Create a Series from a list

In [2]:
```
import pandas as pd
import numpy as np
```

In [5]:
```
colors = ["Yellow","Red","Black","White","Pink","Orange"]
pd.Series(colors)
```

Out[5]:
```
0    Yellow
1       Red
2     Black
3     White
4      Pink
5    Orange
dtype: object
```

note: dtype: object means string. dtype can be any dtype like as int fload bool. series start in o index position

In [4]:
```
numbers = [4,5,6,7,8,10,89,56,72,34]
pd.Series(numbers)
```

Out[4]:
```
0     4
1     5
2     6
3     7
4     8
5    10
6    89
7    56
8    72
9    34
dtype: int64
```

In [7]:
```
boolean = [True,False,True,True,False]
pd.Series(boolean)
```

Out[7]:
```
0     True
1    False
2     True
3     True
4    False
dtype: bool
```

Create a series object from a dictionary

In [9]:
```
my_foods = {"One": "Apple","Two":"Water Melon","Three":"Orange","Four":
"Banana"}
pd.Series(my_foods)
```

Out[9]:
```
One            Apple
Two      Water Melon
Three         Orange
Four          Banana
dtype: object
```

Series Attributes

In [5]:
```
friuts = ['apple','orange','banana','strawberry','jackfruit']
fruits
```

Out[5]:
```
['Apple', 'Banana', 'Orange', 'Strawberry', 'Jackfruit']
```

In [7]:
```
import pandas as pd
fpd = pd.Series(fruits)
```

In [9]:
```
fpd.values
```

Out[9]:
```
array(['Apple', 'Banana', 'Orange', 'Strawberry', 'Jackfruit'], dtype=o
bject)
```

In [10]:
```
fpd.index
```

Out[10]:
```
RangeIndex(start=0, stop=5, step=1)
```

In [11]:
```
fpd.dtype
```

Out[11]:
```
dtype('O')
```

Series Methods

In [46]:
```
numbers = [12,14,15,18,9,12,15,19,90,73,65,6,4,8,15,18]
```

In [48]:
```
fpd = pd.Series(numbers)
```

In [49]:
```
fpd.sum()
```

Out[49]:
```
393
```

In [50]:
```
fpd.product()
```

Out[50]:
```
-5984457835841503232
```

In [51]:
```
fpd.mean()
```

Out[51]:
```
24.5625
```

In [52]:
```
fpd.median()
```

Out[52]:
```
15.0
```

In [53]:
```
fpd.astype
```

Out[53]:
```
<bound method NDFrame.astype of 0     12
1     14
2     15
3     18
4      9
5     12
6     15
7     19
8     90
9     73
10    65
11     6
12     4
13     8
14    15
15    18
dtype: int64>
```

In [54]:
```
fpd.unique()
```

Out[54]:
```
array([12, 14, 15, 18,  9, 19, 90, 73, 65,  6,  4,  8])
```

In [60]:
```
fpd.value_counts(sort=False)
```

Out[60]:
```
65    1
18    2
19    1
4     1
6     1
8     1
9     1
90    1
73    1
12    2
14    1
15    3
dtype: int64
```

Parameters and Arguments

In [61]:
```
name = ["Sumona","Sadia","Shafali","Shamoli","Sultana","Sourovi","Sumaia"]
weeks = ["Saturdsy","Sunday","Monday","Wednesday","Tuesday","Thrusday","Friday"]
pd.Series(name)
```

Out[61]:
```
0     Sumona
1      Sadia
2    Shafali
3    Shamoli
4    Sultana
5    Sourovi
6     Sumaia
dtype: object
```

In [62]:
```
pd.Series(weeks)
```

Out[62]:
```
0     Saturdsy
1       Sunday
2       Monday
3    Wednesday
4      Tuesday
5     Thrusday
6       Friday
dtype: object
```

In [63]:
```
pd.Series(name,weeks)
```

Out[63]:
```
Saturdsy      Sumona
Sunday         Sadia
Monday       Shafali
Wednesday    Shamoli
Tuesday      Sultana
Thrusday     Sourovi
Friday        Sumaia
dtype: object
```

In [64]:
```
pd.Series(data = name,index = weeks)
```

Out[64]:
```
Saturdsy      Sumona
Sunday         Sadia
Monday       Shafali
Wednesday    Shamoli
Tuesday      Sultana
Thrusday     Sourovi
Friday        Sumaia
dtype: object
```

In [65]:
```
pd.Series(data = weeks, index = name)
```

Out[65]:
```
Sumona      Saturdsy
Sadia         Sunday
Shafali       Monday
Shamoli    Wednesday
Sultana      Tuesday
Sourovi     Thrusday
Sumaia        Friday
dtype: object
```

In [66]:
```
name = ["Sumona","Sadia","Shafali","Shamoli","Sultana","Sourovi","Sumai
a","Shati","Shipa"]
weeks = ["Saturdsy","Sunday","Monday","Wednesday","Tuesday","Thrusday",
"Friday","Saturday","Monday"]
pd.Series(name,weeks)
```

Out[66]:
```
Saturdsy      Sumona
Sunday         Sadia
Monday       Shafali
Wednesday    Shamoli
Tuesday      Sultana
Thrusday     Sourovi
Friday        Sumaia
Saturday       Shati
Monday         Shipa
dtype: object
```

note: same data can be use

Import Series with the read_csv()

In [67]:
```
pd.read_csv("student.csv")
```

Out[67]:

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Re
0	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
1	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
2	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
3	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
4	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
5	F	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
6	M	KW	KuwaIT	MiddleSchool	G-07	A	Math	F	
7	M	KW	KuwaIT	MiddleSchool	G-07	A	Math	F	
8	F	KW	KuwaIT	MiddleSchool	G-07	A	Math	F	
9	F	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
10	M	KW	KuwaIT	MiddleSchool	G-07	A	Math	F	
11	M	KW	KuwaIT	MiddleSchool	G-07	B	Math	F	
12	M	KW	KuwaIT	lowerlevel	G-04	A	IT	F	
13	M	lebanon	lebanon	MiddleSchool	G-08	A	Math	F	
14	F	KW	KuwaIT	MiddleSchool	G-08	A	Math	F	
15	F	KW	KuwaIT	MiddleSchool	G-06	A	IT	F	
16	M	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
17	M	KW	KuwaIT	MiddleSchool	G-07	A	Math	F	

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Re
18	F	KW	KuwaIT	MiddleSchool	G-07	A	IT	F	
19	M	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
20	F	KW	KuwaIT	MiddleSchool	G-07	A	IT	F	
21	F	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
22	M	KW	KuwaIT	MiddleSchool	G-07	A	IT	F	
23	M	KW	KuwaIT	MiddleSchool	G-07	A	IT	F	
24	M	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
25	M	KW	KuwaIT	MiddleSchool	G-07	A	IT	F	
26	M	KW	KuwaIT	MiddleSchool	G-07	B	IT	F	
27	M	KW	KuwaIT	MiddleSchool	G-08	A	Arabic	F	
28	M	KW	KuwaIT	MiddleSchool	G-08	A	Science	F	
29	F	KW	KuwaIT	MiddleSchool	G-08	A	Arabic	F	
...	...	...	...	...	...	...	...	...	
450	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	F	
451	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	
452	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	F	
453	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	S	
454	F	Jordan	Jordan	MiddleSchool	G-08	A	History	F	
455	F	Jordan	Jordan	MiddleSchool	G-08	A	History	S	
456	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	F	
457	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	
458	M	Iraq	Iraq	MiddleSchool	G-08	A	Chemistry	F	
459	M	Iraq	Iraq	MiddleSchool	G-08	A	Chemistry	S	
460	M	Iraq	Iraq	MiddleSchool	G-08	A	Geology	F	
461	M	Iraq	Iraq	MiddleSchool	G-08	A	Geology	S	

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Re
462	M	Iraq	Iraq	MiddleSchool	G-08	A	History	F	
463	M	Iraq	Iraq	MiddleSchool	G-08	A	History	S	
464	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	F	
465	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	
466	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	F	
467	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	S	
468	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	F	
469	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	
470	M	Palestine	Jordan	MiddleSchool	G-08	A	History	F	
471	M	Palestine	Jordan	MiddleSchool	G-08	A	History	S	
472	M	Palestine	Palestine	MiddleSchool	G-08	A	Geology	F	
473	M	Palestine	Palestine	MiddleSchool	G-08	A	Geology	S	
474	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	F	
475	F	Jordan	Jordan	MiddleSchool	G-08	A	Chemistry	S	
476	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	F	
477	F	Jordan	Jordan	MiddleSchool	G-08	A	Geology	S	
478	F	Jordan	Jordan	MiddleSchool	G-08	A	History	F	
479	F	Jordan	Jordan	MiddleSchool	G-08	A	History	S	

480 rows × 17 columns

In [68]:
```
pd.read_csv("Google_Stock_Price_Train.csv")
```

Out[68]:

	Date	Open	High	Low	Close	Volume
0	1/3/2012	325.25	332.83	324.97	663.59	7,380,500

	Date	Open	High	Low	Close	Volume
1	1/4/2012	331.27	333.87	329.08	666.45	5,749,400
2	1/5/2012	329.83	330.75	326.89	657.21	6,590,300
3	1/6/2012	328.34	328.77	323.68	648.24	5,405,900
4	1/9/2012	322.04	322.29	309.46	620.76	11,688,800
5	1/10/2012	313.70	315.72	307.30	621.43	8,824,000
6	1/11/2012	310.59	313.52	309.40	624.25	4,817,800
7	1/12/2012	314.43	315.26	312.08	627.92	3,764,400
8	1/13/2012	311.96	312.30	309.37	623.28	4,631,800
9	1/17/2012	314.81	314.81	311.67	626.86	3,832,800
10	1/18/2012	312.14	315.82	309.90	631.18	5,544,000
11	1/19/2012	319.30	319.30	314.55	637.82	12,657,800
12	1/20/2012	294.16	294.40	289.76	584.39	21,231,800
13	1/23/2012	291.91	293.23	290.49	583.92	6,851,300
14	1/24/2012	292.07	292.74	287.92	579.34	6,134,400
15	1/25/2012	287.68	288.27	282.13	567.93	10,012,700
16	1/26/2012	284.92	286.17	281.22	566.54	6,476,500
17	1/27/2012	284.32	289.08	283.60	578.39	7,262,000
18	1/30/2012	287.95	288.92	285.63	576.11	4,678,400
19	1/31/2012	290.41	290.91	286.50	578.52	4,300,700
20	2/1/2012	291.38	291.66	288.49	579.24	4,658,700
21	2/2/2012	291.34	292.11	289.95	583.51	4,847,400
22	2/3/2012	294.23	297.42	292.93	594.7	6,360,700
23	2/6/2012	296.39	304.27	295.90	607.42	7,386,700
24	2/7/2012	302.44	303.56	300.75	605.11	4,199,700
25	2/8/2012	303.18	304.53	301.24	608.18	3,686,400

