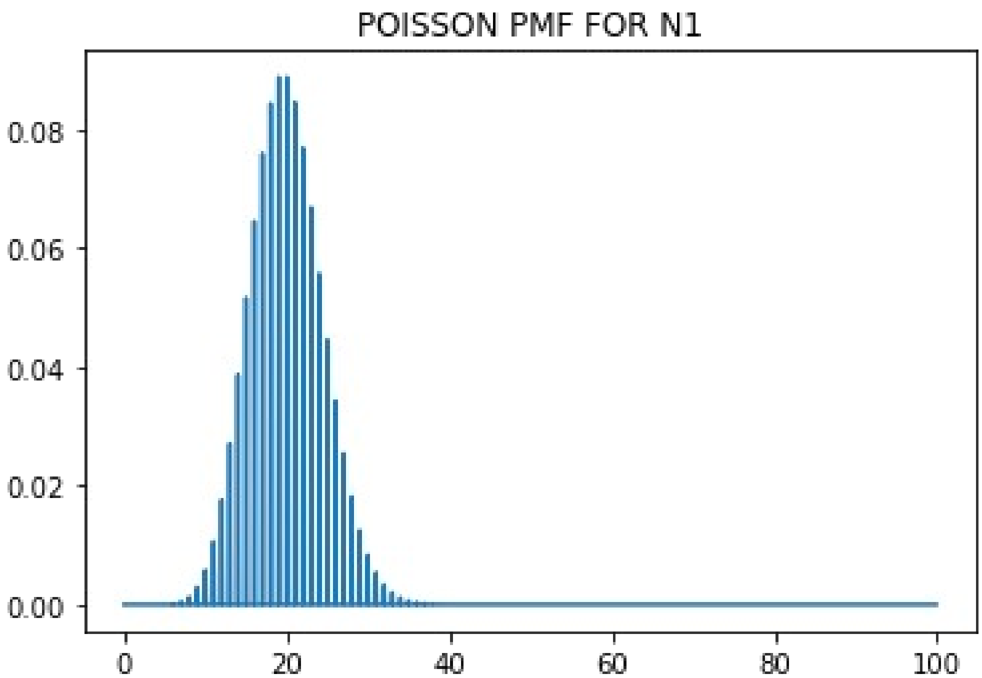
POISSON DISTRIBUTION PROCESS

Let lambda=20 and t=time implies the mean mu=lambda*t

PMF OF N1

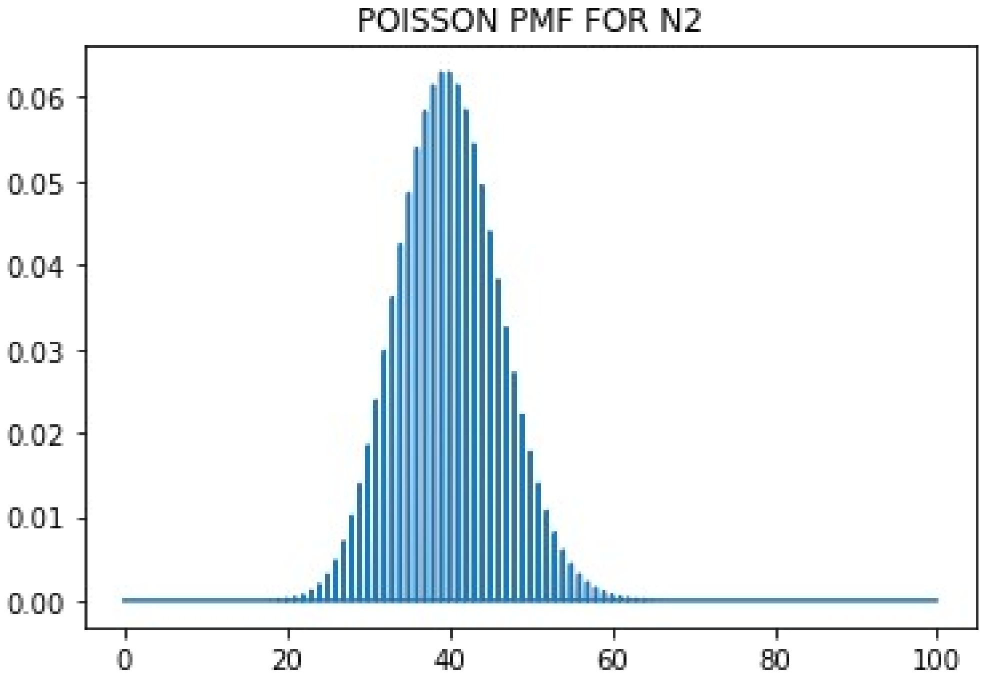
```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t=1
X=np.arange(0,100,0.1)
Y=poisson.pmf(X,mu=L*t)
plt.title("POISSON PMF FOR N1")
plt.plot(X,Y)
plt.show()
```



PMF OF N2

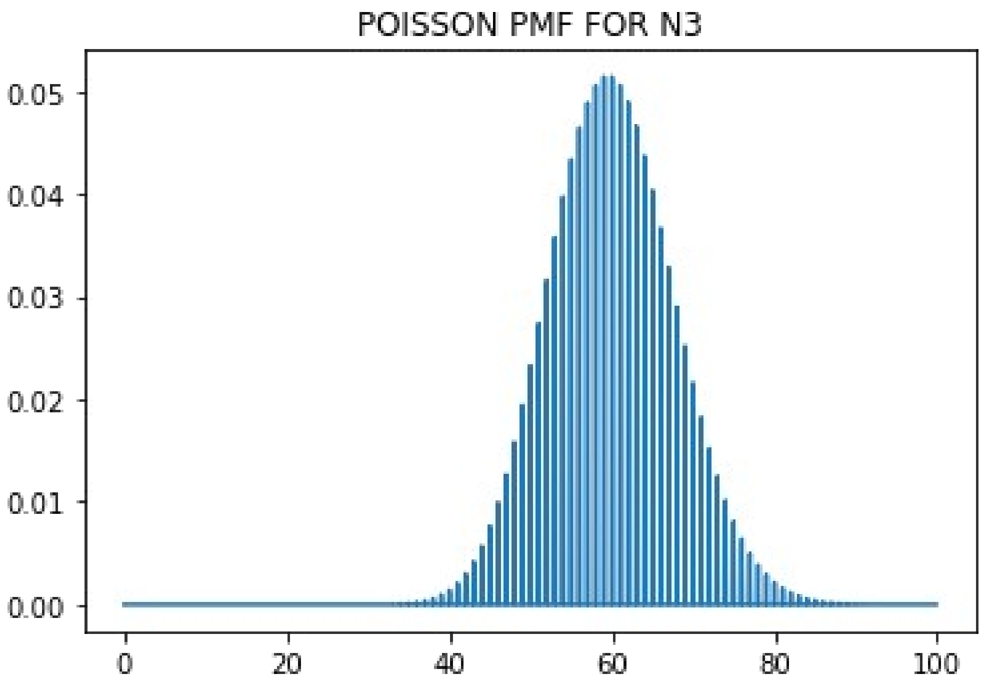
```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t=2
```

```
X=np.arange(0,100,0.1)
Y=poisson.pmf(X,mu=L*t)
plt.title("POISSON PMF FOR N2")
plt.plot(X,Y)
plt.show()
```



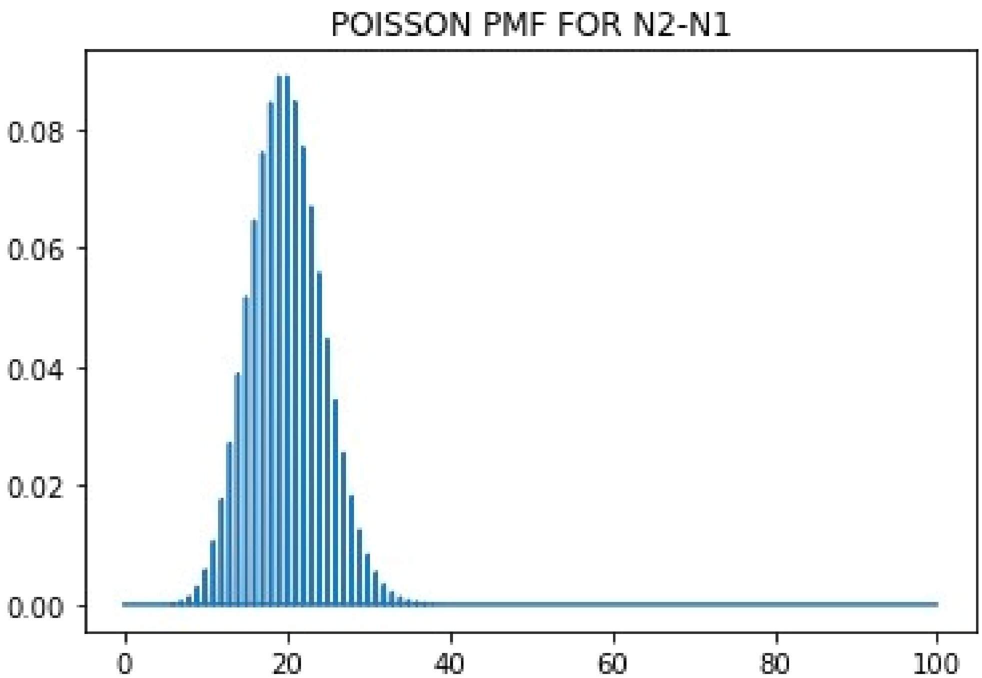
PMF OF N3

```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t=3
X=np.arange(0,100,0.1)
Y= poisson.pmf(X,mu=L*t)
plt.title("POISSON PMF FOR N3")
plt.plot(X,Y)
plt.show()
```



PMF OF N2-N1

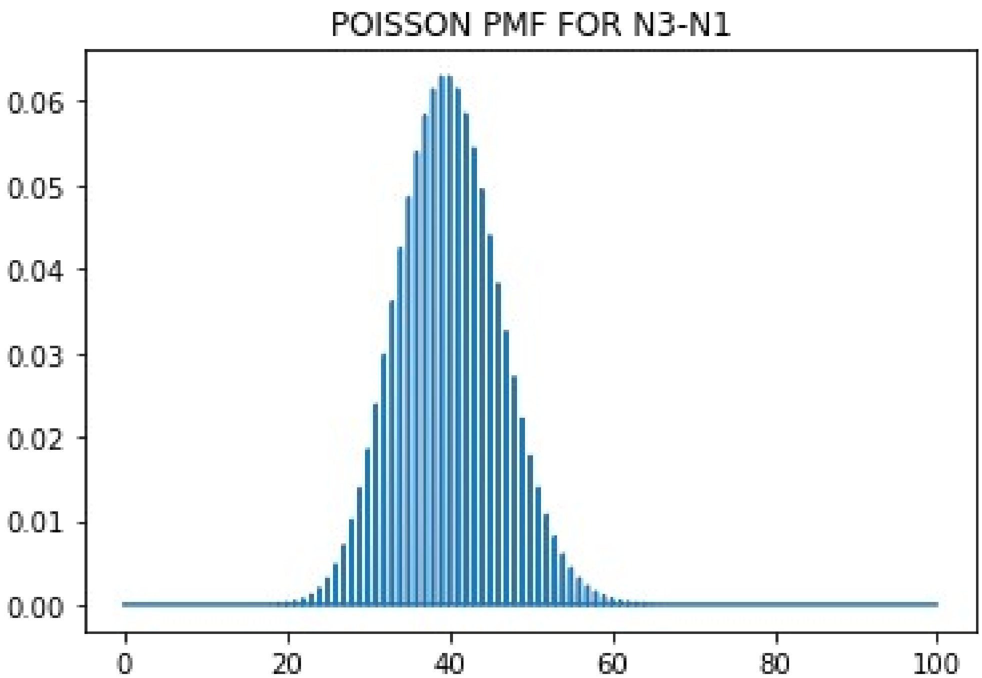
```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t2=2
t1=1
dt=t2-t1
X=np.arange(0,100,0.1)
Y= poisson.pmf(X,mu=L*dt)
plt.title("POISSON PMF FOR N2-N1")
plt.plot(X,Y)
plt.show()
```



AS POISSON IS MEMORYLESS. THUS PMF OF N(S) TO N(S+T) IS EQUIVALENT TO N(T). THUS PMF OF N2-N1 IS EQUIVALENT TO N1

PMF OF N3-N1

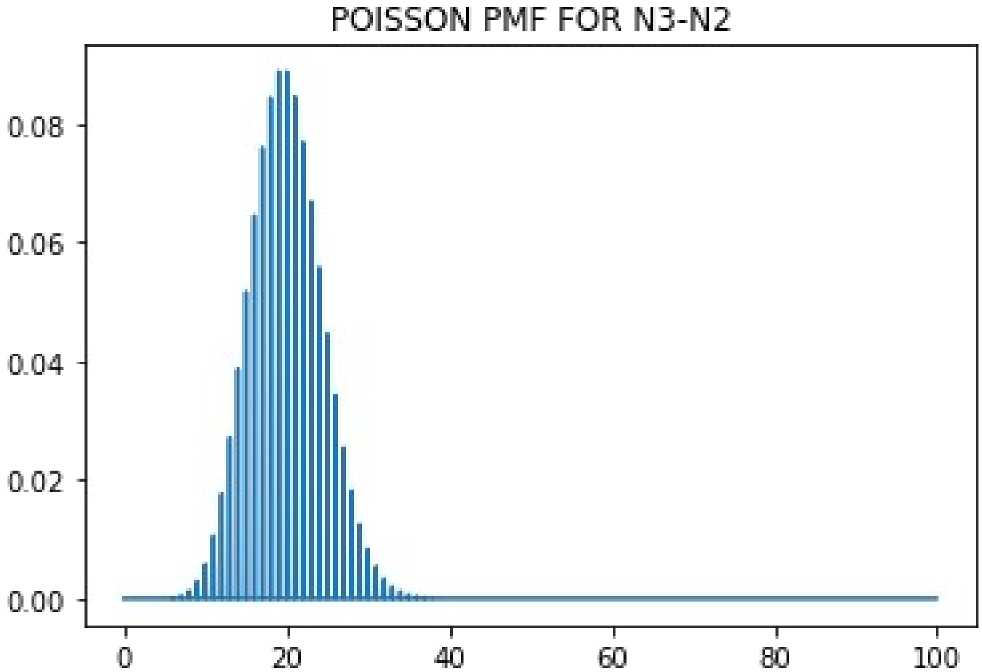
```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t2=3
t1=1
dt=t2-t1
X=np.arange(0,100,0.1)
Y= poisson.pmf(X,mu=L*dt)
plt.title("POISSON PMF FOR N3-N1")
plt.plot(X,Y)
plt.show()
```



AS POISSON IS MEMORYLESS. THUS PMF OF N(S) TO N(S+T) IS EQUIVALENT TO N(T). THUS PMF OF N3-N1 IS EQUIVALENT TO N2.

PMF OF N3-N2

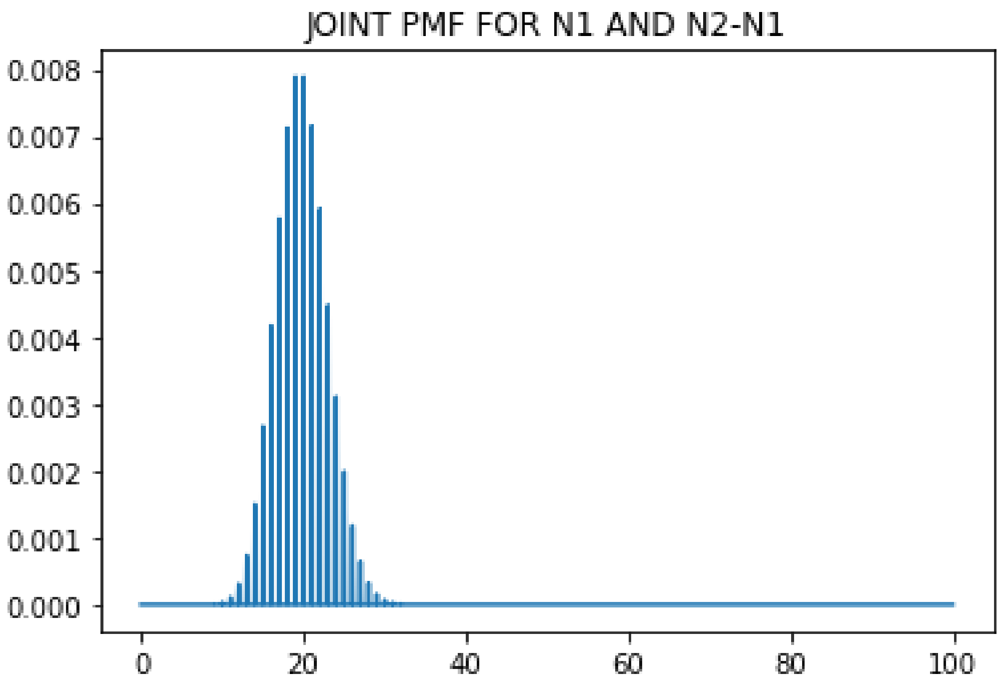
```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t2=3
t1=2
dt=t2-t1
X=np.arange(0,100,0.1)
Y= poisson.pmf(X,mu=L*dt)
plt.title("POISSON PMF FOR N3-N2")
plt.plot(X,Y)
plt.show()
```



AS POISSON IS MEMORYLESS. THUS PMF OF N(S) TO N(S+T) IS EQUIVALENT TO N(T). THUS PMF OF N3-N2 IS EQUIVALENT TO N1

JOINT PMF OF N1 AND N1-N2

```
from scipy.stats import poisson
import numpy as np
import matplotlib.pyplot as plt
L=20
t2=3
t1=2
dt=t2-t1
X=np.arange(0,100,0.1)
Y1= poisson.pmf(X,mu=L*dt)
t=1
Y2=poisson.pmf(X,mu=L*t)
Y=Y1*Y2
plt.title("JOINT PMF FOR N1 AND N2-N1")
plt.plot(X,Y)
plt.show()
```



FOR JOINT PMF IN POISSON DISTRIBUTION N1 AND N2-N1 ARE INDEPENDENT OF EACH OTHER AS POISSON DISTRIBUTION IS MEMORYLESS. THUS JOINT PMF IS THE PRODUCT OF THERE PMFS