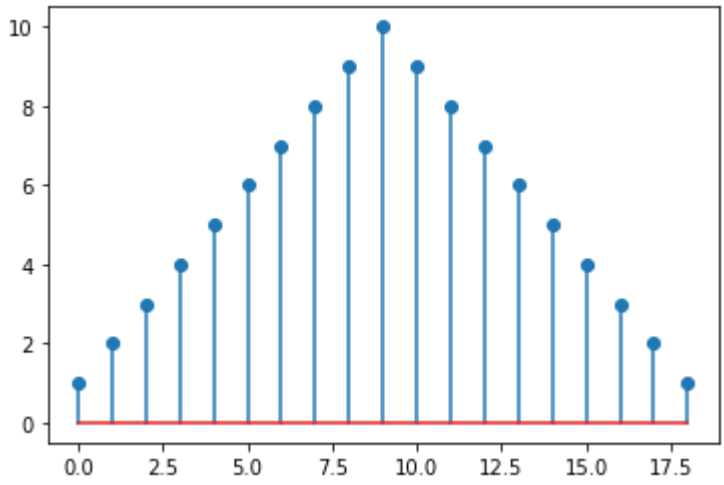
```
from IPython import get_ipython
get_ipython().magic('reset -sf')
get_ipython().magic('cls')

import numpy as np
import matplotlib.pyplot as plt


#---------------------App1 convolution rect10(k)*rect10(k) ---------------------------
x=np.ones(10);
h=x;
y=np.convolve(x,h);
N=len(x)+len(h)-1
k=np.arange(0,N);
plt.figure()
plt.stem(k,y);
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:8: UserWarning: In Matpl
```

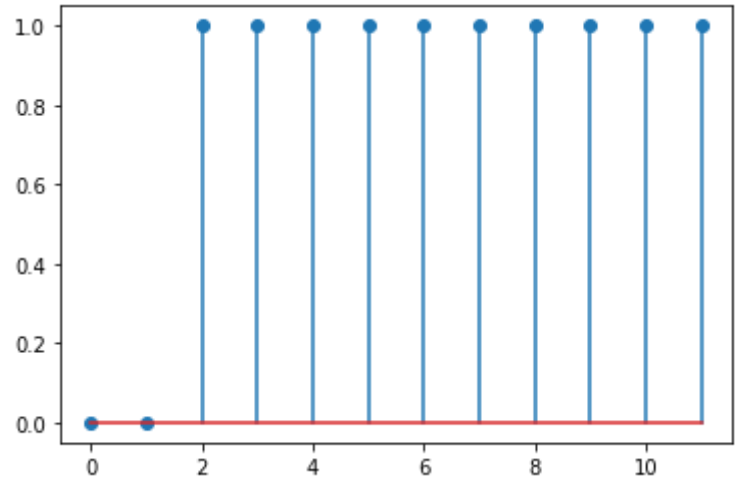



```
#---------------------App2/a convolution rect10(k)*d(k)-------------------------
x=np.ones(10);
h=np.ones(1);
y=np.convolve(x,h);
N=len(x)+len(h)-1
k=np.arange(0,N);
plt.figure()
plt.stem(k,y);
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:8: UserWarning: In Ma
```


```
#----------------------App2/b convolution rect10(k)*d(k-2)-------------------------
x=np.ones(10);
h=np.array([0,0,1]);
y=np.convolve(x,h);
N=len(x)+len(h)-1
k=np.arange(0,N);
plt.figure()
plt.stem(k,y);
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:8: UserWarning: In Ma
```




```
#----------------------App3 auto-correlation rect10(k)*rect10(k) ----------------
x=np.ones(10);
cx=np.correlate(x, x, mode='full');
k=np.arange(-9,10);
plt.figure()
plt.stem(k,cx);
e0=np.sum(x**2)
e1=cx[9]
X=np.fft.fftshift(np.abs(np.fft.fft(x)));
Sx=X**2
N=len(x);
e3=np.sum(X**2)/N
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: UserWarning: In Ma
```