```
import pandas as pd
a = pd.read csv("/content/nces330 20.csv")
# will return the dimension of the data set whether it is 2D, 3D, etc.
(3548, 6)
а
      Year
              State
                                           Length
                                                         Expense
                                                                  Value
                                     Type
0
      2013
            Alabama
                                  Private 4-year
                                                   Fees/Tuition
                                                                  13983
                                  Private 4-year
1
      2013
           Alabama
                                                      Room/Board
                                                                   8503
2
                                                   Fees/Tuition
      2013
           Alabama
                         Public In-State 2-year
                                                                   4048
3
      2013
           Alabama
                         Public In-State 4-year
                                                   Fees/Tuition
                                                                   8073
4
      2013
                         Public In-State 4-year
                                                      Room/Board
           Alabama
                                                                   8473
       . . .
                                              . . .
                                                                    . . .
3543
      2021
                         Public In-State
                                           2-year
                                                   Fees/Tuition
                                                                   3987
           Wyoming
3544
      2021
           Wyoming
                         Public In-State 4-year
                                                      Room/Board
                                                                   9799
      2021
            Wyoming
                     Public Out-of-State
                                           2-vear
3545
                                                   Fees/Tuition
                                                                   9820
3546
      2021
            Wyoming
                     Public Out-of-State 4-year
                                                    Fees/Tuition
                                                                  14710
3547
      2021
            Wyoming
                     Public Out-of-State
                                           4-year
                                                      Room/Board
                                                                   9799
[3548 \text{ rows } \times 6 \text{ columns}]
a['Length'].unique()
# will return the unique values of the column 'Length'
array(['4-year', '2-year'], dtype=object)
a.describe()
# will return Statistical Information of dataset
              Year
                            Value
count
       3548.000000
                     3548,000000
       2016.923337 13027.720124
mean
                     8734.568645
std
          2.553910
       2013.000000
                     1225.000000
min
25%
       2015.000000
                     7756.750000
50%
       2017.000000
                    10203.500000
75%
       2019.000000
                    14830.750000
max
       2021.000000
                    49152.000000
a.info()
# will return information about no. of columns, column data types, etc
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3548 entries, 0 to 3547
Data columns (total 6 columns):
              Non-Null Count Dtype
     Column
- - -
```

```
0
     Year
              3548 non-null
                               int64
 1
     State
              3548 non-null
                               object
 2
              3548 non-null
     Type
                               object
 3
     Length
              3548 non-null
                               object
     Expense 3548 non-null
4
                               object
 5
     Value
              3548 non-null
                               int64
dtypes: int64(2), object(4)
memory usage: 166.4+ KB
a.columns # will return names of the columns
a.columns[0:2] # will return the name of the column form 0 to 2.
Index(['Year', 'State'], dtype='object')
a[['Year','State'] ]
      Year
              State
0
      2013
           Alabama
1
      2013
           Alabama
2
      2013 Alabama
3
      2013
           Alabama
4
      2013 Alabama
       . . .
. . .
3543
      2021
           Wyoming
3544
      2021
            Wyoming
3545
           Wyoming
      2021
3546
      2021
            Wyoming
3547
      2021
           Wyoming
[3548 rows x 2 columns]
list1 = ['Year','Value']
a[list1]
      Year
            Value
0
      2013
            13983
1
             8503
      2013
2
      2013
             4048
3
      2013
             8073
4
      2013
             8473
       . . .
              . . .
. . .
3543
      2021
             3987
3544
      2021
             9799
3545
      2021
             9820
3546
      2021
            14710
3547
             9799
      2021
[3548 rows x 2 columns]
a.loc[0:2] # will return the row form 0 to 2 i.e 3 rows
```

```
Year
           State
                              Type
                                     Length
                                                  Expense
                                                            Value
   2013
         Alabama
                           Private
                                     4-year
                                             Fees/Tuition
                                                            13983
0
  2013
1
         Alabama
                           Private
                                     4-year
                                               Room/Board
                                                             8503
2
  2013
         Alabama
                  Public In-State
                                     2-year
                                             Fees/Tuition
                                                             4048
a.iloc[0:2]
   Year
           State
                      Type
                            Length
                                          Expense
                                                    Value
         Alabama
   2013
                  Private
                            4-year
                                     Fees/Tuition
                                                    13983
  2013
         Alabama
                  Private
                            4-year
                                       Room/Board
                                                    8503
a.iloc[0:4.0:2]
# will display rows from 0 to 4 and columns from 0 to 2.
   Year
           State
0
   2013
         Alabama
1
  2013
         Alabama
2
   2013
         Alabama
3
         Alabama
  2013
a.iloc[:,0:2]
# will display all rows and columns from 0 to 2
              State
      Year
0
      2013
            Alabama
1
      2013
            Alabama
2
      2013
            Alabama
3
      2013
            Alabama
4
      2013
            Alabama
. . .
       . . .
3543
      2021
            Wyoming
      2021
3544
            Wyoming
3545
      2021
            Wyoming
3546
      2021
            Wyoming
3547
      2021
            Wyoming
[3548 rows x 2 columns]
a.head(10)
# Display first 10 values
   Year
           State
                                  Type
                                        Length
                                                       Expense
                                                                Value
   2013
                                         4-vear
                                                 Fees/Tuition
                                                                13983
0
         Alabama
                               Private
1
   2013
         Alabama
                               Private
                                         4-year
                                                    Room/Board
                                                                 8503
2
   2013
         Alabama
                       Public In-State
                                         2-year
                                                 Fees/Tuition
                                                                 4048
                                         4-year
3
   2013
                       Public In-State
         Alabama
                                                 Fees/Tuition
                                                                 8073
4
   2013
         Alabama
                       Public In-State
                                         4-year
                                                                 8473
                                                    Room/Board
5
   2013
         Alabama
                  Public Out-of-State
                                         2-year
                                                 Fees/Tuition
                                                                 7736
6
   2013
         Alabama
                  Public Out-of-State
                                         4-year
                                                 Fees/Tuition
                                                                20380
7
   2013
         Alabama
                  Public Out-of-State
                                         4-year
                                                    Room/Board
                                                                 8473
8
   2013
          Alaska
                               Private
                                         4-year
                                                 Fees/Tuition
                                                                21496
9
  2013
          Alaska
                               Private
                                         4-year
                                                                 8923
                                                    Room/Board
```

a.tail(10)

Will retuen last 10 values

	Year	State	Туре	Length	Expense
Value 3538	2021	Wisconsin	Public In-State	2-year	Fees/Tuition
4534	2021	WISCONSIN	Tubtic in-State	2 - year	rees/rultion
3539	2021	Wisconsin	Public In-State	4-year	Room/Board
9093 3540	2021	Wisconsin	Public Out-of-State	2-year	Fees/Tuition
6552	2021	112300113111	rabile out or state	2 year	1005/10111011
3541	2021	Wisconsin	Public Out-of-State	4-year	Fees/Tuition
26970	2021				D (D)
3542	2021	Wisconsin	Public Out-of-State	4-year	Room/Board
9093 3543	2021	Wyoming	Public In-State	2-year	Fees/Tuition
3987	2021	wyomitng	rubtic in-state	z-yeai	rees/ruittion
3544	2021	Wyoming	Public In-State	4-year	Room/Board
9799					
3545 9820	2021	Wyoming	Public Out-of-State	2-year	Fees/Tuition
9620 3546	2021	Wyoming	Public Out-of-State	4-vear	Fees/Tuition
14710	2021	Wyoming	Tubele out of State	4 year	rees, raicion
3547 9799	2021	Wyoming	Public Out-of-State	4-year	Room/Board

a.head()

will return first 5 values

		a	_		_	
	Year	State	Type	Length	Expense	Value
0	2013	Alabama	Private	4-year	Fees/Tuition	13983
1	2013	Alabama	Private	4-year	Room/Board	8503
2	2013	Alabama	Public In-State	2-year	Fees/Tuition	4048
3	2013	Alabama	Public In-State	4-year	Fees/Tuition	8073
4	2013	Alabama	Public In-State	4-vear	Room/Board	8473

a2 = a.iloc[0:10,0:4]

a2

#Here, we have created new data frame and added first 10 entries of data frame a

	Year	State	Type	Length
0	2013	Alabama	Private	4-year
1	2013	Alabama	Private	4-year
2	2013	Alabama	Public In-State	2-year
3	2013	Alabama	Public In-State	4-year
4	2013	Alabama	Public In-State	4-year
5	2013	Alabama	Public Out-of-State	2-year
6	2013	Alabama	Public Out-of-State	4-year
7	2013	Alabama	Public Out-of-State	4-vear

```
2013
          Alaska
                              Private
                                       4-year
  2013
          Alaska
                              Private
                                        4-year
a2['Stud Id']=5 # We add new column.
a2
   Year
           State
                                  Type
                                       Length
                                                Stud Id
   2013
         Alabama
                               Private
                                        4-year
                                                      5
1
   2013
         Alabama
                              Private
                                        4-year
                                                      5
   2013
                      Public In-State
                                       2-year
         Alabama
                                                      5
3
   2013
         Alabama
                      Public In-State
                                       4-year
                                                      5
4
  2013
         Alabama
                      Public In-State
                                       4-year
5
  2013
                                                      5
                  Public Out-of-State
                                        2-year
         Alabama
                                                      5
6
  2013
         Alabama Public Out-of-State
                                        4-year
7
  2013
         Alabama Public Out-of-State
                                                      5
                                        4-year
                                                      5
8
  2013
                              Private
          Alaska
                                        4-year
                                                      5
9
  2013
          Alaska
                              Private
                                        4-year
a2['Stud Id']=a['Year']
a2
# Here, we updated values of 'Stud Id' by the values of column 'Year'
from data frame 'a'
   Year
           State
                                  Type
                                        Length
                                                Stud Id
   2013
                                        4-year
                                                   2013
         Alabama
                              Private
1
   2013
                              Private
                                        4-year
                                                   2013
         Alabama
2
   2013
                      Public In-State
                                        2-year
                                                   2013
         Alabama
3
   2013
         Alabama
                      Public In-State
                                       4-year
                                                   2013
4
         Alabama
  2013
                      Public In-State
                                       4-year
                                                   2013
5
   2013
         Alabama
                 Public Out-of-State
                                        2-year
                                                   2013
6
  2013
         Alabama Public Out-of-State
                                        4-year
                                                   2013
                                        4-year
7
   2013
         Alabama Public Out-of-State
                                                   2013
   2013
                                        4-year
8
          Alaska
                              Private
                                                   2013
   2013
9
          Alaska
                              Private
                                        4-year
                                                   2013
a2.drop(['Stud Id'],axis=1)
# Here, we drop the column 'Stud Id'.
   Year
           State
                                 Type
                                       Length
0
  2013
         Alabama
                              Private
                                        4-year
1
  2013
         Alabama
                              Private
                                        4-year
         Alabama
   2013
                      Public In-State
                                        2-year
3
  2013
         Alabama
                      Public In-State
                                       4-year
4
  2013
                      Public In-State
                                       4-year
         Alabama
5
  2013
                 Public Out-of-State
                                       2-year
         Alabama
6
  2013
         Alabama
                 Public Out-of-State
                                        4-year
7
   2013
         Alabama
                 Public Out-of-State
                                        4-year
8
   2013
          Alaska
                              Private
                                        4-year
9
   2013
          Alaska
                              Private
                                        4-year
a['New Length'] = a['Length'].map({'4-year':4, '2-year':2}) # will
replace the value of '4-year' by 4 and values of '2-year' by 2 and add
```

`	Year	State	Туре	Length	Expense	Value
0	2013	Alabama	Private	4-year	Fees/Tuition	13983
1	2013	Alabama	Private	4-year	Room/Board	8503
2	2013	Alabama	Public In-State	2-year	Fees/Tuition	4048
3	2013	Alabama	Public In-State	4-year	Fees/Tuition	8073
4	2013	Alabama	Public In-State	4-year	Room/Board	8473
3543	2021	Wyoming	Public In-State	2-year	Fees/Tuition	3987
3544	2021	Wyoming	Public In-State	4-year	Room/Board	9799
3545	2021	Wyoming	Public Out-of-State	2-year	Fees/Tuition	9820
3546	2021	Wyoming	Public Out-of-State	4-year	Fees/Tuition	14710
3547	2021	Wyoming	Public Out-of-State	4-year	Room/Board	9799

	New_Length
0	_ 4
1	4
2	2
3	4
4	4
3543	2
3544	4
3545	2
3546	4
3547	4

[3548 rows x 7 columns]

a['Year'].dtype # will return the type of data
dtype('int64')

a['Value']<10000 # will check the condition is true or false

```
False
0
         True
1
2
         True
3
         True
         True
3543
         True
3544
         True
3545
         True
3546
        False
3547
         True
Name: Value, Length: 3548, dtype: bool
a[a['Value']<10000] # will return all the record were it is true
      Year
                State
                                       Type Length
                                                          Expense
Value
      2013
1
              Alabama
                                    Private 4-year
                                                       Room/Board
8503
      2013
              Alabama
                           Public In-State 2-year Fees/Tuition
4048
      2013
              Alabama
                           Public In-State 4-year
                                                     Fees/Tuition
8073
      2013
              Alabama
                           Public In-State 4-year
                                                       Room/Board
8473
      2013
              Alabama Public Out-of-State 2-year
                                                     Fees/Tuition
7736
       . . .
            Wisconsin Public Out-of-State 4-year
3542
      2021
                                                       Room/Board
9093
3543
      2021
              Wyoming
                           Public In-State 2-year
                                                     Fees/Tuition
3987
3544
      2021
              Wyoming
                           Public In-State 4-year
                                                       Room/Board
9799
3545
      2021
              Wyoming Public Out-of-State 2-year
                                                     Fees/Tuition
9820
3547
              Wyoming Public Out-of-State 4-year
                                                       Room/Board
      2021
9799
      New_Length
1
               2
2
3
               4
4
5
               2
               4
3542
3543
               2
```

3544

```
3545
               2
3547
[1695 rows x 7 columns]
a[(a['Value']<10000) | (a['Value']>5000)] # 'OR' condition
      Year
              State
                                     Type Length
                                                         Expense
                                                                   Value
\
      2013
            Alabama
0
                                  Private 4-year
                                                    Fees/Tuition
                                                                   13983
1
      2013
            Alabama
                                  Private
                                                      Room/Board
                                                                    8503
                                            4-year
2
      2013
            Alabama
                          Public In-State 2-year Fees/Tuition
                                                                    4048
3
      2013
            Alabama
                          Public In-State 4-year
                                                    Fees/Tuition
                                                                    8073
4
      2013
            Alabama
                          Public In-State 4-year
                                                      Room/Board
                                                                    8473
       . . .
                 . . .
                                               . . .
. . .
                                                                     . . .
3543
      2021
            Wyoming
                          Public In-State
                                                    Fees/Tuition
                                            2-year
                                                                    3987
                          Public In-State 4-year
3544
      2021
            Wyoming
                                                      Room/Board
                                                                    9799
                      Public Out-of-State 2-year
                                                    Fees/Tuition
3545
            Wyoming
      2021
                                                                    9820
3546
                     Public Out-of-State 4-year
      2021
            Wyoming
                                                    Fees/Tuition
                                                                   14710
3547
      2021
            Wyoming
                     Public Out-of-State 4-year
                                                      Room/Board
                                                                    9799
      New Length
0
1
               4
2
               2
3
4
               4
               2
3543
               4
3544
               2
3545
3546
3547
[3548 rows x 7 columns]
```

a[(a['Value']<10000) & (a['Value']>5000)] # 'AND' condition

```
Year
                State
                                       Type Length
                                                          Expense
Value
      \
1
      2013
              Alabama
                                    Private 4-year
                                                       Room/Board
8503
                           Public In-State 4-year
              Alabama
                                                     Fees/Tuition
3
      2013
8073
                           Public In-State 4-year
                                                       Room/Board
      2013
              Alabama
4
8473
5
      2013
              Alabama Public Out-of-State 2-year Fees/Tuition
7736
              Alabama Public Out-of-State 4-year
7
      2013
                                                       Room/Board
8473
. . .
       . . .
                  . . .
                                               . . .
                                                               . . .
3540
      2021
            Wisconsin Public Out-of-State 2-year
                                                     Fees/Tuition
6552
            Wisconsin Public Out-of-State 4-year
3542
      2021
                                                       Room/Board
9093
3544
      2021
              Wyoming
                           Public In-State 4-year
                                                       Room/Board
9799
3545
              Wyoming Public Out-of-State 2-year Fees/Tuition
      2021
9820
3547
      2021
              Wyoming Public Out-of-State 4-year
                                                       Room/Board
9799
      New Length
1
               4
3
               4
4
               4
5
               2
7
               4
3540
               2
3542
               4
               4
3544
3545
               2
3547
[1255 rows x 7 columns]
def doublevalue(x):
  return(x*2)
a['New value']= a['Value'].apply(doublevalue)
a[['Value', 'New value']]
      Value New value
0
      13983
                 27966
       8503
                 17006
1
2
                  8096
       4048
3
       8073
                 16146
```

```
8473
4
                 16946
3543
       3987
                  7974
3544
       9799
                 19598
3545
       9820
                 19640
3546
      14710
                 29420
3547
       9799
                 19598
[3548 rows x 2 columns]
# For inline function
# def doublevalue(x):
# return(x*2)
a['New_value']= a['Value'].apply(lambda x:x*2)
a[['Value', 'New_value']]
      Value
             New_value
      13983
                 27966
0
1
       8503
                 17006
2
       4048
                  8096
3
       8073
                 16146
4
       8473
                 16946
3543
       3987
                  7974
3544
       9799
                 19598
3545
       9820
                 19640
3546
      14710
                 29420
3547
       9799
                 19598
[3548 rows x 2 columns]
a.isnull() # to find null values
       Year State
                     Type Length Expense Value New Length
New value
      False False False
                             False
                                      False
                                            False
                                                          False
False
      False False False
                             False
                                      False False
                                                          False
False
      False False False
                             False
                                      False False
                                                          False
False
      False False False
                                      False False
3
                             False
                                                          False
False
      False False False
                             False
                                      False False
                                                          False
False
                                        . . .
                               . . .
                                                            . . .
3543 False False False
                             False
                                      False False
                                                          False
False
3544
     False False False
                             False
                                      False False
                                                          False
False
```

```
3545 False False False
                           False
                                    False False
                                                       False
False
3546 False False False
                           False
                                    False False
                                                       False
False
3547 False False False
                           False
                                    False False
                                                       False
False
[3548 rows x 8 columns]
a.isnull().sum() # to count the null values
Year
              0
State
             0
Type
             0
Length
             0
Expense
             0
Value
New Length
             0
New value
             0
dtype: int64
name = "12"
type(name)
str
# convert string into integer
name = int(name)
type(name)
int
```