AKTU B.Tech Second Year

PYTHON PROGRAMMING

Unit 5

LEC-2

Python packages

Today's Target

- **NUMPY program**
- **AKTU PYQs**

By
Pragya Rajvanshi

Gateway classes

Write a python program to create an array of 5 random integer between 10 and 50(inclusive 10 and 50)

main.py

```
1  import numpy as np
2  # Create an array of 5 random integers between 10 and 50
3  random_integers = np.random.randint(10, 51, size=5)
4  # Print the array
5  print(random_integers)
```

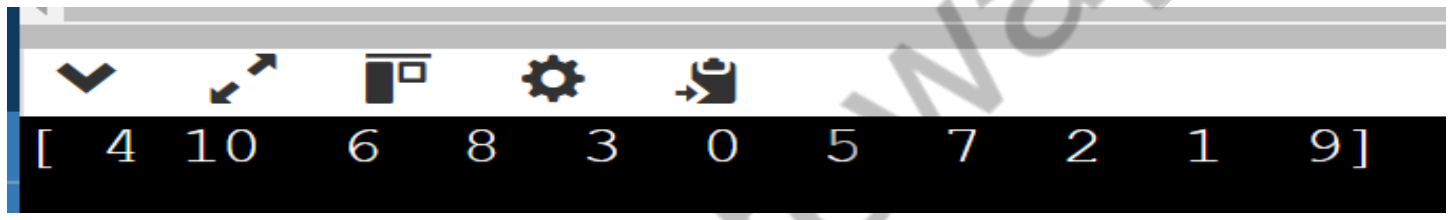


Gateway classes

Write a NumPy program to shuffle numbers between 0 and 10 (inclusive).

main.py

```
1  import numpy as np
2  # Create an array of numbers between 0 and 10 (inclusive)
3  numbers = np.arange(11)
4  # Shuffle the numbers
5  np.random.shuffle(numbers)
6  print(numbers)
```

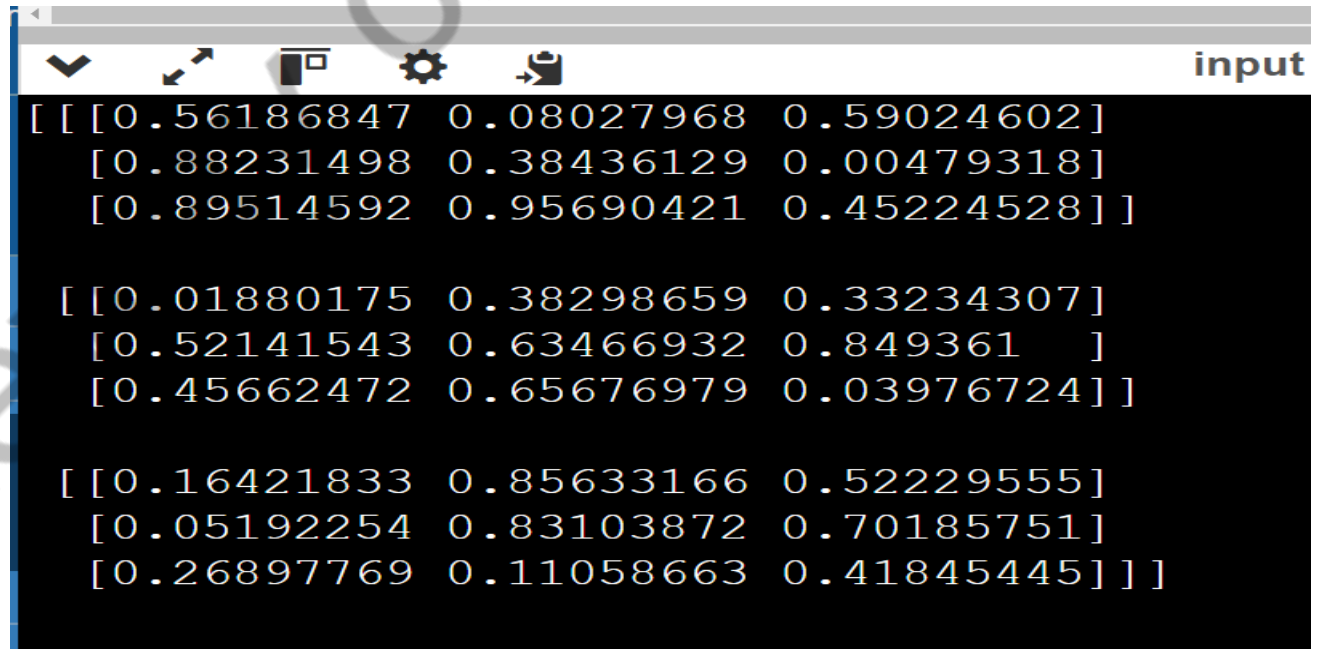


Gateway classes

Write a NumPy program to create a 3x3x3 array with random values

main.py

```
1  import numpy as np
2  # Create a 3x3x3 array with random values
3  random_array = np.random.random((3, 3, 3))
4  # Print the array
5  print(random_array)
```



Gate Classes

Panda

- Pandas is a powerful and open-source Python library. The Pandas library is used for data manipulation and analysis.
- Pandas is well-suited for working with tabular data, such as spreadsheet.
- Data Structures in Pandas Library
  - series and frames

Panda data series

Pandas Series is a one-dimensional labeled array capable of holding data of any type (integer, string, float, python objects, etc.).

main.py

```
1  # import pandas as pd
2  import pandas as pd
3   # simple array
4  data = [1, 2, 3, 4]
5  ser = pd.Series(data)
6  print(ser)
```

```
0    1
1    2
2    3
3    4
dtype: int64
```

The axis labels are collectively called *index*. Pandas Series is nothing but a column in an excel sheet.

Gateway Classes

Creating series from list

main.py

```
1  import pandas as pd
2  # a simple list
3  list = ['h', 'e', 'l', 'l', 'o']
4  # create series form a list
5  ser = pd.Series(list)
6  print(ser)
```

```
0      h
1      e
2      l
3      l
4      o
dtype: object
```

Accessing Element from Series with Position

```
# import pandas and numpy
import pandas as pd
import numpy as np
# creating simple array
data = np.array(['l','e','e','m'])
ser = pd.Series(data)
#with the help of index operator
#retrieve the first element
print(ser[:2])
```

```
0    l
1    e
dtype: object
```

Gateway classes

Accessing Element Using Label (index)

main.py

```
1  # import pandas and numpy
2  import pandas as pd
3  import numpy as np
4   # creating simple array
5  data = np.array(['p','y','t','h','o','n', 'o','u','n','i','t','5','s'])
6  ser = pd.Series(data,index=[10,11,12,13,14,15,16,17,18,19,20,21,22])
7  # accessing a element using index element
8  print(ser[16])
```



Gateway classes

Binary operator

main.py

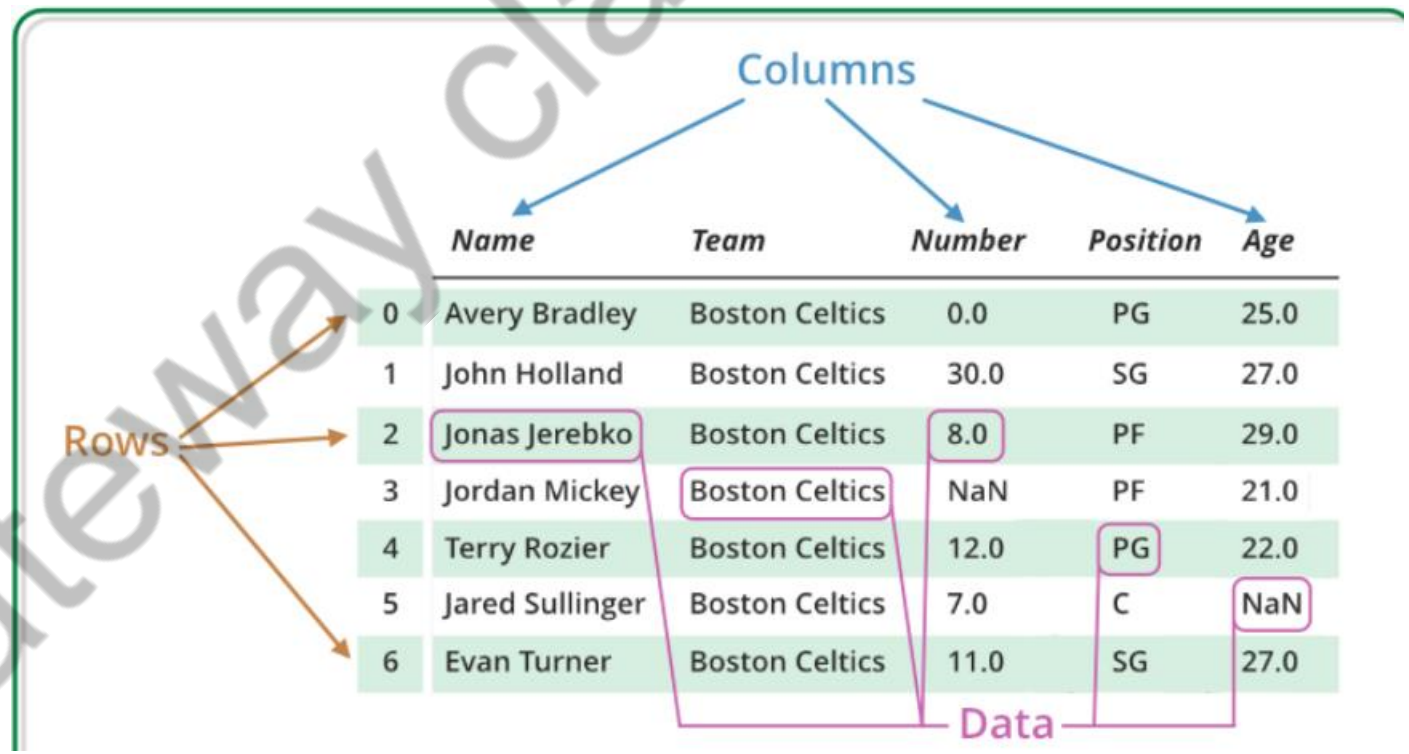
```
1  # importing pandas module
2  import pandas as pd
3  # creating a series
4  data = pd.Series([5, 2, 3,7], index=['a', 'b', 'c', 'd'])
5  # creating a series
6  data1 = pd.Series([1, 6, 4, 9], index=['a', 'b', 'd', 'e'])
7  print(data.add(data1, fill_value=0))
8  print(data.sub(data1, fill_value=0))
```

```
a      6.0
b      8.0
c      3.0
d     11.0
e      9.0
dtype: float64
a     4.0
b    -4.0
c     3.0
d     3.0
e    -9.0
dtype: float64
```

Gateway classes

Pandas DataFrame

Pandas DataFrame is two-dimensional size-mutable, potentially heterogeneous tabular data structure with labeled axes (rows and columns). A Data frame is a two-dimensional data structure, i.e., data is aligned in a tabular fashion in rows and columns. Pandas DataFrame consists of three principal components, the data, rows, and columns.



	Name	Team	Number	Position	Age
0	Avery Bradley	Boston Celtics	0.0	PG	25.0
1	John Holland	Boston Celtics	30.0	SG	27.0
2	Jonas Jerebko	Boston Celtics	8.0	PF	29.0
3	Jordan Mickey	Boston Celtics	NaN	PF	21.0
4	Terry Rozier	Boston Celtics	12.0	PG	22.0
5	Jared Sullinger	Boston Celtics	7.0	C	NaN
6	Evan Turner	Boston Celtics	11.0	SG	27.0

Gateway classes

Create a Pandas DataFrame from dictionary

```python
import pandas as pd
# intialise data of lists.
data = {'Name':['Tom', 'nick', 'krish', 'jack'],
        'Age':[20, 21, 19, 18]}
# Create DataFrame
df = pd.DataFrame(data)
# Print the output.
print(df)
```

```
    Name  Age
0    Tom   20
1   nick   21
2  krish   19
3   jack   18
```

Gateway classes

Create a Pandas DataFrame from dictionary

```
# Import pandas package
import pandas as pd

# Define a dictionary containing employee data
data = {'Name':['Jai', 'Princi', 'Gaurav', 'Anuj'],
        'Age':[27, 24, 22, 32],
        'Address':['Delhi', 'Kanpur', 'Allahabad', 'Kannauj'],
        'Qualification':['Msc', 'MA', 'MCA', 'Phd']}

# Convert the dictionary into DataFrame
df = pd.DataFrame(data)
print(df[['Name','Age']])
```

```
     Name  Age
0     Jai   27
1  Princi   24
2  Gaurav   22
3    Anuj   32
```

Gateway classes

Write a Pandas program to compare the elements of the two Pandas Series. Sample Series: [2, 4, 6, 8, 10], [1, 3, 5, 7, 10]

```
import pandas as pd
# Sample Series
series1 = pd.Series([2, 4, 6, 8, 10])
series2 = pd.Series([1, 3, 5, 7, 10])
# Compare the elements of the two Series
comparison_result = series1 == series2
print(comparison_result)
```

```
Comparison result:
0    False
1    False
2    False
3    False
4     True
dtype: bool
```

Gateway classes

Write a Pandas program to sort a given Series.

```
import pandas as pd
# Sample Series
series = pd.Series([10, 2, 5, 8, 1, 7])
# Sort the Series in ascending order
sorted_series = series.sort_values()
print("Sorted Series in ascending order:")
print(sorted_series)
```

```
Sorted Series in ascending order:
4     1
1     2
2     5
5     7
3     8
0    10
dtype: int64
```

G classes


Thank
you