

```

4      495
...
151    435
152    563
153    448
154    454
155    561
Name: (EPIDBalls, 1, x), Length: 156, dtype: object

```

```

In [77]: . 1 'x' .
Out[77]:
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)

```

```

In [78]: 'xsmoothed' = . 1 'x' .

```

```

In [79]: 'median' = . 1 'x' .

```

```

In [80]: . 1 'x' .

```

```

Out[80]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN

...
151    425.0
152    431.5
153    431.5
154    431.5
155    441.5
Name: (EPIDBalls, 1, x), Length: 156, dtype: float64

```

```

In [81]: . 1 'x' .

```

```

Traceback (most recent call last):

```

```

File "<ipython-input-81-a2932427f322>", line 1, in <module>
    df.loc[:, (what, 1, 'x')].rolling(window).median().values()

```

```

TypeError: 'numpy.ndarray' object is not callable

```

```

In [82]: . 1 'x' .

```

```

Out[82]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN

...
151    425.0
152    431.5

```

```

153     431.5
154     431.5
155     441.5
Name: (EPIDBalls, 1, x), Length: 156, dtype: float64

```

```
In [83]: . 1 'x' .
```

```

Out[83]:
array([[559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
        548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
        597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
        604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
        573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
        510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
        338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
        358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
        307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
        292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
        320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
        557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)

```

```
In [84]: = . 1 'x' .
```

```
In [85]:
```

```

Out[85]:
array([[559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
        548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
        597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
        604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
        573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
        510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
        338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
        358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
        307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
        292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
        320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
        557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)

```

```
In [86]: = .
```

```
In [87]:
```

```

Out[87]:
array([[559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
        548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
        597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
        604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
        573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
        510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
        338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
        358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
        307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
        292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
        320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
        557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)

```

```
In [88]: = . 1 'x' .
```

```
In [89]: = . = 0 -1 = 'wrap'
```

```
In [90]:
```

```
Out[90]:
```

```
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561,
       559, 478, 558, 492, 495, 554, 508, 514, 520], dtype=object)
```

In [91]: . 5

Traceback (most recent call last):

File "<ipython-input-91-1fc1552664f1>", line 1, in <module>
np.arrange(5)

File "C:\Users\56153805\Anaconda3\lib\site-packages\numpy__init__.py", line 303, in
__getattr__
raise AttributeError("module {!r} has no attribute "

AttributeError: module 'numpy' has no attribute 'arrange'

In [92]: . 5

Out[92]: array([0, 1, 2, 3, 4])

In [93]:

Out[93]:

```
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)
```

In [94]: def rolling_window

....: # http://www.mail-archive.com/numpy-discussion@scipy.org/msg29450.html

....: = . -1 + . -1 - + 1

....: = . + . -1

....: return . . = =

....: def circular_rolling_window

....: = . = 0 -1 = 'wrap'

....: return

In [95]: = 10

....: =

In [96]:

Out[96]:

```
array([[559, 478, 558, ..., 514, 520, 545],
       [478, 558, 492, ..., 520, 545, 532],
```

```
[558, 492, 495, ..., 545, 532, 537],
...,
[448, 454, 561, ..., 495, 554, 508],
[454, 561, 559, ..., 554, 508, 514],
[561, 559, 478, ..., 508, 514, 520]], dtype=object)
```

```
In [97]:          = .          = 0          -1          = 'wrap'
```

```
In [98]:
```

```
Out[98]:
```

```
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561,
       559, 478, 558, 492, 495, 554, 508, 514, 520], dtype=object)
```

```
In [99]:          'padded' =
```

```
Traceback (most recent call last):
```

```
File "<ipython-input-99-0b137a0362f2>", line 1, in <module>
    df['padded'] = pseudocircular
```

```
File "C:\Users\56153805\Anaconda3\lib\site-packages\pandas\core\frame.py", line 3163,
in _setitem
    self._set_item(key, value)
```

```
File "C:\Users\56153805\Anaconda3\lib\site-packages\pandas\core\frame.py", line 3242,
in _set_item
    value = self._sanitize_column(key, value)
```

```
File "C:\Users\56153805\Anaconda3\lib\site-packages\pandas\core\frame.py", line 3899,
in _sanitize_column
    value = sanitize_index(value, self.index)
```

```
File "C:\Users\56153805\Anaconda3\lib\site-packages\pandas\core\internals
\construction.py", line 751, in sanitize_index
    raise ValueError(
```

```
ValueError: Length of values (165) does not match length of index (156)
```

```
In [100]:
```

```
Out[100]:
```

```
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561,
```

```
559, 478, 558, 492, 495, 554, 508, 514, 520], dtype=object)
```

```
In [101]: = .
Traceback (most recent call last):

File "<ipython-input-101-325aa48f7ead>", line 1, in <module>
    a_series = pd.Series(pseudocircular)
```

NameError: name 'pd' is not defined

```
In [102]: = .
```

```
In [103]: = .
```

```
In [104]:
Out[104]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN
...
160    493.5
161    524.5
162    501.5
163    511.0
164    517.0
Length: 165, dtype: float64
```

```
In [105]: = . = .
Traceback (most recent call last):

File "<ipython-input-105-92e3710588d7>", line 1, in <module>
    m_series = a_series.rolling(window, closed = left).median()
```

NameError: name 'left' is not defined

```
In [106]: = . = 'left' .
```

```
In [107]:
Out[107]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN
...
160    485.0
161    493.5
162    524.5
163    501.5
164    511.0
Length: 165, dtype: float64
```

```
In [108]: 'std' = 'median' .
```

```
In [109]: = 10
```

```
In [110]: 'std' = 'median' .
```

```
In [111]: = . = -1 -1 = 'wrap'
```

```
In [112]:
Out[112]:
array([559, 478, 558, 492, 495, 554, 508, 514, 520, 545, 532, 537, 543,
       548, 553, 559, 563, 568, 572, 576, 580, 584, 587, 590, 591, 594,
       597, 599, 601, 603, 604, 605, 606, 607, 608, 608, 607, 607, 342,
       604, 604, 603, 601, 599, 597, 596, 593, 590, 587, 584, 580, 577,
       573, 569, 565, 560, 363, 551, 546, 541, 535, 530, 525, 519, 516,
       510, 342, 498, 493, 487, 480, 474, 468, 462, 455, 449, 443, 436,
       338, 339, 419, 412, 342, 400, 397, 391, 385, 379, 374, 368, 363,
       358, 353, 348, 343, 338, 334, 330, 326, 322, 318, 315, 313, 309,
       307, 304, 302, 300, 298, 296, 295, 294, 293, 292, 292, 292, 292,
       292, 297, 480, 295, 297, 298, 300, 301, 304, 306, 310, 313, 316,
       320, 527, 328, 332, 337, 540, 346, 351, 357, 363, 368, 555, 380,
       557, 558, 396, 402, 561, 415, 422, 428, 435, 563, 448, 454, 561],
      dtype=object)
```

```
In [113]:
Out[113]:
array([561, 415, 422, 428, 435, 563, 448, 454, 561, 559, 478, 558, 492,
       495, 554, 508, 514, 520, 545, 532, 537, 543, 548, 553, 559, 563,
       568, 572, 576, 580, 584, 587, 590, 591, 594, 597, 599, 601, 603,
       604, 605, 606, 607, 608, 608, 607, 607, 342, 604, 604, 603, 601,
       599, 597, 596, 593, 590, 587, 584, 580, 577, 573, 569, 565, 560,
       363, 551, 546, 541, 535, 530, 525, 519, 516, 510, 342, 498, 493,
       487, 480, 474, 468, 462, 455, 449, 443, 436, 338, 339, 419, 412,
       342, 400, 397, 391, 385, 379, 374, 368, 363, 358, 353, 348, 343,
       338, 334, 330, 326, 322, 318, 315, 313, 309, 307, 304, 302, 300,
       298, 296, 295, 294, 293, 292, 292, 292, 292, 292, 297, 480, 295,
       297, 298, 300, 301, 304, 306, 310, 313, 316, 320, 527, 328, 332,
       337, 540, 346, 351, 357, 363, 368, 555, 380, 557, 558, 396, 402,
       561, 415, 422, 428, 435, 563, 448, 454, 561, 559, 478, 558, 492,
       495, 554, 508, 514, 520], dtype=object)
```

```
In [114]:          = .
Traceback (most recent call last):

  File "<ipython-input-114-1951894738eb>", line 1, in <module>
    a_series = pd.Series(ps)
```

NameError: name 'pd' is not defined

```
In [115]:          = .

In [116]:          = 10
...:      = .          1 'x' .
...:      = .          = -1          -1          = 'wrap'
...:      = .
...:      = .
```

```
In [117]:
Out[117]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN
...
169    493.5
170    524.5
171    501.5
172    511.0
```

```
173      517.0
Length: 174, dtype: float64
```

```
In [118]: 156-173
Out[118]: -17
```

```
In [119]: 156-173-9
Out[119]: -26
```

```
In [120]: 174-156
Out[120]: 18
```

```
In [121]: = . 1 'x' .
...: = . = -1 0 = 'wrap'
...: = .
...: = .
```

```
In [122]: 174-156
Out[122]: 18
```

```
In [123]:
Out[123]:
0      NaN
1      NaN
2      NaN
3      NaN
4      NaN
...
160    425.0
161    431.5
162    431.5
163    431.5
164    441.5
Length: 165, dtype: float64
```

```
In [124]:
Traceback (most recent call last):

  File "<ipython-input-124-1d8811297dc3>", line 1, in <module>
    m_series.size()

TypeError: 'int' object is not callable
```

```
In [125]:
Out[125]: 165
```

```
In [126]: 9
File "<ipython-input-126-29d856452385>", line 1
    m_series(9:end)

SyntaxError: invalid syntax
```

```
In [127]: 9
File "<ipython-input-127-065fbfc45bf3>", line 1
    m_series(9:m_series.size)

SyntaxError: invalid syntax
```

```
In [128]: 9
Out[128]:
```

```

9      451.0
10     451.0
11     466.0
12     485.0
13     493.5
...
160    425.0
161    431.5
162    431.5
163    431.5
164    441.5
Length: 156, dtype: float64

```

```

In [129]:          -1      .
Out[129]:

```

```

9      451.0
10     451.0
11     466.0
12     485.0
13     493.5
...
160    425.0
161    431.5
162    431.5
163    431.5
164    441.5
Length: 156, dtype: float64

```

```

In [130]:          = 10
...:      = .          1 'x' .
...:      = .          = -1 0      = 'wrap'
...:      = .
...:      = .
...:      = -1 .

```

```

In [131]:          = 'EPIDBaLLs'
...:
...:
...:      = 10
...:      = .          1 'x' .
...:      = .          = -1 0      = 'wrap'
...:      = .
...:      = .
...:      = -1 .

```

Traceback (most recent call last):

```

File "<ipython-input-131-58cb8df7e28a>", line 6, in <module>
    m = np.pad(m, pad_width=(windowsize-1, 0), mode='wrap')

```

NameError: name 'windowsize' is not defined

```

In [132]:          = 'EPIDBaLLs'
...:
...:
...:      = 10
...:      = .          1 'x' .
...:      = .          = -1 0      = 'wrap'
...:      = .
...:      = .
...:      = -1 .

```


In [133]: