General

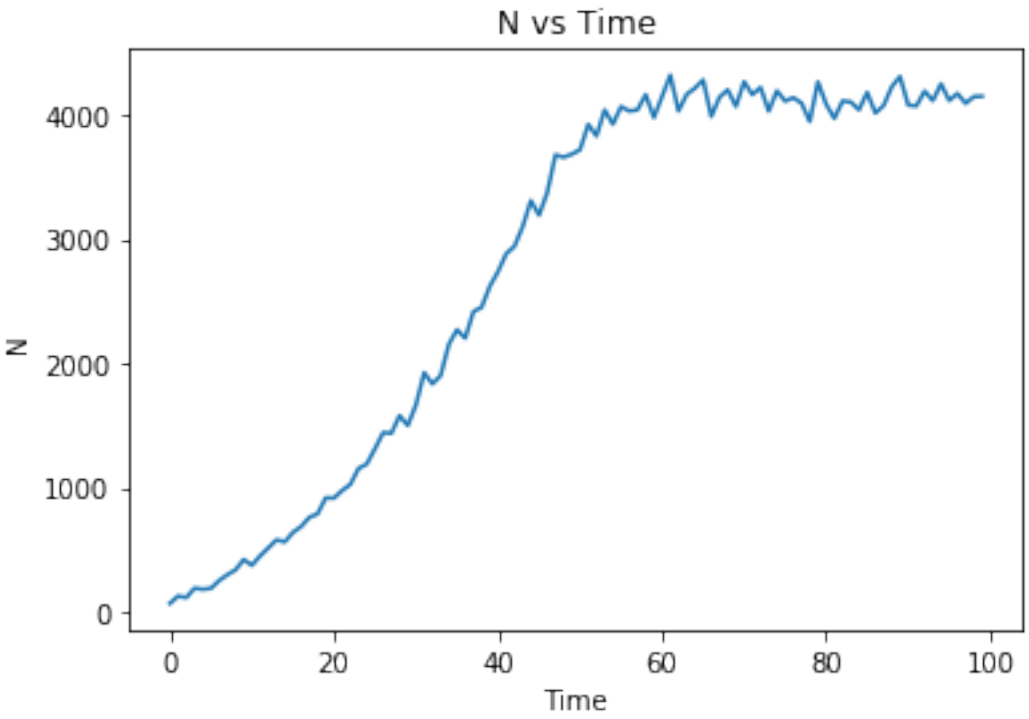
February 14, 2019

In [1]:
```
%matplotlib inline

import matplotlib
import numpy as np
import matplotlib.pyplot as plt

from matplotlib import animation, rc
from IPython.display import HTML
from ipywidgets import interact
import ipywidgets as widgets


from astropy.stats import RipleysKEstimator
import seaborn as sns
```

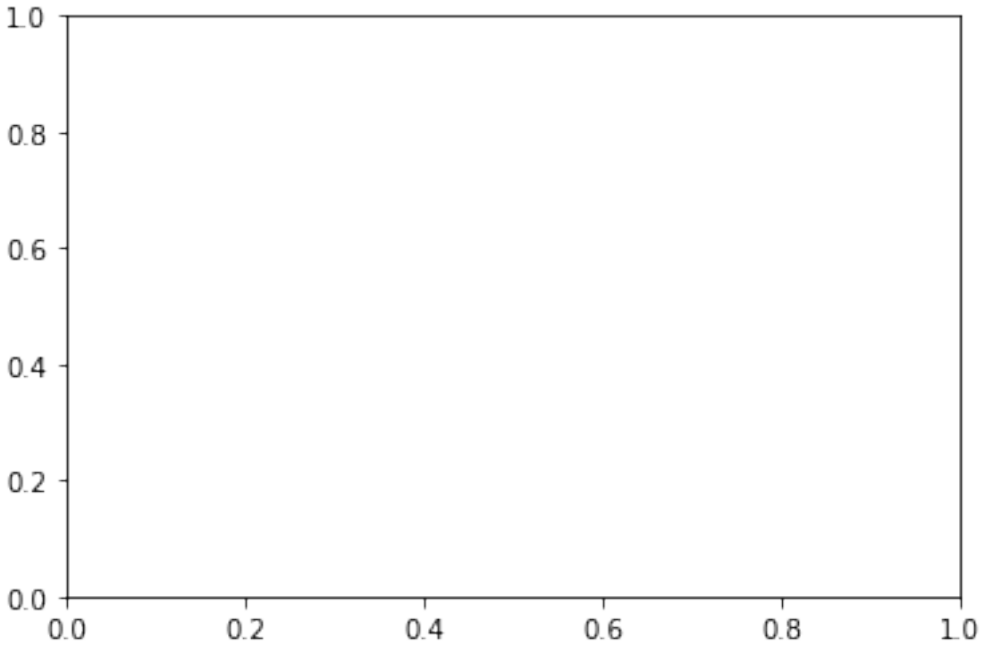
In [2]:
```
N = []
pos = []
age = []
count = 0
with open("generalSpace.txt", "r") as f:
    for line in f:
        if line.startswith("#N: "):
            N.append(int(line.split(": ")[1]))
        elif line.startswith("#Position: "):
            cols = line.split()[1:]
            pos.append([float(i) for i in cols])
        elif line.startswith("#Age: "):
            cols = line.split()[1:]
            age.append([int(i) for i in cols])
```

In [3]:
```
plt.plot(N)
plt.title("N vs Time")
plt.xlabel("Time")
plt.ylabel("N")
```

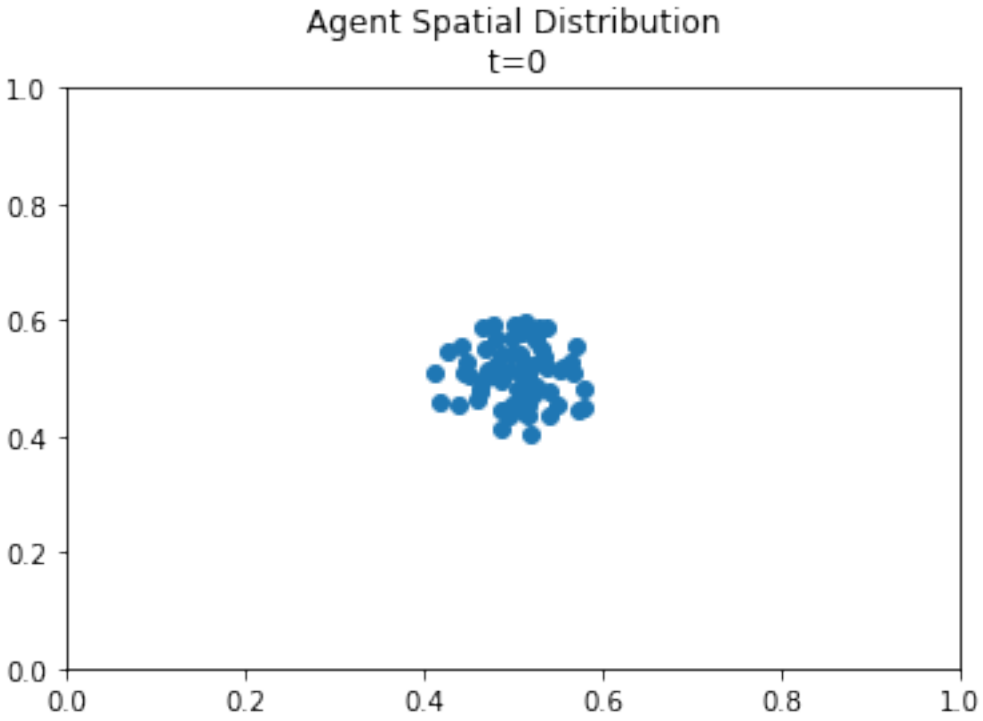
Out[3]:
```
Text(0, 0.5, 'N')
```



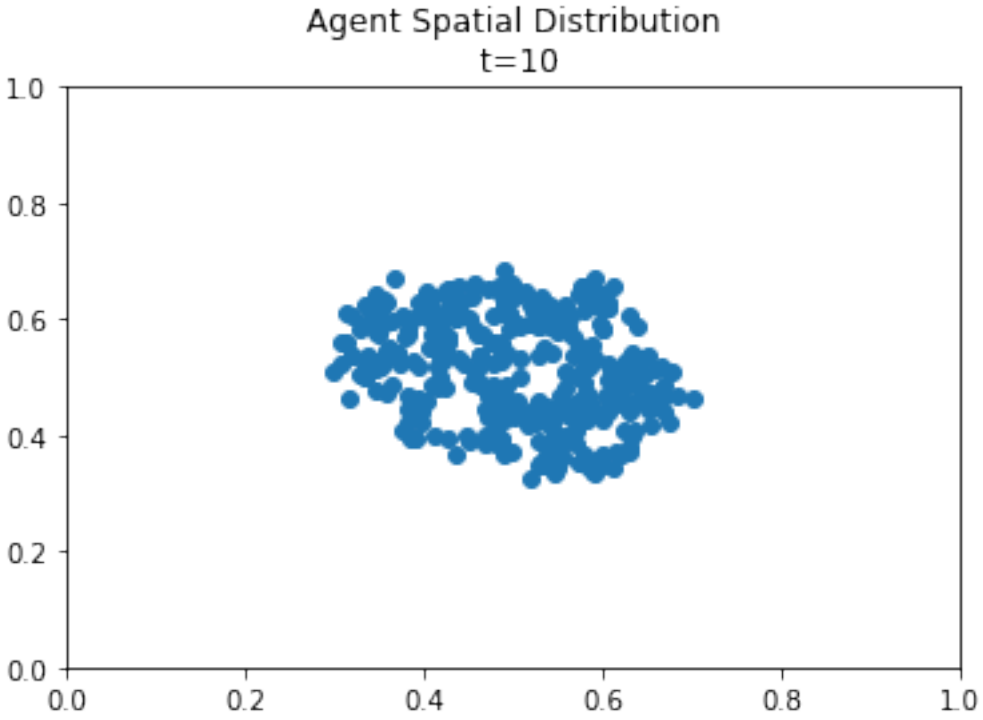

```
In [4]: fig, ax = plt.subplots()

        ax.set_xlim(( 0, 1))
        ax.set_ylim((0, 1))

        scat = ax.scatter([], [])

        def init():
            scat.set_offsets(np.c_[[], []])
            return (scat)

        def animate(i):
            x = pos[i][::2]
            y = pos[i][1::2]
            scat.set_offsets(np.c_[x, y])
            return (scat)

        def plotSpace(i):
            x = pos[i][::2]
            y = pos[i][1::2]
            plt.scatter(x, y)
            plt.ylim(0, 1)
            plt.xlim(0, 1)
            plt.title("Agent Spatial Distribution\n t=" + str(i))
```



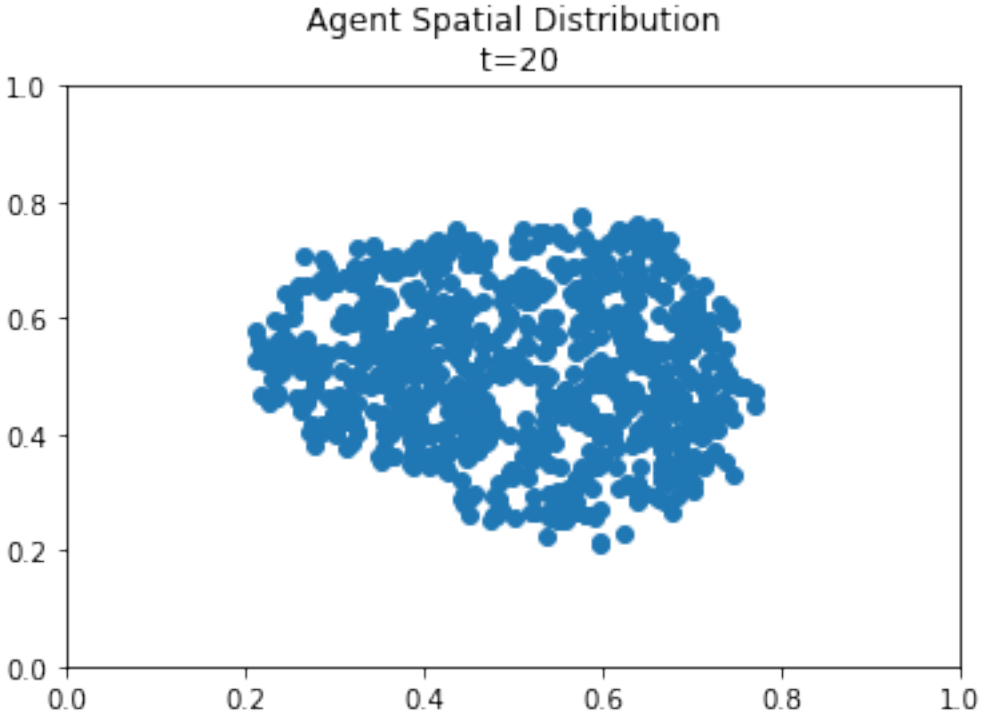
In [5]: plotSpace(0)



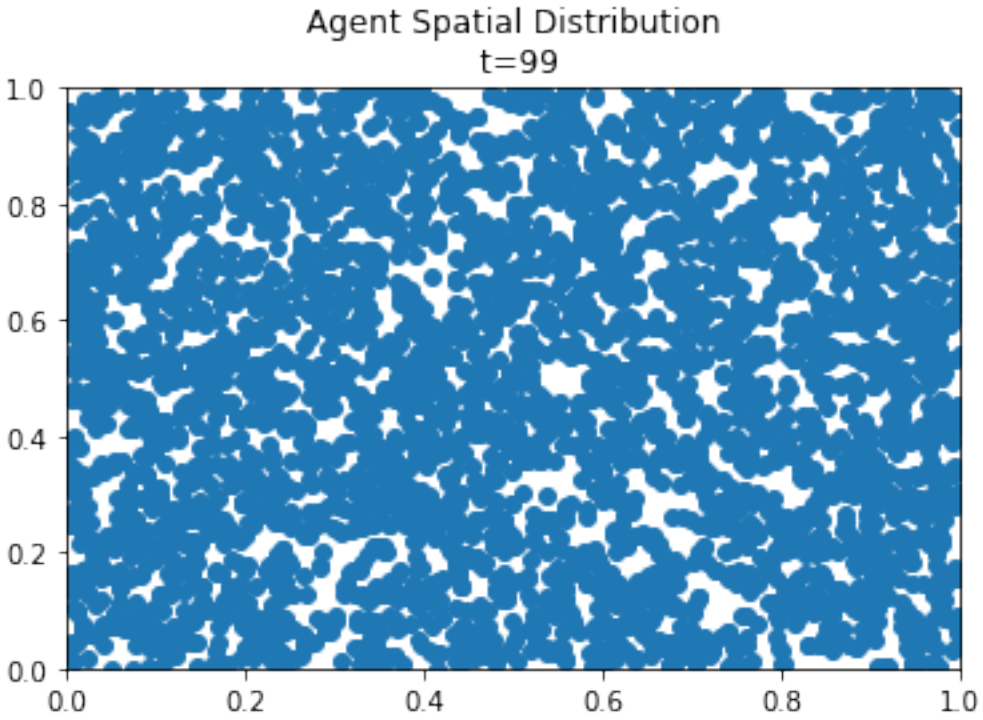
In [6]: plotSpace(10)



In [7]: plotSpace(20)



```
In [8]: plotSpace(99)
```

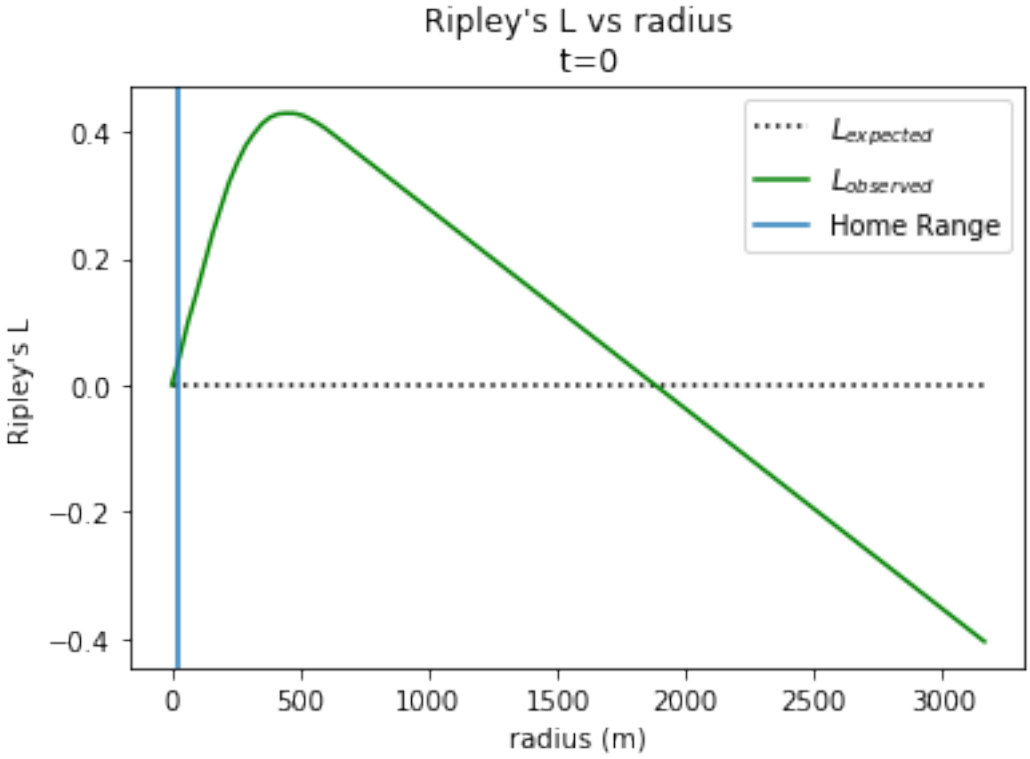


1 L Function

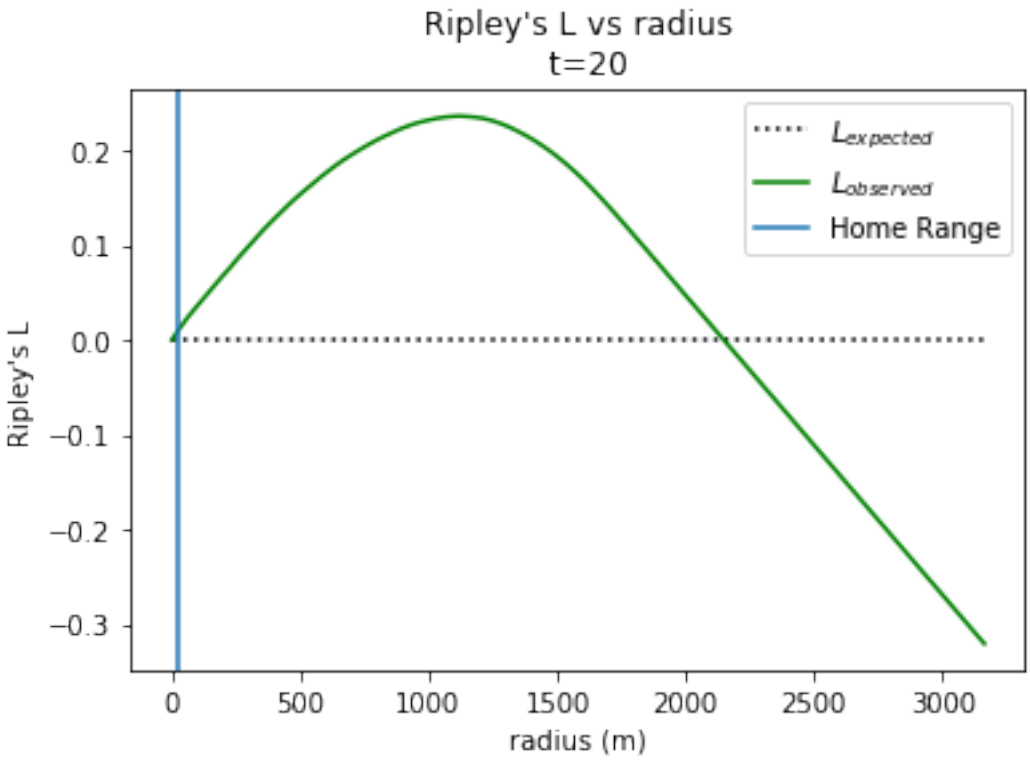
```
In [37]: def plotL(j):
             Kest = RipleysKEstimator(area=1, x_max=1, y_max=1, x_min=0, y_min=0)
             r = np.linspace(0, 1, 100)
             x = pos[j][::2]
             y = pos[j][1::2]
             z = np.array([[x[0],y[0]]])

             d = ((10**0.5)*1000)
             x2 = [i*d for i in r]

             for i in range(1, len(x)):
                z = np.append(z, [[x[i], y[i]]], axis=0)
             plt.plot(x2, -r+(Kest.poisson(r)/np.pi)**0.5, color='black', ls=':', label=r'$L_{ex
             plt.plot(x2, -r+(Kest(data=z, radii=r, mode='translation')/np.pi)**0.5, color='gree
                      label=r'$L_{observed}$')
             plt.axvline(x=25, label=r'Home Range')
```

```
    plt.title("Ripley's L vs radius\n  t="+str(j))
    plt.xlabel("radius (m)")
    plt.ylabel("Ripley's L")
    plt.legend()
```

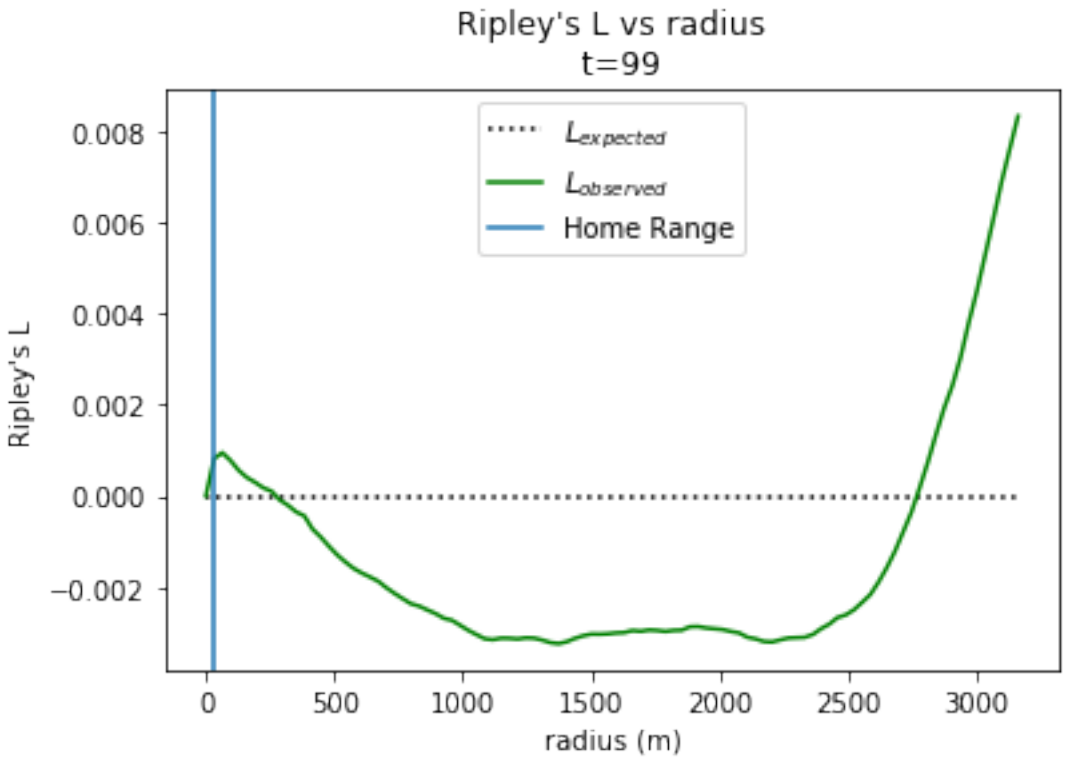
In [38]: `plotL(0)`



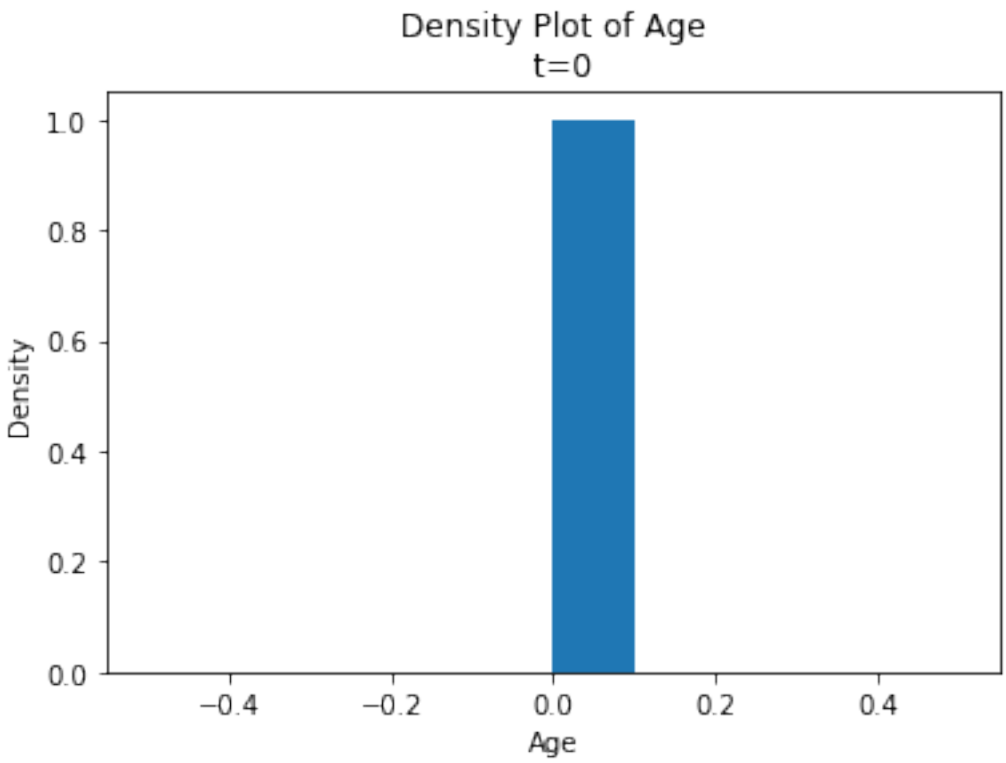
In [39]: `plotL(20)`



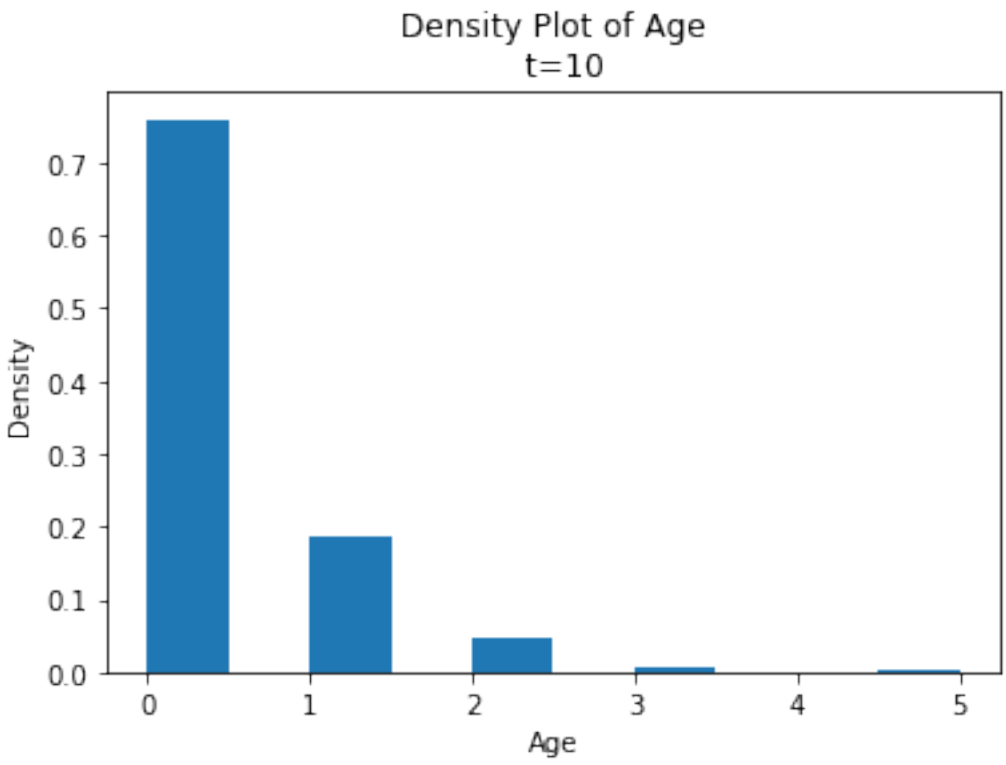
In [40]: plotL(99)