	Date	Open	High	Low	Close	Volume
26	2/9/2012	304.87	306.10	303.36	609.79	4,546,300
27	2/10/2012	302.81	302.93	300.87	604.25	4,667,700
28	2/13/2012	304.11	305.77	303.87	610.52	3,646,100
29	2/14/2012	304.63	304.86	301.25	608.09	3,620,900
...	...	...	...	...	...	...
1228	11/17/2016	766.92	772.70	764.23	771.23	1,304,000
1229	11/18/2016	771.37	775.00	760.00	760.54	1,547,100
1230	11/21/2016	762.61	769.70	760.60	769.2	1,330,600
1231	11/22/2016	772.63	776.96	767.00	768.27	1,593,100
1232	11/23/2016	767.73	768.28	755.25	760.99	1,478,400
1233	11/25/2016	764.26	765.00	760.52	761.68	587,400
1234	11/28/2016	760.00	779.53	759.80	768.24	2,188,200
1235	11/29/2016	771.53	778.50	768.24	770.84	1,616,600
1236	11/30/2016	770.07	772.99	754.83	758.04	2,392,900
1237	12/1/2016	757.44	759.85	737.03	747.92	3,017,900
1238	12/2/2016	744.59	754.00	743.10	750.5	1,452,500
1239	12/5/2016	757.71	763.90	752.90	762.52	1,394,200
1240	12/6/2016	764.73	768.83	757.34	759.11	1,690,700
1241	12/7/2016	761.00	771.36	755.80	771.19	1,761,000
1242	12/8/2016	772.48	778.18	767.23	776.42	1,488,100
1243	12/9/2016	780.00	789.43	779.02	789.29	1,821,900
1244	12/12/2016	785.04	791.25	784.35	789.27	2,104,100
1245	12/13/2016	793.90	804.38	793.34	796.1	2,145,200
1246	12/14/2016	797.40	804.00	794.01	797.07	1,704,200
1247	12/15/2016	797.34	803.00	792.92	797.85	1,626,500

	Date	Open	High	Low	Close	Volume
1248	12/16/2016	800.40	800.86	790.29	790.8	2,443,800
1249	12/19/2016	790.22	797.66	786.27	794.2	1,232,100
1250	12/20/2016	796.76	798.65	793.27	796.42	951,000
1251	12/21/2016	795.84	796.68	787.10	794.56	1,211,300
1252	12/22/2016	792.36	793.32	788.58	791.26	972,200
1253	12/23/2016	790.90	792.74	787.28	789.91	623,400
1254	12/27/2016	790.68	797.86	787.66	791.55	789,100
1255	12/28/2016	793.70	794.23	783.20	785.05	1,153,800
1256	12/29/2016	783.33	785.93	778.92	782.79	744,300
1257	12/30/2016	782.75	782.78	770.41	771.82	1,770,000

1258 rows × 6 columns

In [111]:
```
student = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True
)
student
```

Out[111]:
```
0              Vasant Govind Patil
1                    Debjyoti Roy
2                    Kaustav Saha
3                 Debobrata Podder
4                Anurag Mark Topno
5                      Tarun Minz
6               Praveen Rao Rokkam
7                  Arindam Sharma
8                Kaustubh Tripathi
9                     Nakul Gupta
10                   Gaurav Kumar
11                  Abhiram Kasina
12                    Biplab Sinha
13                  M Jagan Mohan
14                    Asit Parija
15             Shenoy Naresh Keshav
```

16	Amit Kumar Suthar
17	Amar Singh Patel
18	Rahul Jaimini
19	Rohit Rajgarhia
20	Akshit Sharma
21	Divya Kumar Kala
22	Sri Harshad
23	Micky Mrinal Minz
24	Nishant Mundu
25	Vinu Rajashekhar
26	Mainack Mondal
27	Debabrata Dey
28	Vivekananda Bhat K
29	E S F Najumudheen
	...
1905	Debanjana Kar
1906	Gourab Chowdhury
1907	Pritam Pallab
1908	Rumia Masburah
1909	Sayantan Basu
1910	Shalmoli Ghosh
1911	Kalyani Roy
1912	Avirup Saha
1913	Bijoy Das
1914	Boyapally Harishma
1915	Minu Tiwari
1916	Ningombam Anandshree Singh
1917	Pranesh S Santikellur
1918	Sayandeep Sanyal
1919	Soumi Das
1920	Abhisek Dash
1921	Anit Kumar Ghosal
1922	Arnab Bag
1923	Arpita Dutta
1924	Indrajit Mazumdar
1925	Pallav Kumar Deb
1926	Soumyajit Chatterjee
1927	Soumya Majumdar
1928	Rajdeep Mukherjee

```
1929                Srijeeta Maity
1930                F Lalchhandama
1931            Gourab Kumar Patro
1932                  Haque Arijul
1933                  Khusbu Bubna
1934            Paheli Bhattacharya
Name: Name, Length: 1935, dtype: object
```

In [77]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
google
```

Out[77]:
```
0       324.97
1       329.08
2       326.89
3       323.68
4       309.46
5       307.30
6       309.40
7       312.08
8       309.37
9       311.67
10      309.90
11      314.55
12      289.76
13      290.49
14      287.92
15      282.13
16      281.22
17      283.60
18      285.63
19      286.50
20      288.49
21      289.95
22      292.93
23      295.90
24      300.75
25      301.24
26      303.36
```

```
27      300.87
28      303.87
29      301.25
         ...
1228    764.23
1229    760.00
1230    760.60
1231    767.00
1232    755.25
1233    760.52
1234    759.80
1235    768.24
1236    754.83
1237    737.03
1238    743.10
1239    752.90
1240    757.34
1241    755.80
1242    767.23
1243    779.02
1244    784.35
1245    793.34
1246    794.01
1247    792.92
1248    790.29
1249    786.27
1250    793.27
1251    787.10
1252    788.58
1253    787.28
1254    787.66
1255    783.20
1256    778.92
1257    770.41
Name: Low, Length: 1258, dtype: float64
```

The head() and tail() methods

In [79]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
google.head()
```

Out[79]:
```
0    324.97
1    329.08
2    326.89
3    323.68
4    309.46
Name: Low, dtype: float64
```

In [80]:
```
google.head(10)
```

Out[80]:
```
0    324.97
1    329.08
2    326.89
3    323.68
4    309.46
5    307.30
6    309.40
7    312.08
8    309.37
9    311.67
Name: Low, dtype: float64
```

In [81]:
```
google.tail()
```

Out[81]:
```
1253    787.28
1254    787.66
1255    783.20
1256    778.92
1257    770.41
Name: Low, dtype: float64
```

In [85]:
```
google.tail(10)
```

Out[85]:
```
1248    790.29
1249    786.27
```

```
1250    793.27
1251    787.10
1252    788.58
1253    787.28
1254    787.66
1255    783.20
1256    778.92
1257    770.41
Name: Low, dtype: float64
```

Built-in function

In [ ]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
```

In [87]:
```
len(google)
```

Out[87]:
```
1258
```

In [88]:
```
type(google)
```

Out[88]:
```
pandas.core.series.Series
```

In [89]:
```
google.dtype
```

Out[89]:
```
dtype('float64')
```

In [90]:
```
min(google)
```

Out[90]:
```
277.22
```

In [91]:
```
max(google)
```

Out[91]:
```
805.14
```

In [92]:
```
dir(google)
```

Out[92]:
```
['T',
 '_AXIS_ALIASES',
 '_AXIS_IALIASES',
 '_AXIS_LEN',
 '_AXIS_NAMES',
 '_AXIS_NUMBERS',
 '_AXIS_ORDERS',
 '_AXIS_REVERSED',
 '_AXIS_SLICEMAP',
 '__abs__',
 '__add__',
 '__and__',
 '__array__',
 '__array_prepare__',
 '__array_priority__',
 '__array_wrap__',
 '__bool__',
 '__bytes__',
 '__class__',
 '__contains__',
 '__copy__',
 '__deepcopy__',
 '__delattr__',
 '__delitem__',
 '__dict__',
 '__dir__',
 '__div__',
 '__divmod__',
 '__doc__',
 '__eq__',
 '__finalize__',
 '__float__',
 '__floordiv__',
 '__format__',
 '__ge__',
 '__getattr__',
 '__getattribute__',
 '__getitem__',
```

```
'__getstate__',
'__gt__',
'__hash__',
'__iadd__',
'__iand__',
'__ifloordiv__',
'__imod__',
'__imul__',
'__init__',
'__init_subclass__',
'__int__',
'__invert__',
'__ior__',
'__ipow__',
'__isub__',
'__iter__',
'__itruediv__',
'__ixor__',
'__le__',
'__len__',
'__long__',
'__lt__',
'__matmul__',
'__mod__',
'__module__',
'__mul__',
'__ne__',
'__neg__',
'__new__',
'__nonzero__',
'__or__',
'__pos__',
'__pow__',
'__radd__',
'__rand__',
'__rdiv__',
'__rdivmod__',
'__reduce__',
'__reduce_ex__',
'__repr__',
```

```
'__rfloordiv__',
'__rmatmul__',
'__rmod__',
'__rmul__',
'__ror__',
'__round__',
'__rpow__',
'__rsub__',
'__rtruediv__',
'__rxor__',
'__setattr__',
'__setitem__',
'__setstate__',
'__sizeof__',
'__str__',
'__sub__',
'__subclasshook__',
'__truediv__',
'__unicode__',
'__weakref__',
'__xor__',
'_accessors',
'_add_numeric_operations',
'_add_series_only_operations',
'_add_series_or_dataframe_operations',
'_agg_by_level',
'_agg_examples_doc',
'_agg_see_also_doc',
'_aggregate',
'_aggregate_multiple_funcs',
'_align_frame',
'_align_series',
'_binop',
'_box_item_values',
'_builtin_table',
'_can_hold_na',
'_check_inplace_setting',
'_check_is_chained_assignment_possible',
'_check_label_or_level_ambiguity',
```

```
'_check_percentile',
'_check_setitem_copy',
'_clear_item_cache',
'_clip_with_one_bound',
'_clip_with_scalar',
'_consolidate',
'_consolidate_inplace',
'_construct_axes_dict',
'_construct_axes_dict_for_slice',
'_construct_axes_dict_from',
'_construct_axes_from_arguments',
'_constructor',
'_constructor_expanddim',
'_constructor_sliced',
'_convert',
'_create_indexer',
'_cython_table',
'_deprecations',
'_dir_additions',
'_dir_deletions',
'_drop_axis',
'_drop_labels_or_levels',
'_expand_axes',
'_find_valid_index',
'_formatting_values',
'_from_axes',
'_get_axis',
'_get_axis_name',
'_get_axis_number',
'_get_axis_resolvers',
'_get_block_manager_axis',
'_get_bool_data',
'_get_cacher',
'_get_index_resolvers',
'_get_item_cache',
'_get_label_or_level_values',
'_get_numeric_data',
'_get_value',
'_get_values',
```

```
'_get_values_tuple',
'_get_with',
'_gotitem',
'_iget_item_cache',
'_index',
'_indexed_same',
'_info_axis',
'_info_axis_name',
'_info_axis_number',
'_init_dict',
'_init_mgr',
'_internal_names',
'_internal_names_set',
'_is_builtin_func',
'_is_cached',
'_is_copy',
'_is_cython_func',
'_is_datelike_mixed_type',
'_is_homogeneous_type',
'_is_label_or_level_reference',
'_is_label_reference',
'_is_level_reference',
'_is_mixed_type',
'_is_numeric_mixed_type',
'_is_view',
'_ix',
'_ixs',
'_map_values',
'_maybe_cache_changed',
'_maybe_update_cacher',
'_metadata',
'_ndarray_values',
'_needs_reindex_multi',
'_obj_with_exclusions',
'_protect_consolidate',
'_reduce',
'_reindex_axes',
'_reindex_indexer',
'_reindex_multi',
```

```
'_reindex_with_indexers',
'_repr_data_resource_',
'_repr_latex_',
'_reset_cache',
'_reset_cacher',
'_selected_obj',
'_selection',
'_selection_list',
'_selection_name',
'_set_as_cached',
'_set_axis',
'_set_axis_name',
'_set_is_copy',
'_set_item',
'_set_labels',
'_set_name',
'_set_subtyp',
'_set_value',
'_set_values',
'_set_with',
'_set_with_engine',
'_setup_axes',
'_shallow_copy',
'_slice',
'_stat_axis',
'_stat_axis_name',
'_stat_axis_number',
'_take',
'_to_dict_of_blocks',
'_try_aggregate_string_function',
'_typ',
'_unpickle_series_compat',
'_update_inplace',
'_validate_dtype',
'_values',
'_where',
'_xs',
'abs',
'add',
```

```
                'add_prefix',
                'add_suffix',
                'agg',
                'aggregate',
                'align',
                'all',
                'any',
                'append',
                'apply',
                'argmax',
                'argmin',
                'argsort',
                'array',
                'as_matrix',
                'asfreq',
                'asof',
                'astype',
                'at',
                'at_time',
                'autocorr',
                'axes',
                'base',
                'between',
                'between_time',
                'bfill',
                'bool',
                'clip',
                'clip_lower',
                'clip_upper',
                'combine',
                'combine_first',
                'compound',
                'compress',
                'copy',
                'corr',
                'count',
                'cov',
                'cummax',
                'cummin',
```

```
'cumprod',
'cumsum',
'data',
'describe',
'diff',
'div',
'divide',
'divmod',
'dot',
'drop',
'drop_duplicates',
'droplevel',
'dropna',
'dtype',
'dtypes',
'duplicated',
'empty',
'eq',
'equals',
'ewm',
'expanding',
'factorize',
'ffill',
'fillna',
'filter',
'first',
'first_valid_index',
'flags',
'floordiv',
'from_array',
'ftype',
'ftypes',
'ge',
'get',
'get_dtype_counts',
'get_ftype_counts',
'get_values',
'groupby',
'gt',
```

```
'hasnans',
'head',
'hist',
'iat',
'idxmax',
'idxmin',
'iloc',
'imag',
'index',
'infer_objects',
'interpolate',
'is_monotonic',
'is_monotonic_decreasing',
'is_monotonic_increasing',
'is_unique',
'isin',
'isna',
'isnull',
'item',
'items',
'itemsize',
'iteritems',
'ix',
'keys',
'kurt',
'kurtosis',
'last',
'last_valid_index',
'le',
'loc',
'lt',
'mad',
'map',
'mask',
'max',
'mean',
'median',
'memory_usage',
'min',
```

```
                'mod',
                'mode',
                'mul',
                'multiply',
                'name',
                'nbytes',
                'ndim',
                'ne',
                'nlargest',
                'nonzero',
                'notna',
                'notnull',
                'nsmallest',
                'nunique',
                'pct_change',
                'pipe',
                'plot',
                'pop',
                'pow',
                'prod',
                'product',
                'ptp',
                'put',
                'quantile',
                'radd',
                'rank',
                'ravel',
                'rdiv',
                'rdivmod',
                'real',
                'reindex',
                'reindex_axis',
                'reindex_like',
                'rename',
                'rename_axis',
                'reorder_levels',
                'repeat',
                'replace',
                'resample',
```

```
                'reset_index',
                'rfloordiv',
                'rmod',
                'rmul',
                'rolling',
                'round',
                'rpow',
                'rsub',
                'rtruediv',
                'sample',
                'searchsorted',
                'select',
                'sem',
                'set_axis',
                'shape',
                'shift',
                'size',
                'skew',
                'slice_shift',
                'sort_index',
                'sort_values',
                'squeeze',
                'std',
                'strides',
                'sub',
                'subtract',
                'sum',
                'swapaxes',
                'swaplevel',
                'tail',
                'take',
                'timetuple',
                'to_clipboard',
                'to_csv',
                'to_dense',
                'to_dict',
                'to_excel',
                'to_frame',
                'to_hdf',
```

```
 'to_json',
 'to_latex',
 'to_list',
 'to_msgpack',
 'to_numpy',
 'to_period',
 'to_pickle',
 'to_sparse',
 'to_sql',
 'to_string',
 'to_timestamp',
 'to_xarray',
 'transform',
 'transpose',
 'truediv',
 'truncate',
 'tshift',
 'tz_convert',
 'tz_localize',
 'unique',
 'unstack',
 'update',
 'value_counts',
 'values',
 'var',
 'view',
 'where',
 'xs']
```

In [93]:
```
sorted(google)
```

Out[93]:
```
[277.22,
 277.5,
 277.56,
 277.63,
 278.25,
 278.3,
 278.58,
```

```
278.7,
280.0,
280.81,
281.22,
281.42,
281.85,
281.95,
282.13,
282.18,
282.29,
283.11,
283.14,
283.21,
283.6,
283.94,
284.82,
285.03,
285.49,
285.63,
285.68,
285.73,
286.22,
286.5,
286.99,
287.17,
287.55,
287.92,
287.92,
288.29,
288.42,
288.49,
289.54,
289.76,
289.95,
290.32,
290.49,
290.68,
291.91,
292.93,
```

```
293.04,
293.06,
293.17,
294.0,
295.81,
295.9,
296.39,
296.8,
296.89,
297.24,
297.29,
297.45,
297.54,
297.75,
297.97,
298.01,
298.32,
298.38,
298.51,
298.88,
298.88,
298.97,
299.05,
299.17,
299.18,
299.18,
299.23,
299.71,
299.78,
300.08,
300.15,
300.28,
300.31,
300.31,
300.75,
300.75,
300.87,
301.04,
301.24,
```

```
                301.25,
                301.26,
                301.4,
                301.55,
                301.62,
                301.64,
                301.8,
                302.04,
                302.22,
                302.37,
                302.71,
                303.34,
                303.36,
                303.71,
                303.87,
                303.88,
                303.98,
                304.16,
                304.55,
                305.58,
                306.27,
                306.6,
                306.82,
                307.3,
                307.6,
                307.92,
                308.87,
                309.0,
                309.37,
                309.4,
                309.46,
                309.46,
                309.46,
                309.9,
                310.54,
                310.61,
                311.11,
                311.48,
                311.67,
```

```
                312.08,
                312.46,
                312.94,
                313.11,
                313.57,
                314.32,
                314.37,
                314.47,
                314.51,
                314.55,
                315.07,
                316.23,
                316.81,
                316.88,
                316.88,
                317.05,
                318.06,
                318.13,
                318.42,
                318.58,
                318.93,
                319.25,
                319.3,
                319.56,
                320.75,
                320.95,
                321.2,
                322.13,
                323.68,
                323.94,
                324.04,
                324.32,
                324.4,
                324.97,
                326.54,
                326.89,
                327.77,
                327.89,
                328.27,
```

```
                328.28,
                328.39,
                328.97,
                329.08,
                329.2,
                329.85,
                330.71,
                330.81,
                331.04,
                331.13,
                331.81,
                332.0,
                332.11,
                332.29,
                333.6,
                334.25,
                334.35,
                334.6,
                334.75,
                334.75,
                335.07,
                335.49,
                335.5,
                335.78,
                336.24,
                336.37,
                336.52,
                336.74,
                336.81,
                337.51,
                338.09,
                338.3,
                338.75,
                338.82,
                339.17,
                339.73,
                339.89,
                339.94,
                340.62,
```

```
340.98,
341.09,
341.56,
341.57,
342.4,
342.58,
343.98,
344.21,
345.45,
345.76,
346.46,
346.7,
347.53,
347.89,
347.91,
348.0,
348.47,
348.7,
349.36,
349.89,
350.7,
351.18,
352.07,
352.18,
352.41,
353.93,
354.18,
354.72,
355.5,
356.19,
356.87,
356.94,
357.0,
357.15,
359.01,
359.26,
359.83,
360.86,
362.48,
```

```
                362.94,
                363.7,
                363.76,
                363.93,
                363.99,
                365.38,
                366.52,
                366.78,
                366.85,
                367.77,
                368.75,
                368.87,
                369.12,
                369.88,
                370.66,
                371.88,
                372.43,
                372.55,
                373.72,
                373.72,
                373.73,
                373.74,
                374.17,
                374.42,
                374.7,
                375.05,
                375.67,
                376.69,
                377.63,
                377.72,
                377.83,
                378.28,
                378.32,
                379.21,
                381.08,
                381.32,
                381.7,
                382.77,
                385.11,
```

```
                385.43,
                386.05,
                386.55,
                386.75,
                387.06,
                387.43,
                387.6,
                388.23,
                388.32,
                388.53,
                390.0,
                390.5,
                390.57,
                390.74,
                392.07,
                393.77,
                394.08,
                394.13,
                394.17,
                394.42,
                395.14,
                395.17,
                395.42,
                396.16,
                396.59,
                396.8,
                398.69,
                398.84,
                399.02,
                399.17,
                399.24,
                400.0,
                400.5,
                401.0,
                401.72,
                401.9,
                402.31,
                402.39,
                402.49,
```

```
403.31,
403.41,
404.2,
405.15,
406.66,
407.17,
407.31,
408.0,
409.62,
410.3,
410.98,
412.86,
412.9,
413.24,
414.2,
416.44,
419.92,
421.2,
422.03,
422.3,
422.37,
422.55,
422.71,
423.75,
424.22,
424.86,
425.38,
425.44,
425.91,
425.99,
426.67,
426.96,
427.12,
427.4,
428.5,
430.01,
430.16,
430.44,
430.53,
```

```
            430.64,
            431.03,
            431.04,
            431.08,
            431.13,
            431.41,
            431.59,
            431.63,
            431.96,
            432.14,
            432.49,
            432.53,
            433.2,
            433.25,
            433.38,
            433.5,
            433.66,
            433.88,
            434.03,
            434.18,
            434.42,
            434.45,
            434.9,
            435.06,
            435.24,
            435.37,
            435.37,
            435.43,
            435.46,
            435.87,
            436.17,
            436.17,
            436.46,
            436.69,
            436.93,
            437.0,
            437.27,
            437.5,
            437.61,
```

```
                438.12,
                438.38,
                438.4,
                438.56,
                438.79,
                438.8,
                438.86,
                439.05,
                439.18,
                439.35,
                439.56,
                439.89,
                440.01,
                440.35,
                440.35,
                440.77,
                440.78,
                440.85,
                440.95,
                440.99,
                441.21,
                441.39,
                441.39,
                441.44,
                441.78,
                442.01,
                442.52,
                442.88,
                443.34,
                443.34,
                445.34,
                445.83,
                446.03,
                446.14,
                446.19,
                446.83,
                446.87,
                447.07,
                447.13,
```

```
447.31,
447.92,
448.11,
448.51,
448.58,
448.67,
448.73,
449.32,
449.91,
450.81,
452.56,
455.24,
455.91,
456.44,
456.47,
485.18,
486.23,
487.66,
489.66,
491.04,
491.65,
493.44,
495.45,
496.04,
496.4,
497.91,
498.28,
498.45,
498.63,
499.68,
499.83,
500.62,
501.37,
501.42,
501.92,
501.94,
502.12,
502.37,
502.82,
```

```
503.32,
503.48,
504.6,
504.63,
504.81,
504.86,
505.06,
505.52,
505.79,
506.71,
506.81,
507.14,
508.27,
508.6,
509.11,
509.61,
510.07,
510.49,
510.64,
511.08,
511.08,
511.66,
511.86,
512.69,
512.7,
513.23,
513.25,
513.59,
513.65,
514.01,
514.03,
514.11,
514.67,
514.91,
515.18,
515.58,
516.0,
516.11,
516.17,
```

```
516.77,
516.88,
517.04,
517.13,
517.24,
517.59,
517.69,
518.23,
518.28,
519.0,
519.07,
519.52,
519.58,
519.84,
519.89,
520.35,
520.5,
520.54,
520.66,
520.69,
521.08,
521.09,
521.09,
521.75,
521.79,
521.83,
522.36,
522.45,
522.55,
522.67,
522.84,
523.01,
523.04,
523.06,
523.42,
523.58,
523.85,
524.0,
524.12,
```

```
524.16,
524.17,
524.36,
524.58,
524.81,
524.85,
524.86,
524.97,
525.0,
525.09,
525.1,
525.26,
525.48,
525.55,
525.56,
525.58,
525.66,
525.69,
525.71,
525.87,
526.07,
526.24,
526.65,
526.8,
526.97,
527.14,
527.35,
527.54,
527.75,
527.81,
527.96,
528.02,
528.06,
528.06,
528.11,
528.12,
528.16,
528.22,
528.35,
```

```
528.56,
528.63,
528.66,
528.85,
529.02,
529.35,
529.63,
529.7,
529.76,
529.88,
530.16,
530.29,
530.38,
530.39,
530.4,
530.45,
530.79,
531.33,
531.35,
531.45,
531.54,
531.64,
531.71,
531.71,
531.92,
532.02,
532.1,
532.2,
532.21,
532.39,
532.4,
532.41,
532.5,
532.52,
532.6,
532.71,
532.97,
533.01,
533.02,
```

```
533.04,
533.21,
533.98,
534.02,
534.15,
534.32,
534.32,
534.33,
534.38,
534.53,
535.05,
535.06,
535.09,
535.13,
535.23,
535.25,
535.4,
535.56,
535.57,
535.58,
535.66,
535.82,
535.84,
535.84,
535.98,
536.04,
536.25,
536.54,
536.91,
537.11,
537.13,
537.2,
537.27,
537.53,
537.53,
537.85,
538.02,
538.42,
538.52,
```

```
538.75,
539.11,
539.3,
539.49,
539.51,
539.54,
539.61,
540.02,
540.04,
540.13,
540.14,
540.67,
541.06,
541.51,
541.64,
541.97,
541.99,
542.02,
542.21,
542.51,
542.56,
542.56,
542.73,
542.96,
543.68,
544.07,
544.24,
544.51,
544.8,
545.22,
545.48,
545.5,
546.5,
546.63,
546.67,
546.71,
546.91,
546.96,
547.01,
```

```
547.43,
547.66,
547.8,
548.89,
548.95,
549.14,
549.17,
550.37,
550.4,
550.5,
551.06,
551.15,
551.39,
551.41,
551.44,
551.72,
551.98,
552.06,
552.27,
552.44,
552.73,
552.83,
552.9,
553.2,
553.21,
553.23,
553.5,
554.31,
554.39,
554.39,
554.52,
554.62,
555.41,
555.72,
555.96,
556.37,
556.5,
556.79,
557.14,
```

```
            557.18,
            557.18,
            557.21,
            557.22,
            557.52,
            557.53,
            558.47,
            558.49,
            558.82,
            559.03,
            559.34,
            559.4,
            559.46,
            559.47,
            559.56,
            559.67,
            560.65,
            560.68,
            561.07,
            561.31,
            561.52,
            561.78,
            561.9,
            561.94,
            561.99,
            562.2,
            562.56,
            562.59,
            563.46,
            563.64,
            563.67,
            563.89,
            564.2,
            564.45,
            564.53,
            564.58,
            564.97,
            565.0,
            565.05,
```

```
565.21,
565.46,
565.52,
565.55,
566.38,
566.45,
566.65,
567.05,
567.82,
568.44,
568.54,
568.96,
569.32,
569.61,
569.63,
569.76,
569.86,
569.96,
570.28,
570.84,
570.93,
571.09,
571.28,
571.36,
571.63,
571.84,
571.86,
572.23,
572.61,
572.87,
572.89,
573.09,
573.18,
573.42,
573.43,
573.5,
574.42,
574.68,
574.98,
```

```
575.0,
575.03,
575.07,
575.36,
576.45,
577.19,
577.27,
577.41,
577.63,
578.0,
578.11,
578.41,
578.8,
578.93,
579.05,
579.33,
579.41,
579.55,
580.36,
580.41,
580.61,
580.97,
581.11,
581.86,
581.92,
582.33,
582.4,
582.4,
583.15,
583.4,
583.63,
583.92,
584.08,
584.69,
585.42,
586.86,
587.63,
587.89,
588.48,
```

```
588.98,
589.02,
589.38,
589.88,
590.15,
590.17,
590.22,
590.88,
593.84,
594.1,
594.17,
594.3,
594.97,
595.25,
595.45,
596.09,
596.51,
597.76,
597.87,
599.05,
599.17,
599.71,
599.8,
599.85,
600.3,
600.73,
600.86,
602.49,
602.82,
602.95,
603.13,
603.44,
603.46,
604.12,
604.61,
606.23,
607.02,
609.6,
611.0,
```

```
611.43,
612.33,
612.4,
615.43,
617.42,
617.68,
619.43,
620.0,
620.5,
622.0,
622.05,
622.52,
622.65,
623.31,
623.78,
624.56,
625.34,
625.5,
625.56,
625.94,
627.0,
627.02,
627.16,
629.71,
631.25,
632.15,
632.25,
632.32,
633.16,
635.02,
635.32,
636.53,
639.01,
641.0,
641.73,
642.9,
643.15,
644.01,
644.2,
```

```
645.0,
648.85,
651.24,
651.66,
652.29,
652.66,
653.01,
653.46,
654.19,
654.27,
654.3,
654.46,
657.2,
659.0,
659.58,
663.06,
663.28,
668.77,
668.87,
673.0,
673.26,
673.45,
678.6,
680.15,
680.78,
681.41,
682.13,
683.65,
685.05,
685.34,
685.37,
686.9,
687.0,
688.22,
688.45,
688.88,
689.0,
689.01,
689.09,
```

```
 689.1,
 689.55,
 690.59,
 691.0,
 691.38,
 692.0,
 692.01,
 692.13,
 692.36,
 693.08,
 693.41,
 693.41,
 693.58,
 694.0,
 694.05,
 694.39,
 694.46,
 695.72,
 ...]
```

In [94]:
```
list(google)
```

Out[94]:
```
[324.97,
 329.08,
 326.89,
 323.68,
 309.46,
 307.3,
 309.4,
 312.08,
 309.37,
 311.67,
 309.9,
 314.55,
 289.76,
 290.49,
 287.92,
 282.13,
 281.22,
```

```
283.6,
285.63,
286.5,
288.49,
289.95,
292.93,
295.9,
300.75,
301.24,
303.36,
300.87,
303.87,
301.25,
300.15,
297.75,
300.08,
300.31,
302.22,
299.05,
301.62,
301.4,
302.71,
306.6,
307.92,
309.0,
304.55,
295.81,
301.8,
302.04,
298.88,
298.51,
301.64,
305.58,
306.27,
308.87,
309.46,
312.46,
315.07,
314.32,
```

```
                319.25,
                318.58,
                321.2,
                324.32,
                320.95,
                319.3,
                316.23,
                318.13,
                314.37,
                313.11,
                311.48,
                311.11,
                314.47,
                318.93,
                310.61,
                299.71,
                302.37,
                300.28,
                298.38,
                296.8,
                294.0,
                297.54,
                300.31,
                303.71,
                304.16,
                299.18,
                298.97,
                299.18,
                303.34,
                297.29,
                296.39,
                299.23,
                299.78,
                303.98,
                301.26,
                299.17,
                300.75,
                306.82,
                309.46,
```

```
                297.24,
                298.88,
                296.89,
                297.45,
                298.32,
                293.04,
                293.06,
                290.68,
                288.42,
                283.11,
                283.94,
                282.18,
                285.73,
                287.55,
                286.22,
                282.29,
                278.25,
                278.3,
                277.22,
                277.5,
                278.58,
                285.49,
                285.68,
                280.81,
                281.85,
                277.63,
                278.7,
                281.95,
                277.56,
                285.03,
                287.17,
                287.92,
                293.17,
                290.32,
                289.54,
                288.29,
                281.42,
                280.0,
                283.21,
```

```
284.82,
283.14,
286.99,
291.91,
297.97,
298.01,
301.04,
301.55,
303.88,
307.6,
313.57,
312.94,
314.51,
310.54,
316.88,
318.42,
317.05,
318.06,
319.56,
316.88,
322.13,
328.27,
330.81,
332.29,
334.6,
335.07,
329.85,
332.11,
334.25,
335.78,
328.39,
331.13,
336.81,
338.82,
338.75,
335.49,
338.3,
341.09,
347.53,
```

```
                347.89,
                344.21,
                339.17,
                343.98,
                352.18,
                351.18,
                352.07,
                356.87,
                359.26,
                363.7,
                363.76,
                372.43,
                369.12,
                374.42,
                374.17,
                376.69,
                373.73,
                374.7,
                378.28,
                381.08,
                375.67,
                369.88,
                367.77,
                373.74,
                370.66,
                363.99,
                366.85,
                368.75,
                336.74,
                334.75,
                333.6,
                334.75,
                336.37,
                335.5,
                334.35,
                336.24,
                338.09,
                342.4,
                336.52,
```

```
337.51,
332.0,
324.4,
323.94,
329.2,
327.89,
324.04,
320.75,
316.81,
326.54,
331.04,
328.97,
331.81,
328.28,
327.77,
330.71,
339.73,
341.56,
345.76,
341.57,
339.89,
340.98,
339.94,
340.62,
342.58,
345.45,
348.47,
347.91,
350.7,
356.19,
357.0,
357.15,
353.93,
352.41,
349.89,
348.0,
348.7,
346.7,
356.94,
```

```
359.01,
362.48,
363.93,
360.86,
362.94,
365.38,
366.78,
359.83,
354.72,
355.5,
354.18,
349.36,
346.46,
366.52,
368.87,
373.72,
372.55,
371.88,
375.05,
373.72,
377.63,
377.72,
378.32,
377.83,
381.32,
388.32,
385.43,
388.23,
388.53,
387.43,
392.07,
396.16,
394.42,
394.13,
395.42,
393.77,
390.74,
394.08,
399.02,
```

```
396.59,
401.0,
412.9,
412.86,
413.24,
410.98,
414.2,
410.3,
409.62,
407.17,
405.15,
399.24,
401.72,
404.2,
403.41,
403.31,
401.9,
402.39,
399.17,
395.17,
395.14,
400.5,
398.84,
394.17,
386.75,
382.77,
385.11,
386.55,
390.57,
390.0,
387.06,
390.5,
387.6,
379.21,
381.7,
386.05,
398.69,
402.49,
402.31,
```

```
396.8,
400.0,
407.31,
406.66,
408.0,
416.44,
422.55,
423.75,
424.86,
432.49,
434.45,
435.06,
436.93,
445.34,
449.32,
448.58,
450.81,
447.13,
441.78,
435.37,
433.88,
438.56,
430.53,
431.59,
432.14,
425.91,
425.44,
426.96,
422.03,
431.04,
438.4,
438.12,
433.2,
431.13,
435.43,
437.5,
442.52,
447.07,
440.01,
```

```
434.9,
430.01,
430.64,
433.66,
436.69,
435.46,
440.85,
437.0,
437.61,
442.01,
446.87,
447.31,
448.51,
452.56,
455.91,
456.47,
455.24,
456.44,
449.91,
436.17,
446.83,
448.11,
448.67,
441.39,
439.35,
438.8,
438.79,
441.44,
445.83,
448.73,
447.92,
446.19,
442.88,
440.99,
443.34,
439.18,
436.46,
431.96,
427.4,
```

```
426.67,
427.12,
430.16,
431.63,
433.5,
433.25,
431.41,
422.37,
422.3,
422.71,
421.2,
425.38,
425.99,
434.18,
435.24,
439.56,
440.35,
441.39,
443.34,
440.77,
440.78,
438.86,
439.89,
446.03,
446.14,
440.95,
439.05,
436.17,
435.87,
434.03,
432.53,
438.38,
437.27,
434.42,
433.38,
430.44,
424.22,
419.92,
428.5,
```

```
                431.03,
                431.08,
                435.37,
                440.35,
                441.21,
                485.18,
                497.91,
                496.04,
                498.45,
                510.49,
                503.48,
                504.6,
                504.86,
                511.08,
                510.07,
                510.64,
                509.11,
                506.81,
                505.79,
                501.94,
                502.37,
                502.12,
                500.62,
                501.37,
                513.25,
                513.23,
                512.7,
                509.61,
                508.27,
                511.08,
                512.69,
                515.58,
                519.52,
                528.02,
                527.75,
                523.42,
                522.55,
                523.04,
                523.58,
```

```
528.06,
532.02,
535.82,
535.58,
532.5,
526.97,
529.02,
532.2,
527.54,
537.53,
541.97,
550.5,
551.98,
552.27,
554.39,
552.44,
551.06,
552.06,
550.4,
551.15,
558.49,
564.53,
560.68,
559.03,
556.5,
561.94,
569.76,
571.86,
569.96,
573.5,
577.27,
575.03,
559.4,
539.11,
552.9,
547.66,
561.52,
573.42,
563.89,
```

```
566.38,
561.9,
571.63,
578.11,
582.33,
583.92,
588.48,
587.63,
594.17,
597.76,
596.51,
597.87,
599.17,
600.3,
602.95,
604.61,
606.23,
600.86,
593.84,
602.49,
603.44,
607.02,
603.46,
599.8,
596.09,
589.88,
590.17,
584.08,
586.86,
594.3,
594.97,
595.45,
589.02,
570.84,
571.36,
563.64,
551.41,
557.14,
555.41,
```

```
            557.18,
            560.65,
            562.59,
            541.51,
            525.71,
            540.13,
            551.44,
            538.42,
            525.09,
            528.11,
            517.04,
            538.52,
            529.7,
            524.16,
            526.07,
            524.81,
            520.69,
            514.01,
            501.42,
            514.91,
            521.09,
            522.45,
            524.17,
            519.89,
            513.65,
            501.92,
            505.06,
            502.82,
            517.59,
            528.06,
            523.85,
            516.0,
            514.03,
            516.17,
            524.86,
            530.45,
            539.3,
            542.21,
            552.83,
```

```
559.46,
557.18,
554.39,
544.24,
541.06,
537.27,
542.96,
547.43,
554.52,
556.37,
553.5,
546.96,
544.07,
540.04,
537.85,
542.51,
547.01,
548.89,
552.73,
559.47,
563.67,
570.28,
572.23,
573.18,
575.07,
578.8,
579.33,
578.0,
564.58,
567.82,
563.46,
569.86,
576.45,
574.98,
580.61,
567.05,
580.41,
583.63,
588.98,
```

```
590.88,
590.15,
585.42,
583.15,
581.92,
582.4,
568.44,
561.31,
562.56,
561.07,
558.47,
559.56,
558.82,
564.45,
559.34,
564.2,
569.32,
568.96,
574.42,
582.4,
580.97,
579.55,
579.05,
577.41,
575.0,
568.54,
565.55,
565.52,
569.63,
573.43,
577.63,
580.36,
584.69,
578.41,
575.36,
574.68,
572.89,
566.65,
571.09,
```

```
                577.19,
                583.4,
                587.89,
                581.86,
                579.41,
                578.93,
                572.61,
                573.09,
                569.61,
                571.28,
                565.46,
                561.78,
                570.93,
                572.87,
                562.2,
                555.96,
                557.53,
                542.56,
                531.64,
                531.71,
                516.88,
                513.59,
                507.14,
                506.71,
                517.69,
                527.35,
                534.38,
                534.32,
                535.56,
                540.14,
                545.48,
                542.02,
                553.23,
                551.72,
                547.8,
                542.56,
                539.49,
                537.2,
                539.54,
```

```
544.8,
543.68,
541.99,
540.67,
532.6,
532.71,
528.63,
529.63,
535.09,
534.15,
537.13,
535.57,
535.13,
530.4,
528.35,
527.81,
527.14,
522.84,
522.36,
519.07,
524.12,
525.66,
517.24,
511.86,
487.66,
495.45,
503.32,
505.52,
514.67,
524.85,
525.58,
525.87,
528.56,
525.69,
524.36,
522.67,
511.66,
499.68,
498.28,
```

```
489.66,
493.44,
486.23,
491.04,
491.65,
496.4,
498.63,
504.63,
504.81,
518.28,
531.54,
528.22,
516.77,
508.6,
499.83,
514.11,
517.13,
521.83,
519.84,
520.66,
524.97,
524.58,
525.48,
531.92,
533.21,
541.64,
539.61,
536.04,
536.54,
534.33,
527.96,
526.8,
533.98,
540.02,
551.39,
557.22,
564.97,
566.45,
571.84,
```

```
565.21,
561.99,
553.21,
549.17,
548.95,
542.73,
544.51,
546.5,
545.5,
554.62,
557.52,
554.31,
559.67,
557.21,
549.14,
546.63,
546.67,
545.22,
538.02,
532.39,
528.12,
534.53,
536.91,
534.02,
535.84,
535.84,
526.65,
521.79,
528.16,
519.58,
523.06,
532.21,
530.29,
538.75,
555.72,
553.2,
550.37,
546.91,
535.05,
```

```
532.1,
535.06,
530.39,
521.09,
521.75,
525.0,
535.4,
525.26,
528.66,
532.41,
530.38,
528.85,
533.04,
532.97,
535.98,
539.51,
529.88,
531.71,
536.25,
531.45,
529.76,
531.33,
537.11,
534.32,
532.52,
526.24,
523.01,
529.35,
533.02,
530.16,
524.0,
525.56,
525.1,
530.79,
533.01,
537.53,
535.25,
535.66,
535.23,
```

```
531.35,
520.54,
520.5,
518.23,
521.08,
519.0,
515.18,
516.11,
520.35,
525.55,
532.4,
546.71,
556.79,
565.0,
645.0,
653.01,
654.3,
659.0,
641.0,
622.52,
620.5,
623.31,
622.65,
622.05,
625.5,
625.34,
627.16,
633.16,
632.25,
629.71,
631.25,
654.27,
652.29,
651.66,
652.66,
651.24,
653.46,
654.19,
642.9,
```

```
612.33,
565.05,
581.11,
599.05,
622.0,
624.56,
617.68,
594.1,
599.71,
602.82,
595.25,
604.12,
609.6,
611.43,
617.42,
619.43,
623.78,
632.32,
635.02,
627.02,
625.94,
615.43,
620.0,
612.4,
611.0,
589.38,
590.22,
600.73,
599.85,
603.13,
627.0,
636.53,
632.15,
625.56,
635.32,
639.01,
643.15,
648.85,
654.46,
```

```
657.2,
659.58,
644.2,
641.73,
644.01,
701.5,
701.26,
704.55,
703.08,
710.01,
710.05,
705.85,
714.72,
721.9,
729.47,
727.01,
719.43,
718.5,
730.23,
728.65,
716.73,
711.33,
723.03,
727.0,
737.43,
743.0,
751.82,
737.63,
746.06,
747.49,
741.27,
746.7,
758.96,
745.63,
750.0,
755.09,
754.2,
737.0,
743.83,
```

```
 736.75,
 724.17,
 743.01,
 739.43,
 749.0,
 738.15,
 740.0,
 745.53,
 ...]
```

In [95]:
```
dict(google)
```

Out[95]:
```
{0: 324.97000000000003,
 1: 329.07999999999998,
 2: 326.88999999999999,
 3: 323.68000000000001,
 4: 309.45999999999998,
 5: 307.30000000000001,
 6: 309.39999999999998,
 7: 312.07999999999998,
 8: 309.37,
 9: 311.67000000000002,
 10: 309.89999999999998,
 11: 314.55000000000001,
 12: 289.75999999999999,
 13: 290.49000000000001,
 14: 287.92000000000002,
 15: 282.13,
 16: 281.22000000000003,
 17: 283.60000000000002,
 18: 285.63,
 19: 286.5,
 20: 288.49000000000001,
 21: 289.94999999999999,
 22: 292.93000000000001,
 23: 295.89999999999998,
 24: 300.75,
 25: 301.24000000000001,
 26: 303.36000000000001,
 27: 300.87
```

```
27: 300.87,
28: 303.87,
29: 301.25,
30: 300.14999999999998,
31: 297.75,
32: 300.07999999999998,
33: 300.31,
34: 302.22000000000003,
35: 299.05000000000001,
36: 301.62,
37: 301.39999999999998,
38: 302.70999999999998,
39: 306.60000000000002,
40: 307.92000000000002,
41: 309.0,
42: 304.55000000000001,
43: 295.81,
44: 301.80000000000001,
45: 302.04000000000002,
46: 298.88,
47: 298.50999999999999,
48: 301.63999999999999,
49: 305.57999999999998,
50: 306.26999999999998,
51: 308.87,
52: 309.45999999999998,
53: 312.45999999999998,
54: 315.06999999999999,
55: 314.31999999999999,
56: 319.25,
57: 318.57999999999998,
58: 321.19999999999999,
59: 324.31999999999999,
60: 320.94999999999999,
61: 319.30000000000001,
62: 316.23000000000002,
63: 318.13,
64: 314.37,
65: 313.11000000000001,

66: 311.48000000000002
```

```
66: 311.48000000000002,
67: 311.11000000000001,
68: 314.47000000000003,
69: 318.93000000000001,
70: 310.61000000000001,
71: 299.70999999999998,
72: 302.37,
73: 300.27999999999997,
74: 298.38,
75: 296.80000000000001,
76: 294.0,
77: 297.54000000000002,
78: 300.31,
79: 303.70999999999998,
80: 304.16000000000003,
81: 299.18000000000001,
82: 298.97000000000003,
83: 299.18000000000001,
84: 303.33999999999997,
85: 297.29000000000002,
86: 296.38999999999999,
87: 299.23000000000002,
88: 299.77999999999997,
89: 303.98000000000002,
90: 301.25999999999999,
91: 299.17000000000002,
92: 300.75,
93: 306.81999999999999,
94: 309.45999999999998,
95: 297.24000000000001,
96: 298.88,
97: 296.88999999999999,
98: 297.44999999999999,
99: 298.31999999999999,
100: 293.04000000000002,
101: 293.06,
102: 290.68000000000001,
103: 288.42000000000002,
104: 283.11000000000001,

105: 283.94
```

```
105: 283.94,
106: 282.18000000000001,
107: 285.73000000000002,
108: 287.55000000000001,
109: 286.22000000000003,
110: 282.29000000000002,
111: 278.25,
112: 278.30000000000001,
113: 277.22000000000003,
114: 277.5,
115: 278.57999999999998,
116: 285.49000000000001,
117: 285.68000000000001,
118: 280.81,
119: 281.85000000000002,
120: 277.63,
121: 278.69999999999999,
122: 281.94999999999999,
123: 277.56,
124: 285.02999999999997,
125: 287.17000000000002,
126: 287.92000000000002,
127: 293.17000000000002,
128: 290.31999999999999,
129: 289.54000000000002,
130: 288.29000000000002,
131: 281.42000000000002,
132: 280.0,
133: 283.20999999999998,
134: 284.81999999999999,
135: 283.13999999999999,
136: 286.99000000000001,
137: 291.91000000000003,
138: 297.97000000000003,
139: 298.00999999999999,
140: 301.04000000000002,
141: 301.55000000000001,
142: 303.88,
143: 307.60000000000002,

144: 313.56999999999999
```

```
144: 313.30999999999999,
145: 312.94,
146: 314.50999999999999,
147: 310.54000000000002,
148: 316.88,
149: 318.42000000000002,
150: 317.05000000000001,
151: 318.06,
152: 319.56,
153: 316.88,
154: 322.13,
155: 328.26999999999998,
156: 330.81,
157: 332.29000000000002,
158: 334.60000000000002,
159: 335.06999999999999,
160: 329.85000000000002,
161: 332.11000000000001,
162: 334.25,
163: 335.77999999999997,
164: 328.38999999999999,
165: 331.13,
166: 336.81,
167: 338.81999999999999,
168: 338.75,
169: 335.49000000000001,
170: 338.30000000000001,
171: 341.08999999999997,
172: 347.52999999999997,
173: 347.88999999999999,
174: 344.20999999999998,
175: 339.17000000000002,
176: 343.98000000000002,
177: 352.18000000000001,
178: 351.18000000000001,
179: 352.06999999999999,
180: 356.87,
181: 359.25999999999999,
182: 363.69999999999999,

183: 363.75999999999999
```

```
183: 363.73999999999999,
184: 372.43000000000001,
185: 369.12,
186: 374.42000000000002,
187: 374.17000000000002,
188: 376.69,
189: 373.73000000000002,
190: 374.69999999999999,
191: 378.27999999999997,
192: 381.07999999999998,
193: 375.67000000000002,
194: 369.88,
195: 367.76999999999998,
196: 373.74000000000001,
197: 370.66000000000003,
198: 363.99000000000001,
199: 366.85000000000002,
200: 368.75,
201: 336.74000000000001,
202: 334.75,
203: 333.60000000000002,
204: 334.75,
205: 336.37,
206: 335.5,
207: 334.35000000000002,
208: 336.24000000000001,
209: 338.08999999999997,
210: 342.39999999999998,
211: 336.51999999999998,
212: 337.50999999999999,
213: 332.0,
214: 324.39999999999998,
215: 323.94,
216: 329.19999999999999,
217: 327.88999999999999,
218: 324.04000000000002,
219: 320.75,
220: 316.81,
221: 326.54000000000002,

222: 331.04000000000002
```

```
222: 331.04000000000002,
223: 328.97000000000003,
224: 331.81,
225: 328.27999999999997,
226: 327.76999999999998,
227: 330.70999999999998,
228: 339.73000000000002,
229: 341.56,
230: 345.75999999999999,
231: 341.56999999999999,
232: 339.88999999999999,
233: 340.98000000000002,
234: 339.94,
235: 340.62,
236: 342.57999999999998,
237: 345.44999999999999,
238: 348.47000000000003,
239: 347.91000000000003,
240: 350.69999999999999,
241: 356.19,
242: 357.0,
243: 357.14999999999998,
244: 353.93000000000001,
245: 352.41000000000003,
246: 349.88999999999999,
247: 348.0,
248: 348.69999999999999,
249: 346.69999999999999,
250: 356.94,
251: 359.00999999999999,
252: 362.48000000000002,
253: 363.93000000000001,
254: 360.86000000000001,
255: 362.94,
256: 365.38,
257: 366.77999999999997,
258: 359.82999999999998,
259: 354.72000000000003,
260: 355.5,

261: 354.18000000000001
```

```
261: 354.18000000000001,
262: 349.36000000000001,
263: 346.45999999999998,
264: 366.51999999999998,
265: 368.87,
266: 373.72000000000003,
267: 372.55000000000001,
268: 371.88,
269: 375.05000000000001,
270: 373.72000000000003,
271: 377.63,
272: 377.72000000000003,
273: 378.31999999999999,
274: 377.82999999999998,
275: 381.31999999999999,
276: 388.31999999999999,
277: 385.43000000000001,
278: 388.23000000000002,
279: 388.52999999999997,
280: 387.43000000000001,
281: 392.06999999999999,
282: 396.16000000000003,
283: 394.42000000000002,
284: 394.13,
285: 395.42000000000002,
286: 393.76999999999998,
287: 390.74000000000001,
288: 394.07999999999998,
289: 399.01999999999998,
290: 396.58999999999997,
291: 401.0,
292: 412.89999999999998,
293: 412.86000000000001,
294: 413.24000000000001,
295: 410.98000000000002,
296: 414.19999999999999,
297: 410.30000000000001,
298: 409.62,
299: 407.17000000000002,

300: 405.14999999999998
```

```
300: 405.14999999999998,
301: 399.24000000000001,
302: 401.72000000000003,
303: 404.19999999999999,
304: 403.41000000000003,
305: 403.31,
306: 401.89999999999998,
307: 402.38999999999999,
308: 399.17000000000002,
309: 395.17000000000002,
310: 395.13999999999999,
311: 400.5,
312: 398.83999999999997,
313: 394.17000000000002,
314: 386.75,
315: 382.76999999999998,
316: 385.11000000000001,
317: 386.55000000000001,
318: 390.56999999999999,
319: 390.0,
320: 387.06,
321: 390.5,
322: 387.60000000000002,
323: 379.20999999999998,
324: 381.69999999999999,
325: 386.05000000000001,
326: 398.69,
327: 402.49000000000001,
328: 402.31,
329: 396.80000000000001,
330: 400.0,
331: 407.31,
332: 406.66000000000003,
333: 408.0,
334: 416.44,
335: 422.55000000000001,
336: 423.75,
337: 424.86000000000001,
338: 432.49000000000001,

339: 434.44999999999999
```

```
339: 434.44999999999999,
340: 435.06,
341: 436.93000000000001,
342: 445.33999999999997,
343: 449.31999999999999,
344: 448.57999999999998,
345: 450.81,
346: 447.13,
347: 441.77999999999997,
348: 435.37,
349: 433.88,
350: 438.56,
351: 430.52999999999997,
352: 431.58999999999997,
353: 432.13999999999999,
354: 425.91000000000003,
355: 425.44,
356: 426.95999999999998,
357: 422.02999999999997,
358: 431.04000000000002,
359: 438.39999999999998,
360: 438.12,
361: 433.19999999999999,
362: 431.13,
363: 435.43000000000001,
364: 437.5,
365: 442.51999999999998,
366: 447.06999999999999,
367: 440.00999999999999,
368: 434.89999999999998,
369: 430.00999999999999,
370: 430.63999999999999,
371: 433.66000000000003,
372: 436.69,
373: 435.45999999999998,
374: 440.85000000000002,
375: 437.0,
376: 437.61000000000001,
377: 442.00999999999999,

378: 446.87
```

```
378: 446.87,
379: 447.31,
380: 448.50999999999999,
381: 452.56,
382: 455.91000000000003,
383: 456.47000000000003,
384: 455.24000000000001,
385: 456.44,
386: 449.91000000000003,
387: 436.17000000000002,
388: 446.82999999999998,
389: 448.11000000000001,
390: 448.67000000000002,
391: 441.38999999999999,
392: 439.35000000000002,
393: 438.80000000000001,
394: 438.79000000000002,
395: 441.44,
396: 445.82999999999998,
397: 448.73000000000002,
398: 447.92000000000002,
399: 446.19,
400: 442.88,
401: 440.99000000000001,
402: 443.33999999999997,
403: 439.18000000000001,
404: 436.45999999999998,
405: 431.95999999999998,
406: 427.39999999999998,
407: 426.67000000000002,
408: 427.12,
409: 430.16000000000003,
410: 431.63,
411: 433.5,
412: 433.25,
413: 431.41000000000003,
414: 422.37,
415: 422.30000000000001,
416: 422.70999999999998,

417: 421.19999999999999
```

```
417: 421.19999999999999,
418: 425.38,
419: 425.99000000000001,
420: 434.18000000000001,
421: 435.24000000000001,
422: 439.56,
423: 440.35000000000002,
424: 441.38999999999999,
425: 443.33999999999997,
426: 440.76999999999998,
427: 440.77999999999997,
428: 438.86000000000001,
429: 439.88999999999999,
430: 446.02999999999997,
431: 446.13999999999999,
432: 440.94999999999999,
433: 439.05000000000001,
434: 436.17000000000002,
435: 435.87,
436: 434.02999999999997,
437: 432.52999999999997,
438: 438.38,
439: 437.26999999999998,
440: 434.42000000000002,
441: 433.38,
442: 430.44,
443: 424.22000000000003,
444: 419.92000000000002,
445: 428.5,
446: 431.02999999999997,
447: 431.07999999999998,
448: 435.37,
449: 440.35000000000002,
450: 441.20999999999998,
451: 485.18000000000001,
452: 497.91000000000003,
453: 496.04000000000002,
454: 498.44999999999999,
455: 510.49000000000001,

456: 503.48000000000002
```

```
456: 503.48000000000002,
457: 504.60000000000002,
458: 504.86000000000001,
459: 511.07999999999998,
460: 510.06999999999999,
461: 510.63999999999999,
462: 509.11000000000001,
463: 506.81,
464: 505.79000000000002,
465: 501.94,
466: 502.37,
467: 502.12,
468: 500.62,
469: 501.37,
470: 513.25,
471: 513.23000000000002,
472: 512.70000000000005,
473: 509.61000000000001,
474: 508.26999999999998,
475: 511.07999999999998,
476: 512.69000000000005,
477: 515.58000000000004,
478: 519.51999999999998,
479: 528.01999999999998,
480: 527.75,
481: 523.41999999999996,
482: 522.54999999999995,
483: 523.03999999999996,
484: 523.58000000000004,
485: 528.05999999999995,
486: 532.01999999999998,
487: 535.82000000000005,
488: 535.58000000000004,
489: 532.5,
490: 526.97000000000003,
491: 529.01999999999998,
492: 532.20000000000005,
493: 527.53999999999996,
494: 537.52999999999997,

495: 541.97000000000003
```

```
495: 541.9700000000003,
496: 550.5,
497: 551.98000000000002,
498: 552.26999999999998,
499: 554.38999999999999,
500: 552.44000000000005,
501: 551.05999999999995,
502: 552.05999999999995,
503: 550.39999999999998,
504: 551.14999999999998,
505: 558.49000000000001,
506: 564.52999999999997,
507: 560.67999999999995,
508: 559.02999999999997,
509: 556.5,
510: 561.94000000000005,
511: 569.75999999999999,
512: 571.86000000000001,
513: 569.96000000000004,
514: 573.5,
515: 577.26999999999998,
516: 575.02999999999997,
517: 559.39999999999998,
518: 539.11000000000001,
519: 552.89999999999998,
520: 547.65999999999997,
521: 561.51999999999998,
522: 573.41999999999996,
523: 563.88999999999999,
524: 566.38,
525: 561.89999999999998,
526: 571.63,
527: 578.11000000000001,
528: 582.33000000000004,
529: 583.91999999999996,
530: 588.48000000000002,
531: 587.63,
532: 594.16999999999996,
533: 597.75999999999999,

534: 596.50999999999999
```

```
534: 590.30999999999999,
535: 597.87,
536: 599.16999999999996,
537: 600.29999999999995,
538: 602.95000000000005,
539: 604.61000000000001,
540: 606.23000000000002,
541: 600.86000000000001,
542: 593.84000000000003,
543: 602.49000000000001,
544: 603.44000000000005,
545: 607.01999999999998,
546: 603.46000000000004,
547: 599.79999999999995,
548: 596.09000000000003,
549: 589.88,
550: 590.16999999999996,
551: 584.08000000000004,
552: 586.86000000000001,
553: 594.29999999999995,
554: 594.97000000000003,
555: 595.45000000000005,
556: 589.01999999999998,
557: 570.84000000000003,
558: 571.36000000000001,
559: 563.63999999999999,
560: 551.40999999999997,
561: 557.13999999999999,
562: 555.40999999999997,
563: 557.17999999999995,
564: 560.64999999999998,
565: 562.59000000000003,
566: 541.50999999999999,
567: 525.71000000000004,
568: 540.13,
569: 551.44000000000005,
570: 538.41999999999996,
571: 525.09000000000003,
572: 528.11000000000001,

573: 517.03999999999996
```

```
573: 517.0399999999996,
574: 538.51999999999998,
575: 529.70000000000005,
576: 524.15999999999997,
577: 526.07000000000005,
578: 524.80999999999995,
579: 520.69000000000005,
580: 514.00999999999999,
581: 501.42000000000002,
582: 514.90999999999997,
583: 521.09000000000003,
584: 522.45000000000005,
585: 524.16999999999996,
586: 519.88999999999999,
587: 513.64999999999998,
588: 501.92000000000002,
589: 505.06,
590: 502.81999999999999,
591: 517.59000000000003,
592: 528.05999999999995,
593: 523.85000000000002,
594: 516.0,
595: 514.02999999999997,
596: 516.16999999999996,
597: 524.86000000000001,
598: 530.45000000000005,
599: 539.29999999999995,
600: 542.21000000000004,
601: 552.83000000000004,
602: 559.46000000000004,
603: 557.17999999999995,
604: 554.38999999999999,
605: 544.24000000000001,
606: 541.05999999999995,
607: 537.26999999999998,
608: 542.96000000000004,
609: 547.42999999999995,
610: 554.51999999999998,
611: 556.37,

612: 553.5
```

```
612: 553.5,
613: 546.96000000000004,
614: 544.07000000000005,
615: 540.03999999999996,
616: 537.85000000000002,
617: 542.50999999999999,
618: 547.00999999999999,
619: 548.88999999999999,
620: 552.73000000000002,
621: 559.47000000000003,
622: 563.66999999999996,
623: 570.27999999999997,
624: 572.23000000000002,
625: 573.17999999999995,
626: 575.07000000000005,
627: 578.79999999999995,
628: 579.33000000000004,
629: 578.0,
630: 564.58000000000004,
631: 567.82000000000005,
632: 563.46000000000004,
633: 569.86000000000001,
634: 576.45000000000005,
635: 574.98000000000002,
636: 580.61000000000001,
637: 567.04999999999995,
638: 580.40999999999997,
639: 583.63,
640: 588.98000000000002,
641: 590.88,
642: 590.14999999999998,
643: 585.41999999999996,
644: 583.14999999999998,
645: 581.91999999999996,
646: 582.39999999999998,
647: 568.44000000000005,
648: 561.30999999999995,
649: 562.55999999999995,
650: 561.07000000000005,

651: 558.47000000000003
```

```
651: 558.4700000000003,
652: 559.55999999999995,
653: 558.82000000000005,
654: 564.45000000000005,
655: 559.34000000000003,
656: 564.20000000000005,
657: 569.32000000000005,
658: 568.96000000000004,
659: 574.41999999999996,
660: 582.39999999999998,
661: 580.97000000000003,
662: 579.54999999999995,
663: 579.04999999999995,
664: 577.40999999999997,
665: 575.0,
666: 568.53999999999996,
667: 565.54999999999995,
668: 565.51999999999998,
669: 569.63,
670: 573.42999999999995,
671: 577.63,
672: 580.36000000000001,
673: 584.69000000000005,
674: 578.40999999999997,
675: 575.36000000000001,
676: 574.67999999999995,
677: 572.88999999999999,
678: 566.64999999999998,
679: 571.09000000000003,
680: 577.19000000000005,
681: 583.39999999999998,
682: 587.88999999999999,
683: 581.86000000000001,
684: 579.40999999999997,
685: 578.92999999999995,
686: 572.61000000000001,
687: 573.09000000000003,
688: 569.61000000000001,
689: 571.27999999999997,

690: 565.46000000000004
```

```
690: 565.4000000000004,
691: 561.77999999999997,
692: 570.92999999999995,
693: 572.87,
694: 562.20000000000005,
695: 555.96000000000004,
696: 557.52999999999997,
697: 542.55999999999995,
698: 531.63999999999999,
699: 531.71000000000004,
700: 516.88,
701: 513.59000000000003,
702: 507.13999999999999,
703: 506.70999999999998,
704: 517.69000000000005,
705: 527.35000000000002,
706: 534.38,
707: 534.32000000000005,
708: 535.55999999999995,
709: 540.13999999999999,
710: 545.48000000000002,
711: 542.01999999999998,
712: 553.23000000000002,
713: 551.72000000000003,
714: 547.79999999999995,
715: 542.55999999999995,
716: 539.49000000000001,
717: 537.20000000000005,
718: 539.53999999999996,
719: 544.79999999999995,
720: 543.67999999999995,
721: 541.99000000000001,
722: 540.66999999999996,
723: 532.60000000000002,
724: 532.71000000000004,
725: 528.63,
726: 529.63,
727: 535.09000000000003,
728: 534.14999999999998,

729: 537.13
```

```
729: 537.13,
730: 535.57000000000005,
731: 535.13,
732: 530.39999999999998,
733: 528.35000000000002,
734: 527.80999999999995,
735: 527.13999999999999,
736: 522.84000000000003,
737: 522.36000000000001,
738: 519.07000000000005,
739: 524.12,
740: 525.65999999999997,
741: 517.24000000000001,
742: 511.86000000000001,
743: 487.66000000000003,
744: 495.44999999999999,
745: 503.31999999999999,
746: 505.51999999999998,
747: 514.66999999999996,
748: 524.85000000000002,
749: 525.58000000000004,
750: 525.87,
751: 528.55999999999995,
752: 525.69000000000005,
753: 524.36000000000001,
754: 522.66999999999996,
755: 511.66000000000003,
756: 499.68000000000001,
757: 498.27999999999997,
758: 489.66000000000003,
759: 493.44,
760: 486.23000000000002,
761: 491.04000000000002,
762: 491.64999999999998,
763: 496.39999999999998,
764: 498.63,
765: 504.63,
766: 504.81,
767: 518.27999999999997,

768: 531.53999999999996
```

```
768: 531.53999999999996,
769: 528.22000000000003,
770: 516.76999999999998,
771: 508.60000000000002,
772: 499.82999999999998,
773: 514.11000000000001,
774: 517.13,
775: 521.83000000000004,
776: 519.84000000000003,
777: 520.65999999999997,
778: 524.97000000000003,
779: 524.58000000000004,
780: 525.48000000000002,
781: 531.91999999999996,
782: 533.21000000000004,
783: 541.63999999999999,
784: 539.61000000000001,
785: 536.03999999999996,
786: 536.53999999999996,
787: 534.33000000000004,
788: 527.96000000000004,
789: 526.79999999999995,
790: 533.98000000000002,
791: 540.01999999999998,
792: 551.38999999999999,
793: 557.22000000000003,
794: 564.97000000000003,
795: 566.45000000000005,
796: 571.84000000000003,
797: 565.21000000000004,
798: 561.99000000000001,
799: 553.21000000000004,
800: 549.16999999999996,
801: 548.95000000000005,
802: 542.73000000000002,
803: 544.50999999999999,
804: 546.5,
805: 545.5,
806: 554.62,

807: 557.51999999999998
```

```
807: 557.31999999999998,
808: 554.30999999999995,
809: 559.66999999999996,
810: 557.21000000000004,
811: 549.13999999999999,
812: 546.63,
813: 546.66999999999996,
814: 545.22000000000003,
815: 538.01999999999998,
816: 532.38999999999999,
817: 528.12,
818: 534.52999999999997,
819: 536.90999999999997,
820: 534.01999999999998,
821: 535.84000000000003,
822: 535.84000000000003,
823: 526.64999999999998,
824: 521.78999999999996,
825: 528.15999999999997,
826: 519.58000000000004,
827: 523.05999999999995,
828: 532.21000000000004,
829: 530.28999999999996,
830: 538.75,
831: 555.72000000000003,
832: 553.20000000000005,
833: 550.37,
834: 546.90999999999997,
835: 535.04999999999995,
836: 532.10000000000002,
837: 535.05999999999995,
838: 530.38999999999999,
839: 521.09000000000003,
840: 521.75,
841: 525.0,
842: 535.39999999999998,
843: 525.25999999999999,
844: 528.65999999999997,
845: 532.40999999999997,

846: 530.38
```

```
846: 530.38,
847: 528.85000000000002,
848: 533.03999999999996,
849: 532.97000000000003,
850: 535.98000000000002,
851: 539.50999999999999,
852: 529.88,
853: 531.71000000000004,
854: 536.25,
855: 531.45000000000005,
856: 529.75999999999999,
857: 531.33000000000004,
858: 537.11000000000001,
859: 534.32000000000005,
860: 532.51999999999998,
861: 526.24000000000001,
862: 523.00999999999999,
863: 529.35000000000002,
864: 533.01999999999998,
865: 530.15999999999997,
866: 524.0,
867: 525.55999999999995,
868: 525.10000000000002,
869: 530.78999999999996,
870: 533.00999999999999,
871: 537.52999999999997,
872: 535.25,
873: 535.65999999999997,
874: 535.23000000000002,
875: 531.35000000000002,
876: 520.53999999999996,
877: 520.5,
878: 518.23000000000002,
879: 521.08000000000004,
880: 519.0,
881: 515.17999999999995,
882: 516.11000000000001,
883: 520.35000000000002,
884: 525.54999999999995,

885: 532.39999999999998
```

```
885: 552.3999999999998,
886: 546.71000000000004,
887: 556.78999999999996,
888: 565.0,
889: 645.0,
890: 653.00999999999999,
891: 654.29999999999995,
892: 659.0,
893: 641.0,
894: 622.51999999999998,
895: 620.5,
896: 623.30999999999995,
897: 622.64999999999998,
898: 622.04999999999995,
899: 625.5,
900: 625.34000000000003,
901: 627.15999999999997,
902: 633.15999999999997,
903: 632.25,
904: 629.71000000000004,
905: 631.25,
906: 654.26999999999998,
907: 652.28999999999996,
908: 651.65999999999997,
909: 652.65999999999997,
910: 651.24000000000001,
911: 653.46000000000004,
912: 654.19000000000005,
913: 642.89999999999998,
914: 612.33000000000004,
915: 565.04999999999995,
916: 581.11000000000001,
917: 599.04999999999995,
918: 622.0,
919: 624.55999999999995,
920: 617.67999999999995,
921: 594.10000000000002,
922: 599.71000000000004,
923: 602.82000000000005,

924: 595.25
```

```
924: 595.23,
925: 604.12,
926: 609.60000000000002,
927: 611.42999999999995,
928: 617.41999999999996,
929: 619.42999999999995,
930: 623.77999999999997,
931: 632.32000000000005,
932: 635.01999999999998,
933: 627.01999999999998,
934: 625.94000000000005,
935: 615.42999999999995,
936: 620.0,
937: 612.39999999999998,
938: 611.0,
939: 589.38,
940: 590.22000000000003,
941: 600.73000000000002,
942: 599.85000000000002,
943: 603.13,
944: 627.0,
945: 636.52999999999997,
946: 632.14999999999998,
947: 625.55999999999995,
948: 635.32000000000005,
949: 639.00999999999999,
950: 643.14999999999998,
951: 648.85000000000002,
952: 654.46000000000004,
953: 657.20000000000005,
954: 659.58000000000004,
955: 644.20000000000005,
956: 641.73000000000002,
957: 644.00999999999999,
958: 701.5,
959: 701.25999999999999,
960: 704.54999999999995,
961: 703.08000000000004,
962: 710.00999999999999,

963: 710.04999999999995
```

```
963: 710.0499999999995,
964: 705.85000000000002,
965: 714.72000000000003,
966: 721.89999999999998,
967: 729.47000000000003,
968: 727.00999999999999,
969: 719.42999999999995,
970: 718.5,
971: 730.23000000000002,
972: 728.64999999999998,
973: 716.73000000000002,
974: 711.33000000000004,
975: 723.02999999999997,
976: 727.0,
977: 737.42999999999995,
978: 743.0,
979: 751.82000000000005,
980: 737.63,
981: 746.05999999999995,
982: 747.49000000000001,
983: 741.26999999999998,
984: 746.70000000000005,
985: 758.96000000000004,
986: 745.63,
987: 750.0,
988: 755.09000000000003,
989: 754.20000000000005,
990: 737.0,
991: 743.83000000000004,
992: 736.75,
993: 724.16999999999996,
994: 743.00999999999999,
995: 739.42999999999995,
996: 749.0,
997: 738.14999999999998,
998: 740.0,
999: 745.52999999999997,
...}
```

More series attributes

In [112]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
student = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True
)
```

In [96]:
```
google.shape
```

Out[96]:
```
(1258,)
```

In [97]:
```
google.size
```

Out[97]:
```
1258
```

In [98]:
```
google.ndim
```

Out[98]:
```
1
```

In [99]:
```
google.is_unique
```

Out[99]:
```
False
```

In [100]:
```
student.is_unique
```

Out[100]:
```
False
```

In [101]:
```
google.values
```

Out[101]:
```
array([ 324.97,  329.08,  326.89, ...,  783.2 ,  778.92,  770.41])
```

The short values methods

In [157]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
```

```
student = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True
)
student.head(10)
```

Out[157]:
```
0    Vasant Govind Patil
1          Debjyoti Roy
2          Kaustav Saha
3       Debobrata Podder
4      Anurag Mark Topno
5             Tarun Minz
6     Praveen Rao Rokkam
7         Arindam Sharma
8      Kaustubh Tripathi
9            Nakul Gupta
Name: Name, dtype: object
```

In [158]:
```
student.sort_values().head(5)
```

Out[158]:
```
875     A Abhishek Kalyan
812                A Gopi
1655       A K Vishwanath
583                A Venu
469     Aakaash Panigrahi
Name: Name, dtype: object
```

In [164]:
```
student.sort_values(ascending=False).tail(5)
```

Out[164]:
```
469     Aakaash Panigrahi
583                A Venu
1655       A K Vishwanath
812                A Gopi
875     A Abhishek Kalyan
Name: Name, dtype: object
```

In [161]:
```
student.sort_values(ascending=False,inplace=True)
```

In [163]:
```
student.tail(5)
```

Out[163]:
```
469     Aakaash Panigrahi
583                A Venu
1655       A K Vishwanath
812                A Gopi
875     A Abhishek Kalyan
Name: Name, dtype: object
```

The short index methods

In [165]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
student = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True
)
student.head(10)
```

Out[165]:
```
0    Vasant Govind Patil
1           Debjyoti Roy
2           Kaustav Saha
3      Debobrata Podder
4     Anurag Mark Topno
5            Tarun Minz
6     Praveen Rao Rokkam
7        Arindam Sharma
8     Kaustubh Tripathi
9           Nakul Gupta
Name: Name, dtype: object
```

In [166]:
```
student.sort_index().head(5)
```

Out[166]:
```
0    Vasant Govind Patil
1           Debjyoti Roy
2           Kaustav Saha
3      Debobrata Podder
4     Anurag Mark Topno
Name: Name, dtype: object
```

In [168]:
```
student.sort_index(ascending=False).head(5)
```

Out[168]:
```
1934    Paheli Bhattacharya
1933           Khusbu Bubna
1932           Haque Arijul
1931     Gourab Kumar Patro
1930         F Lalchhandama
Name: Name, dtype: object
```

In [169]:
```
student.sort_index(ascending=False,inplace=True)
```

In [170]:
```
student.head(5)
```

Out[170]:
```
1934    Paheli Bhattacharya
1933           Khusbu Bubna
1932           Haque Arijul
1931     Gourab Kumar Patro
1930         F Lalchhandama
Name: Name, dtype: object
```

In [171]:
```
google.sort_index().head(5)
```

Out[171]:
```
0    324.97
1    329.08
2    326.89
3    323.68
4    309.46
Name: Low, dtype: float64
```

Python's in keywords

In [ ]:
```
google = pd.read_csv("Google_Stock_Price_Train.csv", usecols = ["Low"],
 squeeze = True)
student = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True
)
```

In [172]:
```
student.head(5)
```

Out[172]:
```
1934    Paheli Bhattacharya
1933           Khusbu Bubna
1932           Haque Arijul
1931     Gourab Kumar Patro
1930         F Lalchhandama
Name: Name, dtype: object
```

In [173]:
```
100 in student
```

Out[173]: True

In [175]:
```
100 in student.index
```

Out[175]: True

In [176]:
```
"Haque Arijul" in student.values
```

Out[176]: True

Extract series values by index position

In [179]:
```
std = pd.read_csv("student.csv", usecols = ["Name"], squeeze = True)
std.head(5)
```

Out[179]:
```
0    Vasant Govind Patil
1           Debjyoti Roy
2           Kaustav Saha
3       Debobrata Podder
4      Anurag Mark Topno
Name: Name, dtype: object
```

In [183]:
```
std[50:100].head(5)
```

Out[183]:
```
50     Varun K Choudhary
51    Diptesh Chatterjee
52      Anuj Kumar Singh
```

```
53        Dilpreet Singh
54           Amit Sharma
Name: Name, dtype: object
```

In [184]:
```
std[:50]
```

Out[184]:
```
0               Vasant Govind Patil
1                     Debjyoti Roy
2                     Kaustav Saha
3                  Debobrata Podder
4                 Anurag Mark Topno
5                       Tarun Minz
6                Praveen Rao Rokkam
7                    Arindam Sharma
8                 Kaustubh Tripathi
9                       Nakul Gupta
10                    Gaurav Kumar
11                   Abhiram Kasina
12                     Biplab Sinha
13                   M Jagan Mohan
14                     Asit Parija
15              Shenoy Naresh Keshav
16                 Amit Kumar Suthar
17                  Amar Singh Patel
18                     Rahul Jaimini
19                   Rohit Rajgarhia
20                     Akshit Sharma
21                  Divya Kumar Kala
22                        Sri Harshad
23                  Micky Mrinal Minz
24                      Nishant Mundu
25                   Vinu Rajashekhar
26                     Mainack Mondal
27                     Debabrata Dey
28                Vivekananda Bhat K
29                 E S F Najumudheen
30                     Praveen Sonare
31                Ravi Rattan Boipai
32                   Anindya Bhowmik
```

```
33                      Bishal Lama
34                Meenuga Yuva Raju
35                           Prateek
36           G Arun Kumar Saragadam
37                Arit Kumar Mondal
38                          Akash Rao
39                      Marut Agarwal
40    Abhishek Pratap Singh Chauhan
41                      Sushant Kumar
42                       Arpit Mishra
43                      Abhinav Gupta
44          Togarrati Venkata Nagesh
45                        Pam Revanth
46                     Gourav Khaneja
47                     Mayank Jaiswal
48                       Amit Shanker
49                      Abhinav Anand
Name: Name, dtype: object
```

In [186]:
```
std[-50:-30]
```

Out[186]:
```
1885                Nikhil Agrawal
1886        Chanderki Rakesh Kumar
1887          Shah Smit Ketankumar
1888                 Ainuddin Khan
1889           Bhiman Kumar Baghel
1890                   Nidhi Mulay
1891                  Jeffrey Jose
1892                    Apurv Jain
1893                  Sumanta Dey
1894                Jagriti Jalal
1895               Ashish Malgawa
1896                Archie Mittal
1897              Hussain Jagirdar
1898           Ladani Ami Jamnadas
1899              Sourojit Bhaduri
1900    Parmar Nikhil Kishor Hansa
1901                Ishani Mondal
1902          Sinchani Chakraborty
```

```
1903                 Soumyadeep Roy
1904                    Atif Hassan
Name: Name, dtype: object
```

Extract series values by index lavel

In [193]:
```
students = pd.read_csv("student.csv", index_col="Name", squeeze = True)
students.head(5)
```

Out[193]:

Name	Roll No	Homepage
Vasant Govind Patil	04CS9501	vasantgp
Debjyoti Roy	05CS3001	debjyotid
Kaustav Saha	05CS3002	kaustavs
Debobrata Podder	05CS3003	dpodder
Anurag Mark Topno	05CS3004	topno

The get() Method

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: