swcarpentry-python

July 15, 2025

0.1 SwCarpentry on Python

Assignment 3

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[65]:
```
import numpy as np
```

[66]:
```
path = "inflammation-01.csv"
data=np.loadtxt(path, delimiter =",")
print(data)
print(type(data))
print(data.dtype)
print(data.shape)
```

```
[[0. 0. 1. … 3. 0. 0.]
 [0. 1. 2. … 1. 0. 1.]
 [0. 1. 1. … 2. 1. 1.]
 …
 [0. 1. 1. … 1. 1. 1.]
 [0. 0. 0. … 0. 2. 0.]
 [0. 0. 1. … 1. 1. 0.]]
<class 'numpy.ndarray'>
float64
(60, 40)
```

[67]:
```
print("First value in data :", data[0,0])
print("middle value in data :", data[29,19])
print( data[0:4,0:10])
```

```
First value in data : 0.0
middle value in data : 16.0
[[0. 0. 1. 3. 1. 2. 4. 7. 8. 3.]
 [0. 1. 2. 1. 2. 1. 3. 2. 2. 6.]
 [0. 1. 1. 3. 3. 2. 6. 2. 5. 9.]
 [0. 0. 2. 0. 4. 2. 2. 1. 6. 7.]]
```

[68]:
```
print(np.mean(data))
import time
```

```
print(time.ctime())
```

```
6.14875
Tue Jul 15 17:51:56 2025
```

[69]:
```
maxval, minval, stdval = np.amax(data), np.amin(data), np.std(data)
print('the max value:', maxval)
print("the min value:", minval)
print('the standard deviation;',stdval)
print(np.unravel_index(np.argmax(data), data.shape))
```

```
the max value: 20.0
the min value: 0.0
the standard deviation; 4.613833197118566
(np.int64(7), np.int64(20))
```

[70]:
```
print(data[7,20])
print('The maximum inflamationn for patient 2:', np.amax(data[1,:]))
```

```
20.0
The maximum inflamationn for patient 2: 18.0
```

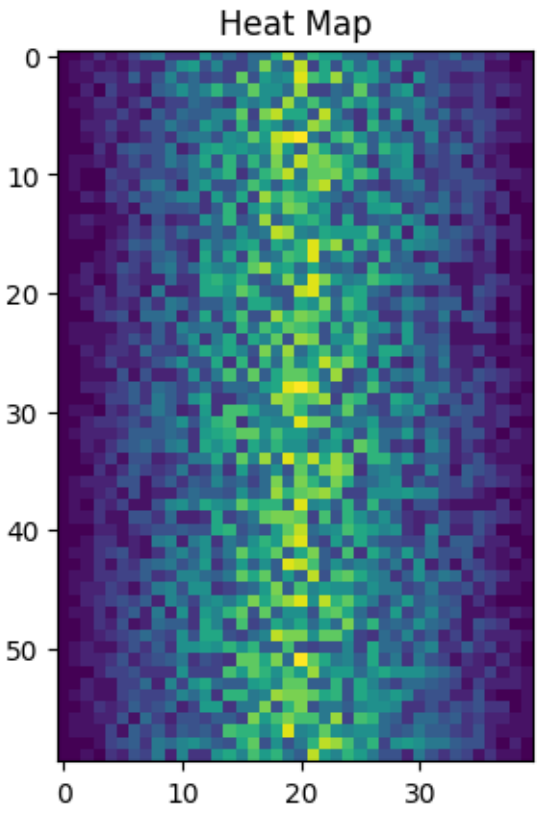
[71]:
```
# maximum daily average across rows or aka patients
print(np.max(data, axis=1))
print(len(np.max(data,axis=1)))
print(data.shape)
print(np.max(data, axis=0))
print(len(np.max(data,axis=0)))
```

```
[18. 18. 19. 17. 17. 18. 17. 20. 17. 18. 18. 18. 17. 16. 17. 18. 19. 19.
 17. 19. 19. 16. 17. 15. 17. 17. 18. 17. 20. 17. 16. 19. 15. 15. 19. 17.
 16. 17. 19. 16. 18. 19. 16. 19. 18. 16. 19. 15. 16. 18. 14. 20. 17. 15.
 17. 16. 17. 19. 18. 18.]
60
(60, 40)
[ 0.  1.  2.  3.  4.  5.  6.  7.  8.  9. 10. 11. 12. 13. 14. 15. 16. 17.
 18. 19. 20. 19. 18. 17. 16. 15. 14. 13. 12. 11. 10.  9.  8.  7.  6.  5.
  4.  3.  2.  1.]
40
```

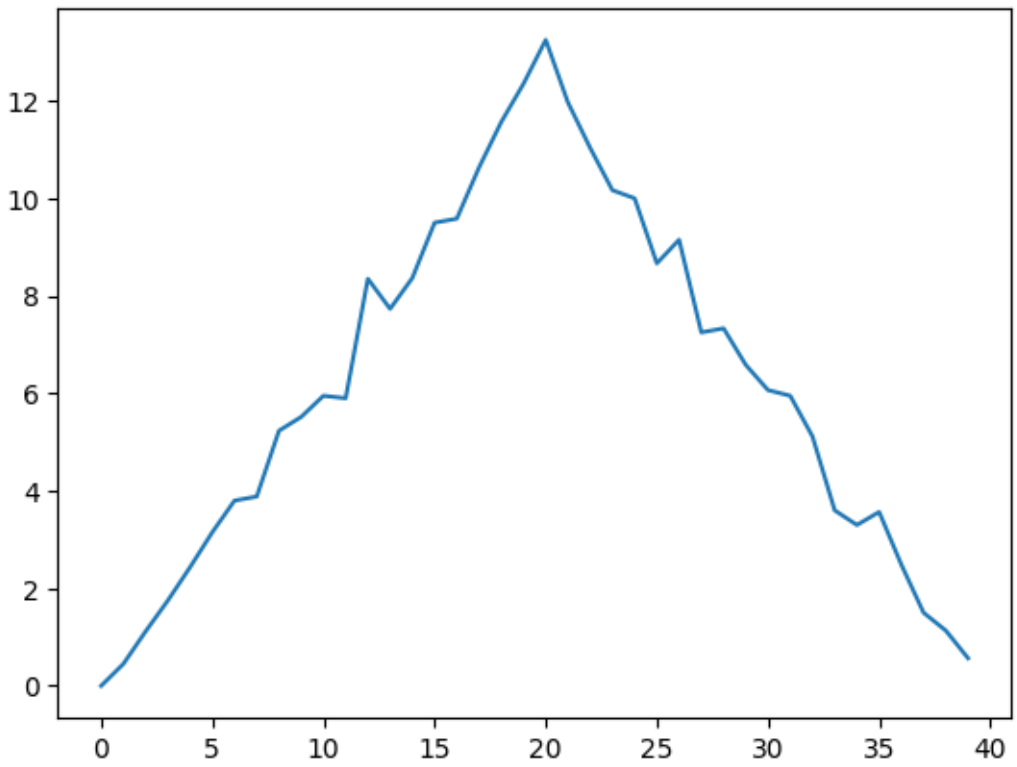
[72]:
```
import matplotlib.pyplot as plt
```

[92]:
```
image = plt.imshow(data)
plt.title('Heat Map')
```

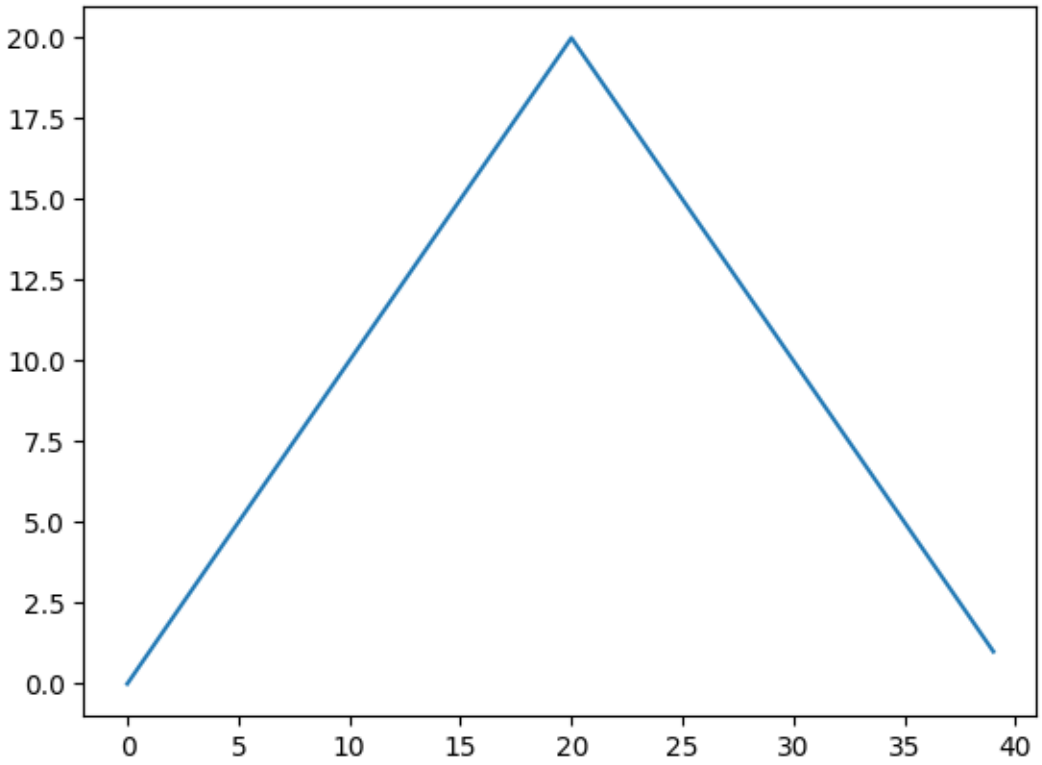
[92]:
```
Text(0.5, 1.0, 'Heat Map')
```



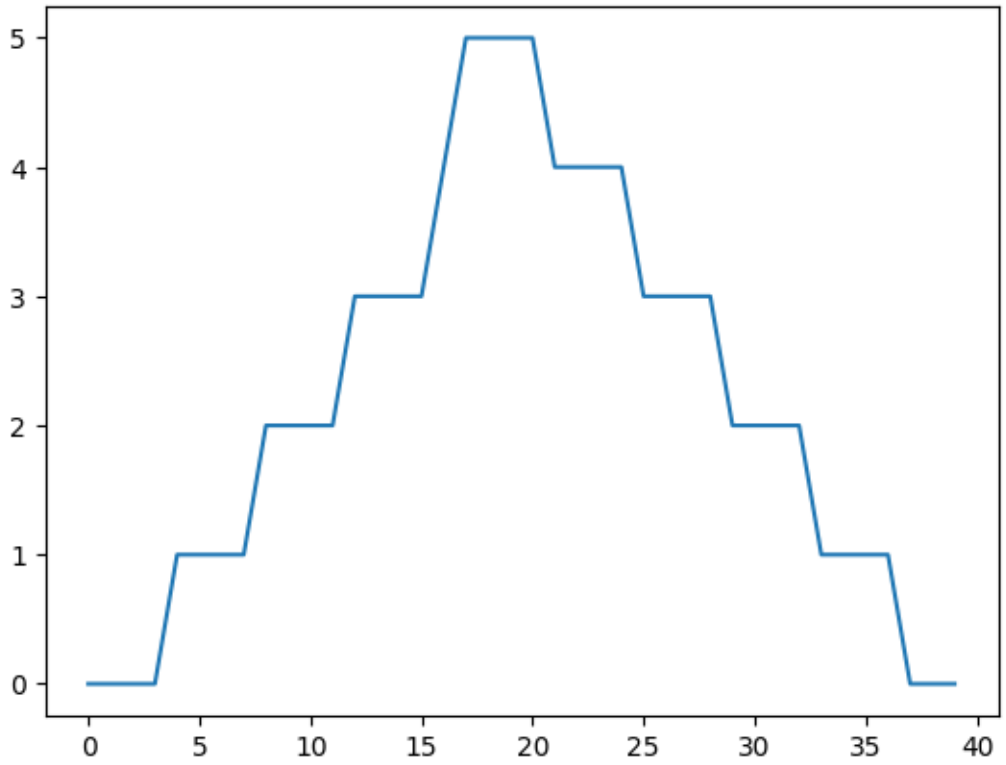
[74]:
```
avg_inflamation = np.mean(data,axis =0)
plt.plot(avg_inflamation)
plt.show()
```



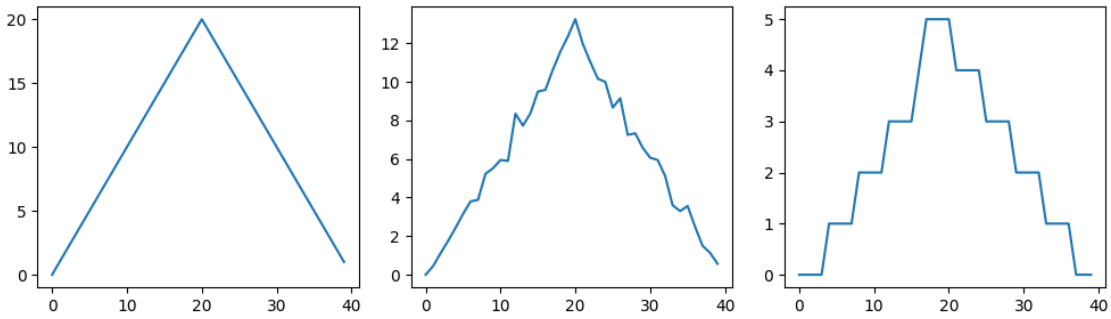
[75]:
```
#max plot
plt.plot(np.max(data,axis=0))
plt.show()
```



[76]:
```
#min plot
plt.plot(np.min(data,axis =0))
plt.show()
```



[86]:
```
# Group plotting
fig = plt.figure(figsize=(10,3))
axes1 = fig.add_subplot(1,3,1)
axes2 = fig.add_subplot(1,3,2)
axes3 = fig.add_subplot(1,3,3)

axes1.plot(np.max(data,axis =0))
axes2.plot(np.mean(data,axis =0))
axes3.plot(np.min(data,axis=0))
plt.savefig('data_patient1.png')
fig.tight_layout()
plt.show()
```



[78]:
```
# Creating Lists
odds = [1,3,5,7]
print (odds)
print(odds[0],odds[-1])
```

```
[1, 3, 5, 7]
1 7
```

[79]:
```
m_salsa = ['pepper','onion']
h_salsa = list(m_salsa)
h_salsa[0]='hot pepper'
print(m_salsa)
print(h_salsa)
```

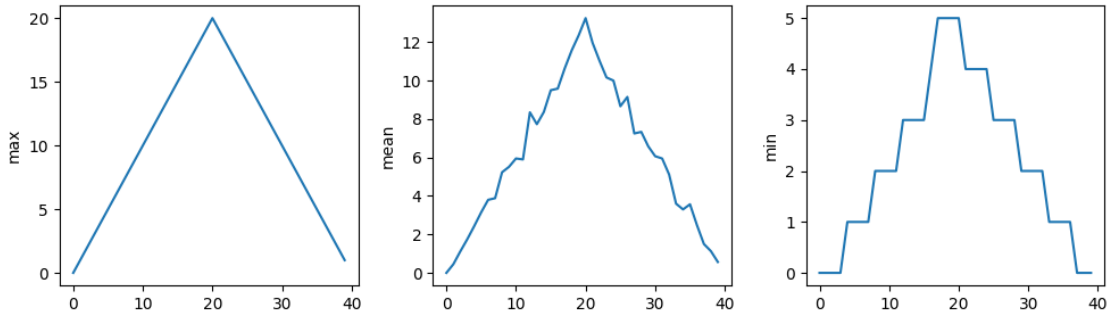
```
['pepper', 'onion']
['hot pepper', 'onion']
```

[80]:
```
import glob
print(sorted(glob.glob('inflammation*.csv')))
```

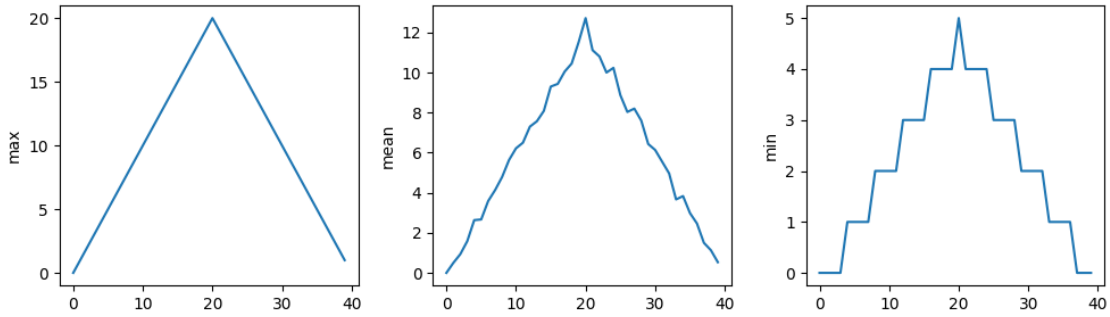
```
['inflammation-01.csv', 'inflammation-02.csv', 'inflammation-03.csv',
'inflammation-04.csv', 'inflammation-05.csv', 'inflammation-06.csv',
'inflammation-07.csv', 'inflammation-08.csv', 'inflammation-09.csv',
'inflammation-10.csv', 'inflammation-11.csv', 'inflammation-12.csv']
```

[84]:
```
x = sorted(glob.glob('inflammation*.csv'))
x = x[0:3]
for x in x:
 print(x)
 y = np.loadtxt(x, delimiter =',')
 fig = plt.figure(figsize=(10,3))
 axes1 = fig.add_subplot(1,3,1)
 axes1.set_ylabel('max')
 axes2 = fig.add_subplot(1,3,2)
 axes2.set_ylabel('mean')
 axes3 = fig.add_subplot(1,3,3)
 axes3.set_ylabel('min')

 axes1.plot(np.max(y,axis =0))
 axes2.plot(np.mean(y,axis =0))
 axes3.plot(np.min(y,axis=0))

 fig.tight_layout()
 plt.show()
```

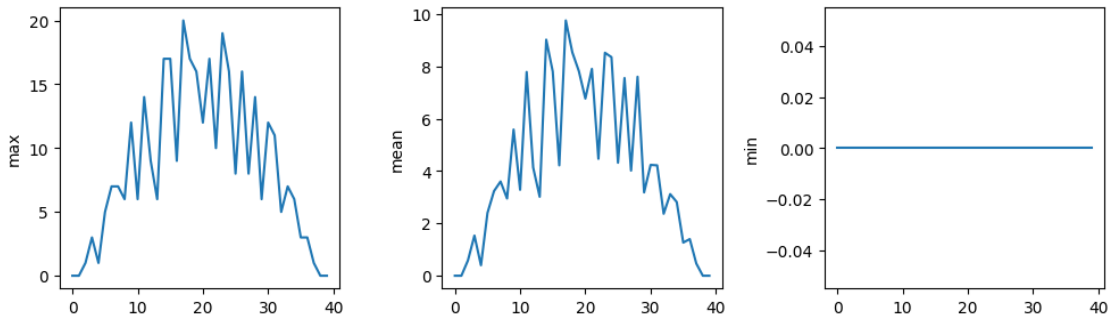
```
inflammation-01.csv
```



inflammation-02.csv



inflammation-03.csv



[87]:
```
max_inflammation_0= np.max(data, axis = 0)[0]
max_inflammation_20= np.max(data, axis = 0)[20]

if max_inflammation_0 == 0 and max_inflammation_20 == 20:
    print('Suspicious looking Maxima!')
elif np.sum(np.min(data, axis =0)) == 0:
    print('Minima add up to Zero!')
```

```
else:
    print('Seems ok')
```

```
Suspicious looking Maxima!
```

[90]:
```
data1 = np.loadtxt('inflammation-03.csv', delimiter=',')

max_inflammation_0= np.max(data1, axis = 0)[0]
max_inflammation_20= np.max(data1, axis = 0)[20]

if max_inflammation_0 == 0 and max_inflammation_20 == 20:
    print('Suspicious looking Maxima!')
elif np.sum(np.min(data1, axis =0)) == 0:
    print('Minima add up to Zero!')
else:
    print('Seems ok')
```

```
Minima add up to Zero!
```

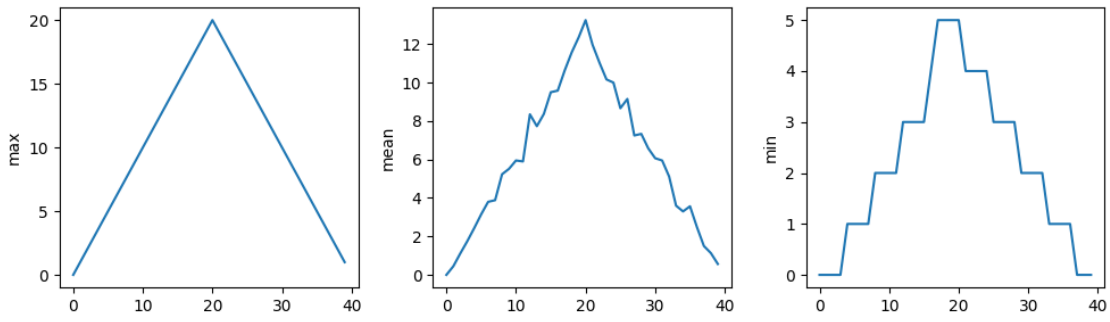
[93]:
```
def far_to_cel(temp):
    return ((temp-32)*(5/9))

T = far_to_cel(212)
print(T)
```

```
100.0
```

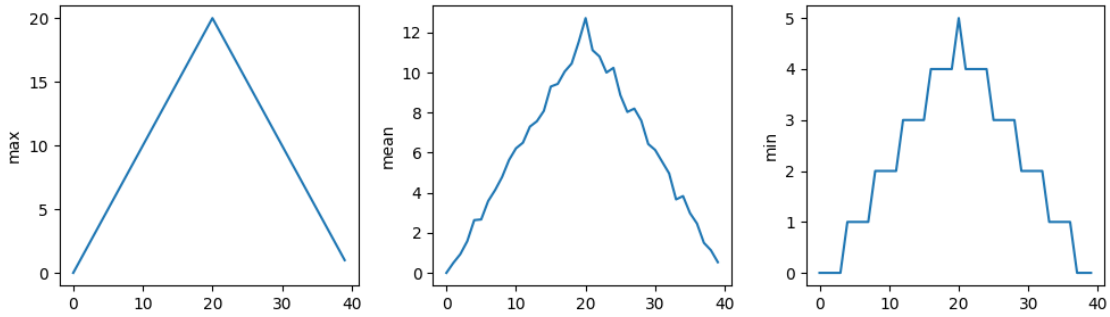
[101]:
```
# Combining the above 2 using the Functions to Tidy up the Code
def plotting(x):

  print(x)
  y=x
  fig = plt.figure(figsize=(10,3))
  axes1 = fig.add_subplot(1,3,1)
  axes1.set_ylabel('max')
  axes2 = fig.add_subplot(1,3,2)
  axes2.set_ylabel('mean')
  axes3 = fig.add_subplot(1,3,3)
  axes3.set_ylabel('min')

  axes1.plot(np.max(y,axis =0))
  axes2.plot(np.mean(y,axis =0))
  axes3.plot(np.min(y,axis=0))

  fig.tight_layout()
  plt.show()
```

```
def error_check(data):
 max_inflammation_0= np.max(data, axis = 0)[0]
 max_inflammation_20= np.max(data, axis = 0)[20]

 if max_inflammation_0 == 0 and max_inflammation_20 == 20:
    print('Suspicious looking Maxima!')
 elif np.sum(np.min(data, axis =0)) == 0:
    print('Minima add up to Zero!')
 else:
    print('Seems ok')

y = sorted(glob.glob('inflammation*.csv'))
y = y[0:5]
for z in y:
  file = np.loadtxt(z, delimiter= ",")
  error_check(file)
  plotting(file)
```

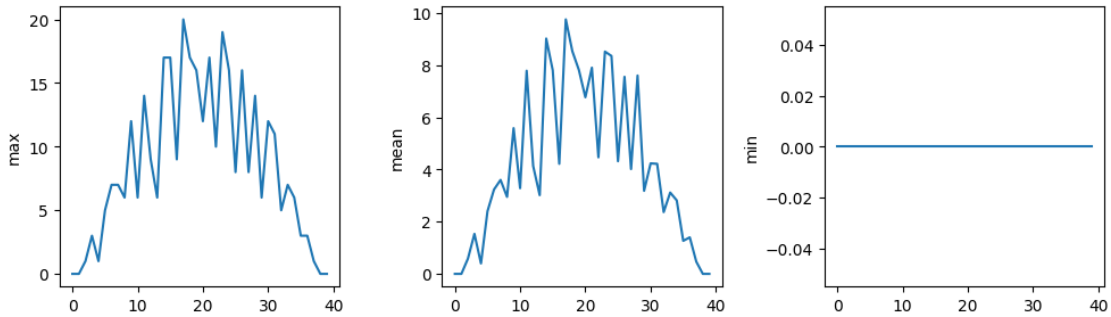
```
Suspicious looking Maxima!
[[0. 0. 1. … 3. 0. 0.]
 [0. 1. 2. … 1. 0. 1.]
 [0. 1. 1. … 2. 1. 1.]
 …
 [0. 1. 1. … 1. 1. 1.]
 [0. 0. 0. … 0. 2. 0.]
 [0. 0. 1. … 1. 1. 0.]]
```



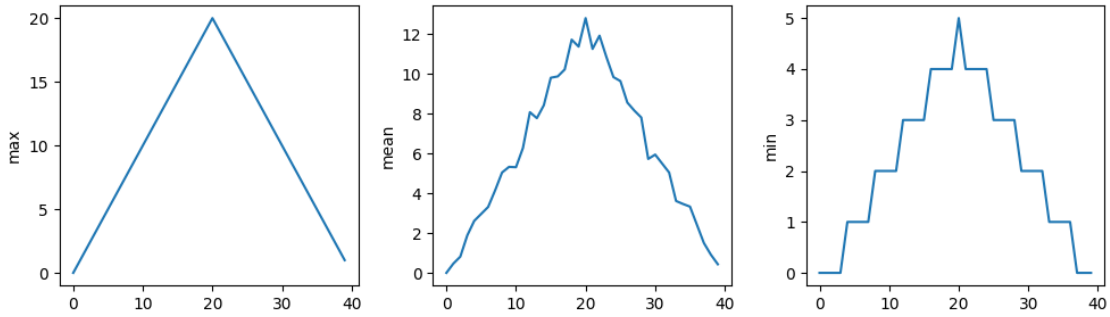

```
Suspicious looking Maxima!
[[0. 0. 0. … 1. 1. 0.]
 [0. 0. 2. … 0. 2. 1.]
 [0. 1. 2. … 0. 2. 1.]
 …
 [0. 0. 2. … 0. 2. 0.]
 [0. 0. 0. … 2. 2. 0.]
 [0. 1. 2. … 3. 2. 0.]]
```



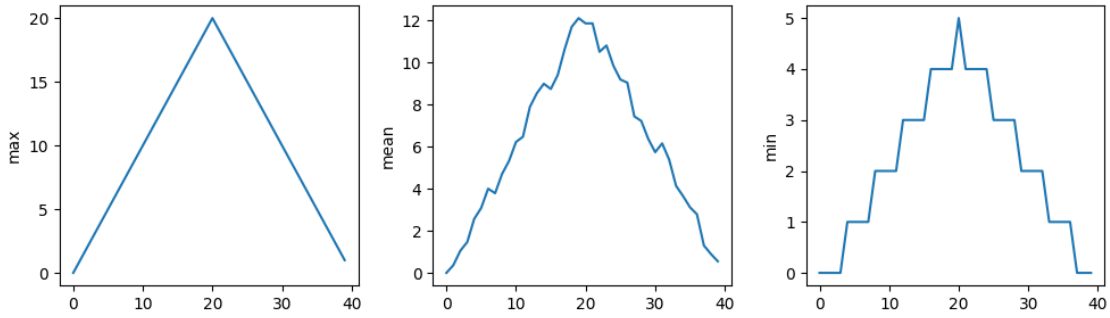

```
Minima add up to Zero!
[[0. 0. 0. … 0. 0. 0.]
 [0. 0. 0. … 1. 0. 0.]
 [0. 0. 1. … 0. 0. 0.]
 …
 [0. 0. 1. … 1. 0. 0.]
 [0. 0. 1. … 1. 0. 0.]
 [0. 0. 0. … 0. 0. 0.]]
```




```
Suspicious looking Maxima!
[[0. 1. 2. … 0. 1. 0.]
 [0. 1. 1. … 0. 1. 0.]
 [0. 0. 1. … 2. 1. 0.]
 …
 [0. 0. 1. … 0. 1. 0.]
 [0. 0. 2. … 2. 0. 1.]
 [0. 0. 2. … 1. 0. 1.]]
```




```
Suspicious looking Maxima!
[[0. 1. 0. … 0. 2. 1.]
 [0. 0. 2. … 1. 0. 1.]
 [0. 1. 0. … 0. 0. 1.]
 …
 [0. 0. 2. … 0. 1. 1.]
 [0. 1. 2. … 1. 2. 1.]
 [0. 0. 1. … 1. 0. 1.]]
```



[ ]: