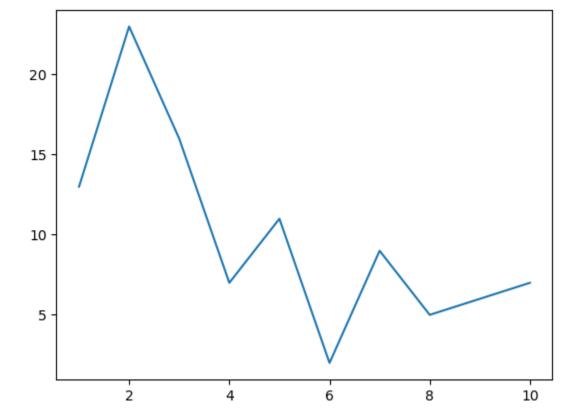
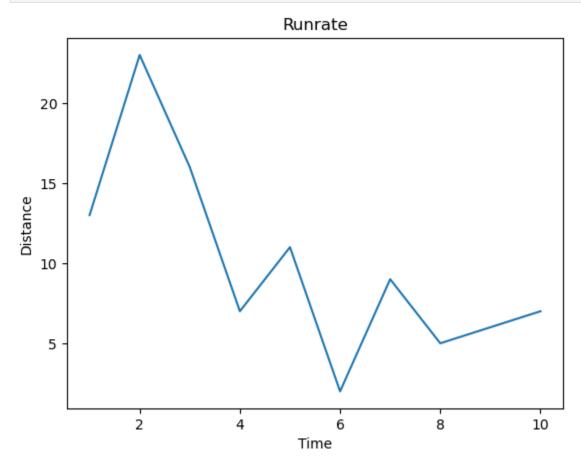
```
import numpy as np
   In [1]:
   In [2]: a=np.array([[1,2,3],[4,5,6],[7,8,9]])
   In [3]:
            a.T
            array([[1, 4, 7],
   Out[3]:
                   [2, 5, 8],
                    [3, 6, 9]])
   In [4]:
            a[:,1]
            array([2, 5, 8])
   Out[4]:
   In [5]:
            b=a
   In [6]:
            a+b
   Out[6]: array([[ 2, 4, 6],
                    [ 8, 10, 12],
                    [14, 16, 18]])
   In [7]: np.add(a,b)
            array([[ 2, 4, 6],
   Out[7]:
                    [ 8, 10, 12],
                   [14, 16, 18]])
   In [8]:
            a-b
            array([[0, 0, 0],
   Out[8]:
                   [0, 0, 0],
                    [0, 0, 0]])
  In [10]: np.subtract(a,b)
            array([[0, 0, 0],
  Out[10]:
                   [0, 0, 0],
                   [0, 0, 0]])
  In [11]:
            np.multiply(a,b)
            array([[ 1, 4, 9],
  Out[11]:
                   [16, 25, 36],
                   [49, 64, 81]])
            a*b
  In [12]:
            array([[ 1, 4, 9],
  Out[12]:
                   [16, 25, 36],
                   [49, 64, 81]])
            a/b
  In [13]:
            array([[1., 1., 1.],
  Out[13]:
                   [1., 1., 1.],
                    [1., 1., 1.]])
  In [14]: a//b
            array([[1, 1, 1],
  Out[14]:
                    [1, 1, 1],
                   [1, 1, 1]], dtype=int32)
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```

```
In [15]: np.sqrt(a)
         array([[1.
                            , 1.41421356, 1.73205081],
Out[15]:
                            , 2.23606798, 2.44948974],
                 [2.
                 [2.64575131, 2.82842712, 3.
                                                     ]])
 In [2]:
          import matplotlib.pyplot as plt
         x = np.arange(0, 5, 0.1)
In [19]:
          y=np.sin(x)
          plt.plot(x,y)
          plt.show()
            1.00
            0.75
            0.50
            0.25 -
            0.00
          -0.25
          -0.50
          -0.75
          -1.00
                                            2
                                1
                                                         3
                   0
                                                                     4
 In [5]:
         c=[1,2,3,4,5,6,7,8,9,10]
          d=[13,23,16,7,11,2,9,5,6,7]
```

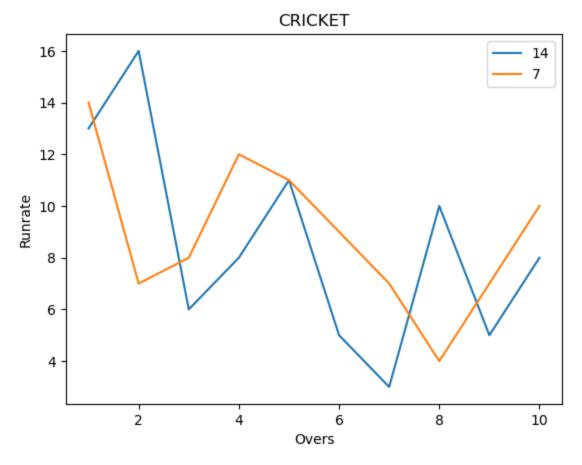


```
In [7]: plt.title("Runrate")
   plt.xlabel("Time")
   plt.ylabel("Distance")
   plt.plot(c,d)
   plt.show()
```



```
In [11]: x=[1,2,3,4,5,6,7,8,9,10]
india=[13,16,6,8,11,5,3,10,5,8]
Loading [MathJax]/extensions/Safe.js 2,11,9,7,4,7,10]
```

```
plt.title("CRICKET")
plt.xlabel("Overs")
plt.ylabel("Runrate")
plt.plot(x,india)
plt.plot(x,aus)
plt.legend(aus)
plt.show()
```



```
In [13]: import pandas as pd
In [14]: ds=pd.read_csv("D:\president_heights.csv") #for x1 sheets: read_excel(filename)
In [44]: ds.info
```

0+[441.	<box>bound</box>	metho	d DataFrame.info of	order	name	height(cm)
Out[44]:	0	1	George Washington	189		,
	1	2	John Adams	170		
	2	3	Thomas Jefferson	189		
	3	4	James Madison	163		
	4	5	James Monroe	183		
	5	6	John Quincy Adams	171		
	6	7	Andrew Jackson	185		
	7	8	Martin Van Buren	168		
	8	9 W	illiam Henry Harrison	173		
	9	10	John Tyler	183		
	10	11	James K. Polk	173		
	11	12	Zachary Taylor	173		
	12	13	Millard Fillmore	175		
	13	14	Franklin Pierce	178		
	14	15	James Buchanan	183		
	15	16	Abraham Lincoln	193		
	16	17	Andrew Johnson	178		
	17	18	Ulysses S. Grant	173		
	18	19	Rutherford B. Hayes	174		
	19	20	James A. Garfield	183		
	20	21	Chester A. Arthur	183		
	21	23	Benjamin Harrison	168		
	22	25	William McKinley	170		
	23	26	Theodore Roosevelt	178		
	24	27	William Howard Taft	182		
	25	28	Woodrow Wilson	180		
	26 27	29 30	Warren G. Harding	183 178		
	28	31	Calvin Coolidge Herbert Hoover	182		
	29		Franklin D. Roosevelt	188		
	30	33	Harry S. Truman	175		
	31	34	Dwight D. Eisenhower	179		
	32	35	John F. Kennedy	183		
	33	36	Lyndon B. Johnson	193		
	34	37	Richard Nixon	182		
	35	38	Gerald Ford	183		
	36	39	Jimmy Carter	177		
	37	40	Ronald Reagan	185		
	38	41	George H. W. Bush	188		
	39	42	Bill Clinton	188		
	40	43	George W. Bush	182		
	41	44	Barack Obama	185>		
In [46]:	ds					

Out[46]:		order	name	height(cm)
	0	1	George Washington	189
	1	2	John Adams	170
	2	3	Thomas Jefferson	189
	3	4	James Madison	163
	4	5	James Monroe	183
	5	6	John Quincy Adams	171
	6	7	Andrew Jackson	185
	7	8	Martin Van Buren	168
	8	9	William Henry Harrison	173
	9	10	John Tyler	183
	10	11	James K. Polk	173
	11	12	Zachary Taylor	173
	12	13	Millard Fillmore	175
	13	14	Franklin Pierce	178
	14	15	James Buchanan	183
	15	16	Abraham Lincoln	193
	16	17	Andrew Johnson	178
	17	18	Ulysses S. Grant	173
	18	19	Rutherford B. Hayes	174
	19	20	James A. Garfield	183
	20	21	Chester A. Arthur	183
	21	23	Benjamin Harrison	168
	22	25	William McKinley	170
	23	26	Theodore Roosevelt	178
	24	27	William Howard Taft	182
	25	28	Woodrow Wilson	180
	26	29	Warren G. Harding	183
	27	30	Calvin Coolidge	178
	28	31	Herbert Hoover	182
	29	32	Franklin D. Roosevelt	188
	30	33	Harry S. Truman	175
	31	34	Dwight D. Eisenhower	179
	32	35	John F. Kennedy	183
	33	36	Lyndon B. Johnson	193
	34	37	Richard Nixon	182
	35	38	Gerald Ford	183
	36	39	Jimmy Carter	177
	37	40	Ronald Reagan	185
ading [MathJax]	38	41	George H. W. Bush	188

Loading [MathJax]

	40	43	George W. Bu	sh 1
	41	44	Barack Obar	na 1
n [47]:	ds.d			
ut[4/]:	orde name heig dtyp	ht(c	int64 object m) int64 bject	
n [15]:	ds1=	ds		
n [49]:	ds1.	head	I()	
ut[49]:	or	der	name	height(cm)
_	0	1	George Washington	189
	1	2	John Adams	170
	2	3	Thomas Jefferson	189
	3	4	James Madison	163
	4	5	James Monroe	183
n [50]:	ds1.	tail	.()	
ut[50]:	c	order	name	height(cm)
_	37	40	Ronald Reagan	185
	38	41	George H. W. Bush	188
	39	42	Bill Clinton	188
	40	43	George W. Bush	182
	41	44	Barack Obama	185
n [16]:	ds1.	iloc	:[0]	
ur[10]:	orde name heig Name	ht(c	George Wa m) dtype: object	1 shington 189
n [52]:	ds1.	iloc	:[35:39]	
ut[52]:	c	order	name	height(cm)
_	35	38	Gerald Ford	183
	36	39	Jimmy Carter	177
	37	40	Ronald Reagan	185
	38	41	George H. W. Bush	188
		.1	11 ()	

In [53]: ds1.describe()

order

42

39

name height(cm)

188

Bill Clinton

```
Out[53]:
                    order
                          height(cm)
          count 42.000000
                           42.000000
          mean 22.476190 179.738095
            std 13.152461
                            7.015869
                 1.000000 163.000000
            min
           25%
                11.250000
                         174.250000
           50%
               22.000000 182.000000
                33.750000 183.000000
           75%
           max 44.000000 193.000000
          ds1['order'].describe()
In [55]:
                    42.000000
          count
Out[55]:
          mean
                    22.476190
          std
                    13.152461
                    1.000000
          min
          25%
                    11.250000
          50%
                    22.000000
          75%
                    33.750000
                    44.000000
          max
          Name: order, dtype: float64
          subset=ds1[['order','name']]
In [56]:
```

subset

In [57]:

Out[57]:		order	name
	0	1	George Washington
	1	2	John Adams
	2	3	Thomas Jefferson
	3	4	James Madison
	4	5	James Monroe
	5	6	John Quincy Adams
	6	7	Andrew Jackson
	7	8	Martin Van Buren
	8	9	William Henry Harrison
	9	10	John Tyler
	10	11	James K. Polk
	11	12	Zachary Taylor
	12	13	Millard Fillmore
	13	14	Franklin Pierce
	14	15	James Buchanan
	15	16	Abraham Lincoln
	16	17	Andrew Johnson
	17	18	Ulysses S. Grant
	18	19	Rutherford B. Hayes
	19	20	James A. Garfield
	20	21	Chester A. Arthur
	21	23	Benjamin Harrison
	22	25	William McKinley
	23	26	Theodore Roosevelt
	24	27	William Howard Taft
	25	28	Woodrow Wilson
	26	29	Warren G. Harding
	27	30	Calvin Coolidge
	28	31	Herbert Hoover
	29	32	Franklin D. Roosevelt
	30	33	Harry S. Truman
	31	34	Dwight D. Eisenhower
	32	35	John F. Kennedy
	33	36	Lyndon B. Johnson
	34	37	Richard Nixon
	35	38	Gerald Ford
	36	39	Jimmy Carter
	37	40	Ronald Reagan
ding [MathJax	38	41	George H. W. Bush

	order	name
39	42	Bill Clinton
40	43	George W. Bush
41	44	Barack Obama

In [58]: del subset['order']

In [59]: subset

	name
0	George Washington
1	John Adams
2	Thomas Jefferson
3	James Madison
4	James Monroe
5	John Quincy Adams
6	Andrew Jackson
7	Martin Van Buren
8	William Henry Harrison
9	John Tyler
10	James K. Polk
11	Zachary Taylor
12	Millard Fillmore
13	Franklin Pierce
14	James Buchanan
15	Abraham Lincoln
16	Andrew Johnson
17	Ulysses S. Grant
18	Rutherford B. Hayes
19	James A. Garfield
20	Chester A. Arthur
21	Benjamin Harrison
22	William McKinley
23	Theodore Roosevelt
24	William Howard Taft
25	Woodrow Wilson
26	Warren G. Harding
27	Calvin Coolidge
28	Herbert Hoover
29	Franklin D. Roosevelt
30	Harry S. Truman
31	Dwight D. Eisenhower
32	John F. Kennedy
33	Lyndon B. Johnson
34	Richard Nixon
35	Gerald Ford
36	Jimmy Carter
37	Ronald Reagan
38	George H. W. Bush

Out[59]:

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	name
39	Bill Clinton
40	George W. Bush
41	Barack Obama

In [60]: ds1

0         1         George Washington         189           1         2         John Adams         170           2         3         Thomas Jefferson         189           3         4         James Monroe         183           4         5         James Monroe         183           5         6         John Quincy Adams         171           6         7         Andrew Jackson         185           7         8         Martin Van Buren         168           8         9         William Henry Harrison         173           9         10         John Tyler         183           10         11         James K. Polk         173           11         12         Zachary Taylor         173           12         13         Millard Fillmore         175           13         14         Franklin Pierce         178           14         15         James Buchanan         183           15         16         Abraham Lincoln         193           16         17         Andrew Johnson         178           17         18         Ulysses S. Grant         173           18	Out[60]:		order	name	height(cm)
2       3       Thomas Jefferson       189         3       4       James Madison       163         4       5       James Monroe       183         5       6       John Quincy Adams       171         6       7       Andrew Jackson       185         7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23		0	1	George Washington	189
3       4       James Madison       163         4       5       James Monroe       183         5       6       John Quincy Adams       171         6       7       Andrew Jackson       185         7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25		1	2	John Adams	170
4       5       James Monroe       183         5       6       John Quincy Adams       171         6       7       Andrew Jackson       185         7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William Howard Taft       182         24       2		2	3	Thomas Jefferson	189
5       6       John Quincy Adams       171         6       7       Andrew Jackson       185         7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24		3	4	James Madison	163
6       7       Andrew Jackson       185         7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25		4	5	James Monroe	183
7       8       Martin Van Buren       168         8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26		5	6	John Quincy Adams	171
8       9       William Henry Harrison       173         9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27 <th></th> <th>6</th> <th>7</th> <th>Andrew Jackson</th> <th>185</th>		6	7	Andrew Jackson	185
9       10       John Tyler       183         10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28		7	8	Martin Van Buren	168
10       11       James K. Polk       173         11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29 <th></th> <th>8</th> <th>9</th> <th>William Henry Harrison</th> <th>173</th>		8	9	William Henry Harrison	173
11       12       Zachary Taylor       173         12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         <		9	10	John Tyler	183
12       13       Millard Fillmore       175         13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175		10	11	James K. Polk	173
13       14       Franklin Pierce       178         14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179		11	12	Zachary Taylor	173
14       15       James Buchanan       183         15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		12	13	Millard Fillmore	175
15       16       Abraham Lincoln       193         16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		13	14	Franklin Pierce	178
16       17       Andrew Johnson       178         17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		14	15	James Buchanan	183
17       18       Ulysses S. Grant       173         18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		15	16	Abraham Lincoln	193
18       19       Rutherford B. Hayes       174         19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William Horkinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		16	17	Andrew Johnson	178
19       20       James A. Garfield       183         20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William Horkinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		17	18	Ulysses S. Grant	173
20       21       Chester A. Arthur       183         21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		18	19	Rutherford B. Hayes	174
21       23       Benjamin Harrison       168         22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		19	20	James A. Garfield	183
22       25       William McKinley       170         23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		20	21	Chester A. Arthur	183
23       26       Theodore Roosevelt       178         24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		21	23	Benjamin Harrison	168
24       27       William Howard Taft       182         25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		22	25	William McKinley	170
25       28       Woodrow Wilson       180         26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		23	26	Theodore Roosevelt	178
26       29       Warren G. Harding       183         27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		24	27	William Howard Taft	182
27       30       Calvin Coolidge       178         28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		25	28	Woodrow Wilson	180
28       31       Herbert Hoover       182         29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		26	29	Warren G. Harding	183
29       32       Franklin D. Roosevelt       188         30       33       Harry S. Truman       175         31       34       Dwight D. Eisenhower       179         32       35       John F. Kennedy       183		27	30	Calvin Coolidge	178
<ul> <li>30 33 Harry S. Truman 175</li> <li>31 34 Dwight D. Eisenhower 179</li> <li>32 35 John F. Kennedy 183</li> </ul>		28	31	Herbert Hoover	182
<ul> <li>31 34 Dwight D. Eisenhower 179</li> <li>32 35 John F. Kennedy 183</li> </ul>		29	32	Franklin D. Roosevelt	188
<b>32</b> 35 John F. Kennedy 183		30	33	Harry S. Truman	175
		31	34	Dwight D. Eisenhower	179
22 26 Lyndon P. Johnson 100		32	35	John F. Kennedy	183
SS SO LYHUUH B. JOHNSON 193		33	36	Lyndon B. Johnson	193
<b>34</b> 37 Richard Nixon 182		34	37	Richard Nixon	182
<b>35</b> 38 Gerald Ford 183		35	38	Gerald Ford	183
<b>36</b> 39 Jimmy Carter 177		36	39	Jimmy Carter	177
<b>37</b> 40 Ronald Reagan 185		37	40	Ronald Reagan	185
38 41 George H. W. Bush 188 Loading [MathJax]/extensions/Safe.js	Loading [Math lav				188

	order	name	height(cm)
39	42	Bill Clinton	188
40	43	George W. Bush	182
41	44	Barack Obama	185

In [20]: ds1.rename(columns={'order':'new column'})

Out[20]:		new column	name
	0	1	George Washington
	1	2	John Adams
	2	3	Thomas Jefferson
	3	4	James Madison
	4	5	James Monroe
	5	6	John Quincy Adams
	6	7	Andrew Jackson
	7	8	Martin Van Buren
	8	9	William Henry Harrison
	9	10	John Tyler
	10	11	James K. Polk
	11	12	Zachary Taylor
	12	13	Millard Fillmore
	13	14	Franklin Pierce
	14	15	James Buchanan
	15	16	Abraham Lincoln
	16	17	Andrew Johnson
	17	18	Ulysses S. Grant
	18	19	Rutherford B. Hayes
	19	20	James A. Garfield
	20	21	Chester A. Arthur
	21	23	Benjamin Harrison
	22	25	William McKinley
	23	26	Theodore Roosevelt
	24	27	William Howard Taft
	25	28	Woodrow Wilson
	26	29	Warren G. Harding
	27	30	Calvin Coolidge
	28	31	Herbert Hoover
	29	32	Franklin D. Roosevelt
	30	33	Harry S. Truman
	31	34	Dwight D. Eisenhower
	32	35	John F. Kennedy
	33	36	Lyndon B. Johnson
	34	37	Richard Nixon
	35	38	Gerald Ford
	36	39	Jimmy Carter
	37	40	Ronald Reagan
	38	41	George H. W. Bush
Loading [MathJax	]/exte	ensions/Safe.js	

	new column	name
39	42	Bill Clinton
40	43	George W. Bush
41	44	Barack Obama

```
In [21]: ds1.columns
```

Out[21]: Index(['order', 'name'], dtype='object')

In [22]: ds1

Out[22]:		order	name
_	0	1	George Washington
	1	2	John Adams
	2	3	Thomas Jefferson
	3	4	James Madison
	4	5	James Monroe
	5	6	John Quincy Adams
	6	7	Andrew Jackson
	7	8	Martin Van Buren
	8	9	William Henry Harrison
	9	10	John Tyler
	10	11	James K. Polk
	11	12	Zachary Taylor
	12	13	Millard Fillmore
	13	14	Franklin Pierce
	14	15	James Buchanan
	15	16	Abraham Lincoln
	16	17	Andrew Johnson
	17	18	Ulysses S. Grant
	18	19	Rutherford B. Hayes
	19	20	James A. Garfield
	20	21	Chester A. Arthur
	21	23	Benjamin Harrison
	22	25	William McKinley
	23	26	Theodore Roosevelt
	24	27	William Howard Taft
	25	28	Woodrow Wilson
	26	29	Warren G. Harding
	27	30	Calvin Coolidge
	28	31	Herbert Hoover
	29	32	Franklin D. Roosevelt
	30	33	Harry S. Truman
	31	34	Dwight D. Eisenhower
	32	35	John F. Kennedy
	33	36	Lyndon B. Johnson
	34	37	Richard Nixon
	35	38	Gerald Ford
	36	39	Jimmy Carter
	37	40	Ronald Reagan
ding [MathJax]	38	41	George H. W. Bush

	39	42	Bill Clinton
	40	43	George W. Bush
	41	44	Barack Obama
[66]:	ds1.iloc[4]		
ut[66]:	orde name		James Monroe
	height(cm) Name: 4, dtyp		183 be: object
n [67]:	ds1.iloc[4]=5, "Dr. Karev", 1		

order

In [68]: ds1

name

Out[68]:		order	name	height(cm)
	0	1	George Washington	189
	1	2	John Adams	170
	2	3	Thomas Jefferson	189
	3	4	James Madison	163
	4	5	Dr. Karev	187
	5	6	John Quincy Adams	171
	6	7	Andrew Jackson	185
	7	8	Martin Van Buren	168
	8	9	William Henry Harrison	173
	9	10	John Tyler	183
	10	11	James K. Polk	173
	11	12	Zachary Taylor	173
	12	13	Millard Fillmore	175
	13	14	Franklin Pierce	178
	14	15	James Buchanan	183
	15	16	Abraham Lincoln	193
	16	17	Andrew Johnson	178
	17	18	Ulysses S. Grant	173
	18	19	Rutherford B. Hayes	174
	19	20	James A. Garfield	183
	20	21	Chester A. Arthur	183
	21	23	Benjamin Harrison	168
	22	25	William McKinley	170
	23	26	Theodore Roosevelt	178
	24	27	William Howard Taft	182
	25	28	Woodrow Wilson	180
	26	29	Warren G. Harding	183
	27	30	Calvin Coolidge	178
	28	31	Herbert Hoover	182
	29	32	Franklin D. Roosevelt	188
	30	33	Harry S. Truman	175
	31	34	Dwight D. Eisenhower	179
	32	35	John F. Kennedy	183
	33	36	Lyndon B. Johnson	193
	34	37	Richard Nixon	182
	35	38	Gerald Ford	183
	36	39	Jimmy Carter	177
	37	40	Ronald Reagan	185
Loading [MathJax	38 1/ovto	41	George H. W. Bush	188
Loading [Mathiatx	J/ EXIC	11310115/3	Jui C.Jo	

	order	name	height(cm)
39	42	Bill Clinton	188
40	43	George W. Bush	182
41	44	Barack Obama	185

In [17]: del ds1["height(cm)"]

In [18]: ds1

name	order		Out[18]:
George Washington	1	0	
John Adams	2	1	
Thomas Jefferson	3	2	
James Madison	4	3	
James Monroe	5	4	
John Quincy Adams	6	5	
Andrew Jackson	7	6	
Martin Van Buren	8	7	
William Henry Harrison	9	8	
John Tyler	10	9	
James K. Polk	11	10	
Zachary Taylor	12	11	
Millard Fillmore	13	12	
Franklin Pierce	14	13	
James Buchanan	15	14	
Abraham Lincoln	16	15	
Andrew Johnson	17	16	
Ulysses S. Grant	18	17	
Rutherford B. Hayes	19	18	
James A. Garfield	20	19	
Chester A. Arthur	21	20	
Benjamin Harrison	23	21	
William McKinley	25	22	
Theodore Roosevelt	26	23	
William Howard Taft	27	24	
Woodrow Wilson	28	25	
Warren G. Harding	29	26	
Calvin Coolidge	30	27	
Herbert Hoover	31	28	
Franklin D. Roosevelt	32	29	
Harry S. Truman	33	30	
Dwight D. Eisenhower	34	31	
John F. Kennedy	35	32	
Lyndon B. Johnson	36	33	
Richard Nixon	37	34	
Gerald Ford	38	35	
Jimmy Carter	39	36	
Ronald Reagan	40	37	
George H. W. Bush	41	38	

	order	name
39	42	Bill Clinton
40	43	George W. Bush
41	44	Barack Obama

In [19]: **ds1** 

name	order		Out[19]:
George Washington	1	0	
John Adams	2	1	
Thomas Jefferson	3	2	
James Madison	4	3	
James Monroe	5	4	
John Quincy Adams	6	5	
Andrew Jackson	7	6	
Martin Van Buren	8	7	
William Henry Harrison	9	8	
John Tyler	10	9	
James K. Polk	11	10	
Zachary Taylor	12	11	
Millard Fillmore	13	12	
Franklin Pierce	14	13	
James Buchanan	15	14	
Abraham Lincoln	16	15	
Andrew Johnson	17	16	
Ulysses S. Grant	18	17	
Rutherford B. Hayes	19	18	
James A. Garfield	20	19	
Chester A. Arthur	21	20	
Benjamin Harrison	23	21	
William McKinley	25	22	
Theodore Roosevelt	26	23	
William Howard Taft	27	24	
Woodrow Wilson	28	25	
Warren G. Harding	29	26	
Calvin Coolidge	30	27	
Herbert Hoover	31	28	
Franklin D. Roosevelt	32	29	
Harry S. Truman	33	30	
Dwight D. Eisenhower	34	31	
John F. Kennedy	35	32	
Lyndon B. Johnson	36	33	
Richard Nixon	37	34	
Gerald Ford	38	35	
Jimmy Carter	39	36	
Ronald Reagan	40	37	
George H. W. Bush	41	38	

	order	name
39	42	Bill Clinton
40	43	George W. Bush
41	44	Barack Obama

In [ ]: