```
In [4]:  1  import pandas as pd
         2  data=pd.read_csv("C:\\Users\\Lenovo\\OneDrive\\Desktop\\pratice_file.csv")
         3  print(type(data))
```

<class 'pandas.core.frame.DataFrame'>

```
In [5]:  1  data.info
```

Out[5]: <bound method DataFrame.info of   Course code   Course Credit I
         nternal End sem   Total \
         0   BS-001   Mathematics   3   51   35   86
         1   BS-002   Mathematics Lab   1   NaN   46   46
         2   BS-003   Physics   3   56   32   88
         3   BS-003   Physics   3   56   32   88
         4   BS-004   Physics Lab   1   NaN   46   46
         5   BS-005   EEAU NaN   51   NaN   NaN
         6   BS-006   EEAU Lab   2   NaN   44   44
         7   BS-007   English   1   31   NaN   NaN
         8   BS-007   English   1   31   NaN   NaN
         9   BS-008   English Lab   3   NaN   20   20
         10   BS-009   Python NaN   57   28   85
         11   BS-010   Python Lab NaN   NaN   43   43
         12   BS-011   Happiness connect   1   NaN   NaN   NaN
         13   BS-011   Happiness connect   1   NaN   NaN   NaN
         14   BS-012 Engineering Workshop NaN   NaN   45   45
         15   BS-013   Design Thinking   3   NaN   37   37
         16   BS-014   Value Added Course NaN   NaN   44   NaN
         17   CGPA   7.92 GRADE   A++ RESULT FIRST DIVISION

             Grade Points
         0   O   8.60
         1   O+   9.20
         2   O   8.80
         3   O   8.80
         4   O+   9.20
         5   A   NaN
         6   O   8.80
         7   NaN   NaN
         8   NaN   NaN
         9   NaN   NaN
         10   O   8.50
         11   O   8.60
         12   O+   9.08
         13   O+   9.08
         14   O+   9.00
         15   A+   NaN
         16   O   8.80
         17   NaN   NaN >
```

In [6]: 
```
1 data.describe()
```
Out[6]:

|  | Points |
|---|---|
| count | 12.000000 |
| mean | 8.871667 |
| std | 0.238397 |
| min | 8.500000 |
| 25% | 8.750000 |
| 50% | 8.800000 |
| 75% | 9.080000 |
| max | 9.200000 |

In [7]: 
```
1 data=data.drop_duplicates()
2 data
```
Out[7]:

| | Course code | Course | Credit | Internal | End sem | Total | Grade | Points |
|---|---|---|---|---|---|---|---|---|
| 0 | BS-001 | Mathematics | 3 | 51 | 35 | 86 | O | 8.60 |
| 1 | BS-002 | Mathematics Lab | 1 | NaN | 46 | 46 | O+ | 9.20 |
| 2 | BS-003 | Physics | 3 | 56 | 32 | 88 | O | 8.80 |
| 4 | BS-004 | Physics Lab | 1 | NaN | 46 | 46 | O+ | 9.20 |
| 5 | BS-005 | EEAU | NaN | 51 | NaN | NaN | A | NaN |
| 6 | BS-006 | EEAU Lab | 2 | NaN | 44 | 44 | O | 8.80 |
| 7 | BS-007 | English | 1 | 31 | NaN | NaN | NaN | NaN |
| 9 | BS-008 | English Lab | 3 | NaN | 20 | 20 | NaN | NaN |
| 10 | BS-009 | Python | NaN | 57 | 28 | 85 | O | 8.50 |
| 11 | BS-010 | Python Lab | NaN | NaN | 43 | 43 | O | 8.60 |
| 12 | BS-011 | Happiness connect | 1 | NaN | NaN | NaN | O+ | 9.08 |
| 14 | BS-012 | Engineering Workshop | NaN | NaN | 45 | 45 | O+ | 9.00 |
| 15 | BS-013 | Design Thinking | 3 | NaN | 37 | 37 | A+ | NaN |
| 16 | BS-014 | Value Added Course | NaN | NaN | 44 | NaN | O | 8.80 |
| 17 | CGPA | | 7.92 | GRADE | A++ | RESULT | FIRST DIVISION | NaN | NaN |

In [8]:
```
1 data.isnull()
```

Out[8]:

| | Course code | Course | Credit | Internal | End sem | Total | Grade | Points |
|---|---|---|---|---|---|---|---|---|
| **0** | False | False | False | False | False | False | False | False |
| **1** | False | False | False | True | False | False | False | False |
| **2** | False | False | False | False | False | False | False | False |
| **4** | False | False | False | True | False | False | False | False |
| **5** | False | False | True | False | True | True | False | True |
| **6** | False | False | False | True | False | False | False | False |
| **7** | False | False | False | False | True | True | True | True |
| **9** | False | False | False | True | False | False | True | True |
| **10** | False | False | True | False | False | False | False | False |
| **11** | False | False | True | True | False | False | False | False |
| **12** | False | False | False | True | True | True | False | False |
| **14** | False | False | True | True | False | False | False | False |
| **15** | False | False | False | True | False | False | False | True |
| **16** | False | False | True | True | False | True | False | False |
| **17** | False | False | False | False | False | False | True | True |

In [9]:
```
1 data.isnull().sum()
```

Out[9]:
```
Course code   0
Course   0
Credit   5
Internal   9
End sem   3
Total   4
Grade   3
Points   5
dtype: int64
```

```
In [10]: 1 data.notnull()
```

Out[10]:

	Course code	Course	Credit	Internal	End sem	Total	Grade	Points
0	True	True	True	True	True	True	True	True
1	True	True	True	False	True	True	True	True
2	True	True	True	True	True	True	True	True
4	True	True	True	False	True	True	True	True
5	True	True	False	True	False	False	True	False
6	True	True	True	False	True	True	True	True
7	True	True	True	True	False	False	False	False
9	True	True	True	False	True	True	False	False
10	True	True	False	True	True	True	True	True
11	True	True	False	False	True	True	True	True
12	True	True	True	False	False	False	True	True
14	True	True	False	False	True	True	True	True
15	True	True	True	False	True	True	True	False
16	True	True	False	False	True	False	True	True
17	True	True	True	True	True	True	False	False

```
In [11]: 1 data.isnull().sum().sum()
```

Out[11]: 29

```
1  data2=data.fillna(value=0)
2  data2
```

Out[12]:

	Course code	Course	Credit	Internal	End sem	Total	Grade	Points
0	BS-001	Mathematics	3	51	35	86	O	8.60
1	BS-002	Mathematics Lab	1	0	46	46	O+	9.20
2	BS-003	Physics	3	56	32	88	O	8.80
4	BS-004	Physics Lab	1	0	46	46	O+	9.20
5	BS-005	EEAU	0	51	0	0	A	0.00
6	BS-006	EEAU Lab	2	0	44	44	O	8.80
7	BS-007	English	1	31	0	0	0	0.00
9	BS-008	English Lab	3	0	20	20	0	0.00
10	BS-009	Python	0	57	28	85	O	8.50
11	BS-010	Python Lab	0	0	43	43	O	8.60
12	BS-011	Happiness connect	1	0	0	0	O+	9.08
14	BS-012	Engineering Workshop	0	0	45	45	O+	9.00
15	BS-013	Design Thinking	3	0	37	37	A+	0.00
16	BS-014	Value Added Course	0	0	44	0	O	8.80
17	CGPA		7.92	GRADE	A++	RESULT	FIRST DIVISION	0	0.00

```
1  data3=data.fillna(method='pad')
2  data3
```

Out[13]:

	Course code	Course	Credit	Internal	End sem	Total	Grade	Points
0	BS-001	Mathematics	3	51	35	86	O	8.60
1	BS-002	Mathematics Lab	1	51	46	46	O+	9.20
2	BS-003	Physics	3	56	32	88	O	8.80
4	BS-004	Physics Lab	1	56	46	46	O+	9.20
5	BS-005	EEAU	1	51	46	46	A	9.20
6	BS-006	EEAU Lab	2	51	44	44	O	8.80
7	BS-007	English	1	31	44	44	O	8.80
9	BS-008	English Lab	3	31	20	20	O	8.80
10	BS-009	Python	3	57	28	85	O	8.50
11	BS-010	Python Lab	3	57	43	43	O	8.60
12	BS-011	Happiness connect	1	57	43	43	O+	9.08
14	BS-012	Engineering Workshop	1	57	45	45	O+	9.00
15	BS-013	Design Thinking	3	57	37	37	A+	9.00
16	BS-014	Value Added Course	3	57	44	37	O	8.80
17	CGPA		7.92	GRADE	A++	RESULT	FIRST DIVISION	O	8.80

```
1  # filling the null value with the next value
2  data4=data.fillna(method='bfill')
3  data4
```

Out[14]:

	Course code	Course	Credit	Internal	End sem	Total	Grade	Points
0	BS-001	Mathematics	3	51	35	86	O	8.60
1	BS-002	Mathematics Lab	1	56	46	46	O+	9.20
2	BS-003	Physics	3	56	32	88	O	8.80
4	BS-004	Physics Lab	1	51	46	46	O+	9.20
5	BS-005	EEAU	2	51	44	44	A	8.80
6	BS-006	EEAU Lab	2	31	44	44	O	8.80
7	BS-007	English	1	31	20	20	O	8.50
9	BS-008	English Lab	3	57	20	20	O	8.50
10	BS-009	Python	1	57	28	85	O	8.50
11	BS-010	Python Lab	1	A++	43	43	O	8.60
12	BS-011	Happiness connect	1	A++	45	45	O+	9.08
14	BS-012	Engineering Workshop	3	A++	45	45	O+	9.00
15	BS-013	Design Thinking	3	A++	37	37	A+	8.80
16	BS-014	Value Added Course	GRADE	A++	44	FIRST DIVISION	O	8.80
17	CGPA	7.92	GRADE	A++	RESULT	FIRST DIVISION	NaN	NaN

In [15]:

```
1  import numpy as np
2  from scipy import stats
```

In [16]:

```
1  #detect the outliers using IQR
2  data2.columns
```

Out[16]: Index(['Course code', 'Course', 'Credit', 'Internal', 'End sem', 'Total', 'Grade', 'Points'],
          dtype='object')

```
In [18]:  1  data2.drop(['Course'],axis=1,inplace=True)
          2  data2
```

Out[18]:

	Course code	Credit	Internal	End sem	Total	Grade	Points
0	BS-001	3	51	35	86	O	8.60
1	BS-002	1	0	46	46	O+	9.20
2	BS-003	3	56	32	88	O	8.80
4	BS-004	1	0	46	46	O+	9.20
5	BS-005	0	51	0	0	A	0.00
6	BS-006	2	0	44	44	O	8.80
7	BS-007	1	31	0	0	0	0.00
9	BS-008	3	0	20	20	0	0.00
10	BS-009	0	57	28	85	O	8.50
11	BS-010	0	0	43	43	O	8.60
12	BS-011	1	0	0	0	O+	9.08
14	BS-012	0	0	45	45	O+	9.00
15	BS-013	3	0	37	37	A+	0.00
16	BS-014	0	0	44	0	O	8.80
17	CGPA	GRADE	A++	RESULT	FIRST DIVISION	0	0.00