.com | bob |
| 2 | claire@example.com | claire |

**Q8. You have a Pandas DataFrame df with columns 'A', 'B', and 'C'. Write a Python function that selects all rows where the value in column 'A' is greater than 5 and the value in column 'B' is less than 10. The function should return a new DataFrame that contains only the selected rows.**

**For example, if df contains the following values:**

| - | A | B | C |
|---|---|---|---|
| 0 | 3 | 5 | 1 |
| 1 | 8 | 2 | 7 |
| 2 | 6 | 9 | 4 |
| 3 | 2 | 3 | 5 |
| 4 | 9 | 1 | 2 |

**Your function should select the following rows:**

| - | A | B | C |
|---|---|---|---|
| 1 | 8 | 2 | 7 |
| 4 | 9 | 1 | 2 |

[178]:
```
data={'A':[3,8,6,2,9],'B':[5,2,9,3,1],'C':[1,7,4,5,2]}
```

[179]:
```
df=pd.DataFrame(data)
```

[180]:
```
def select_rows(df):
    newdf=df[(df['A']>5) & (df['B']<9)]
    return newdf
```

[181]:
```
select_rows(df)
```

[181]:

| | A | B | C |
|---|---|---|---|
| 1 | 8 | 2 | 7 |
| 4 | 9 | 1 | 2 |

**Q9. Given a Pandas DataFrame df with a column 'Values', write a Python function to calculate the mean,median, and standard deviation of the values in the 'Values' column.**

**Ans.**

[182]:
```
data={'Values': [1, 2, 3, 4, 5]}
```

[183]:
```
df=pd.DataFrame(data)
```

[184]:
```
df
```

[184]:
```
   Values
0       1
1       2
2       3
3       4
4       5
```

[185]:
```
def operation(df):
    print('Mean:',df['Values'].mean())
    print('Median:',df['Values'].median())
    print('Standard Deviation:',df['Values'].std())
```

[186]:
```
operation(df)
```

```
Mean: 3.0
Median: 3.0
Standard Deviation: 1.5811388300841898
```

**Q10. Given a Pandas DataFrame df with a column 'Sales' and a column 'Date', write a Python function to create a new column 'MovingAverage' that contains the moving average of the sales for the past 7 days for each row in the DataFrame. The moving average should be calculated using a window of size 7 and should include the current day.**

**Ans.**

[187]:
```
df = pd.DataFrame({'Sales': [10, 15, 20, 25, 30, 35, 40, 45, 50, 55],
                   'Date': pd.date_range(start='2022-01-01', periods=10)})
```

[188]:
```
df
```

[188]:
```
   Sales       Date
0     10 2022-01-01
1     15 2022-01-02
2     20 2022-01-03
3     25 2022-01-04
4     30 2022-01-05
5     35 2022-01-06
6     40 2022-01-07
7     45 2022-01-08
8     50 2022-01-09
9     55 2022-01-10
```

[189]:
```
def newColumn(df):
    df=df.sort_values('Date')
    df['MovingAverage']=df['Sales'].rolling(window=7,min_periods=1).mean()
    return df
```

[190]:
```
newColumn(df)
```

[190]:

| | Sales | Date | MovingAverage |
|---|---|---|---|
| 0 | 10 | 2022-01-01 | 10.0 |
| 1 | 15 | 2022-01-02 | 12.5 |
| 2 | 20 | 2022-01-03 | 15.0 |
| 3 | 25 | 2022-01-04 | 17.5 |
| 4 | 30 | 2022-01-05 | 20.0 |
| 5 | 35 | 2022-01-06 | 22.5 |
| 6 | 40 | 2022-01-07 | 25.0 |
| 7 | 45 | 2022-01-08 | 30.0 |
| 8 | 50 | 2022-01-09 | 35.0 |
| 9 | 55 | 2022-01-10 | 40.0 |

**Q11. You have a Pandas DataFrame df with a column 'Date'. Write a Python function that creates a new column 'Weekday' in the DataFrame. The 'Weekday' column should contain the weekday name (e.g. Monday, Tuesday) corresponding to each date in the 'Date' column.**

**For example, if df contains the following values:**

| - | Date |
|---|---|
| 0 | 2023-01-01 |
| 1 | 2023-01-02 |
| 2 | 2023-01-03 |
| 3 | 2023-01-04 |
| 4 | 2023-01-05 |

**Your function should create the following DataFrame:**

| - | Date | Weekday |
|---|---|---|
| 0 | 2023-01-01 | Sunday |
| 1 | 2023-01-02 | Monday |
| 2 | 2023-01-03 | Tuesday |
| 3 | 2023-01-04 | Wednesday |
| 4 | 2023-01-05 | Thursday |

**The function should return the modified DataFrame.**

**Ans.**

[191]:
```
df = pd.DataFrame({'Date':["␣
↪2023-01-01","2023-01-02","2023-01-03","2023-01-04","2023-01-05"]})
```

[196]:
```
def add_day(df):
    df['Date']=pd.to_datetime(df['Date'])

    df['Weekday']=df['Date'].dt.day_name()

    return df
```

[197]:
```
add_day(df)
```

[197]:

| | Date | Weekday |
|---|---|---|
| 0 | 2023-01-01 | Sunday |
| 1 | 2023-01-02 | Monday |
| 2 | 2023-01-03 | Tuesday |
| 3 | 2023-01-04 | Wednesday |
| 4 | 2023-01-05 | Thursday |

**Q12. Given a Pandas DataFrame df with a column 'Date' that contains timestamps, write a Python function to select all rows where the date is between '2023-01-01' and '2023-01-31'.**

**Ans.**

[198]:
```
df = pd.DataFrame({'Date':["␣
↪2023-01-01","2023-01-02","2023-01-03","2023-01-04","2023-01-05","2023-02-05","2023-02-04","
```

[199]:
```
df
```

[199]:

| | Date |
|---|---|
| 0 | 2023-01-01 |
| 1 | 2023-01-02 |
| 2 | 2023-01-03 |
| 3 | 2023-01-04 |
| 4 | 2023-01-05 |
| 5 | 2023-02-05 |
| 6 | 2023-02-04 |
| 7 | 2023-03-05 |

[200]:
```
start_date='2023-01-01'
stop_date='2023-01-31'
```

[207]:
```
def select_date(df):
    start_date='2023-01-01'
    stop_date='2023-01-31'
    return df[(df['Date']>start_date) & (df['Date']<stop_date)]
```

[208]:
```
select_date(df)
```

[208]:
```
         Date
1  2023-01-02
2  2023-01-03
3  2023-01-04
4  2023-01-05
```

**Q13. To use the basic functions of pandas, what is the first and foremost necessary library that needs to be imported?**

**Ans. The first and foremost necessary library that needs to be imported to use the basic functions of pandas is pandas itself.**