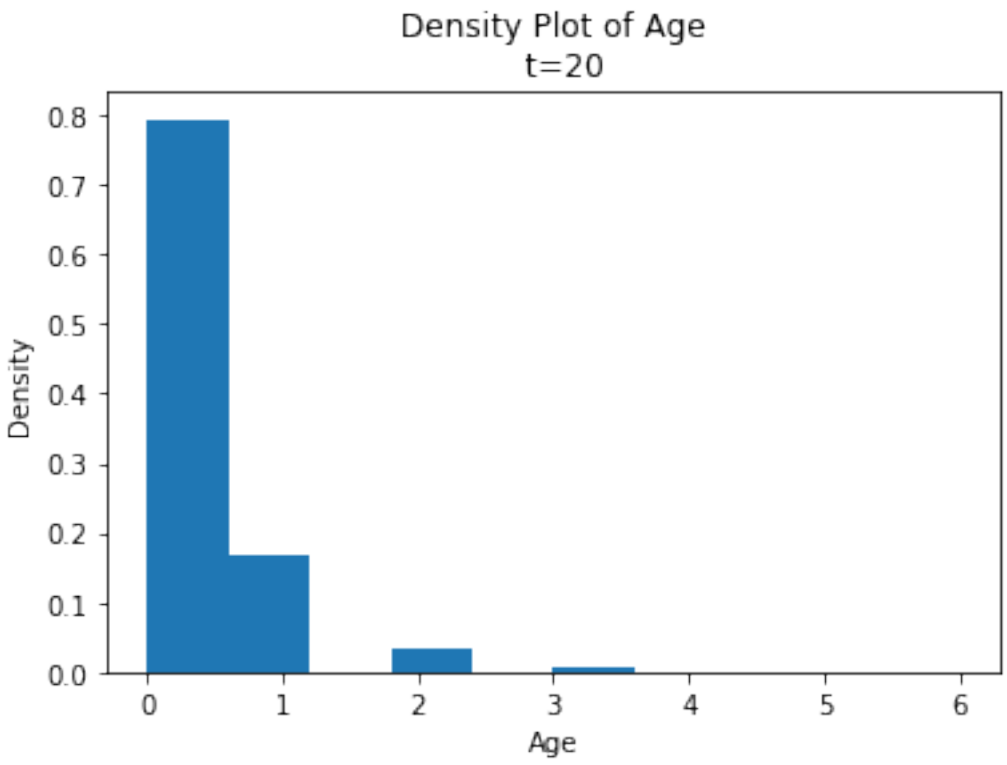

```
In [41]: def agePlot(i):
             weights = np.ones_like(age[i])/float(len(age[i]))
             plt.hist(age[i], weights=weights)
             plt.title("Density Plot of Age\n  t="+str(i))
             plt.xlabel("Age")
             plt.ylabel("Density")

In [42]: agePlot(0)
```



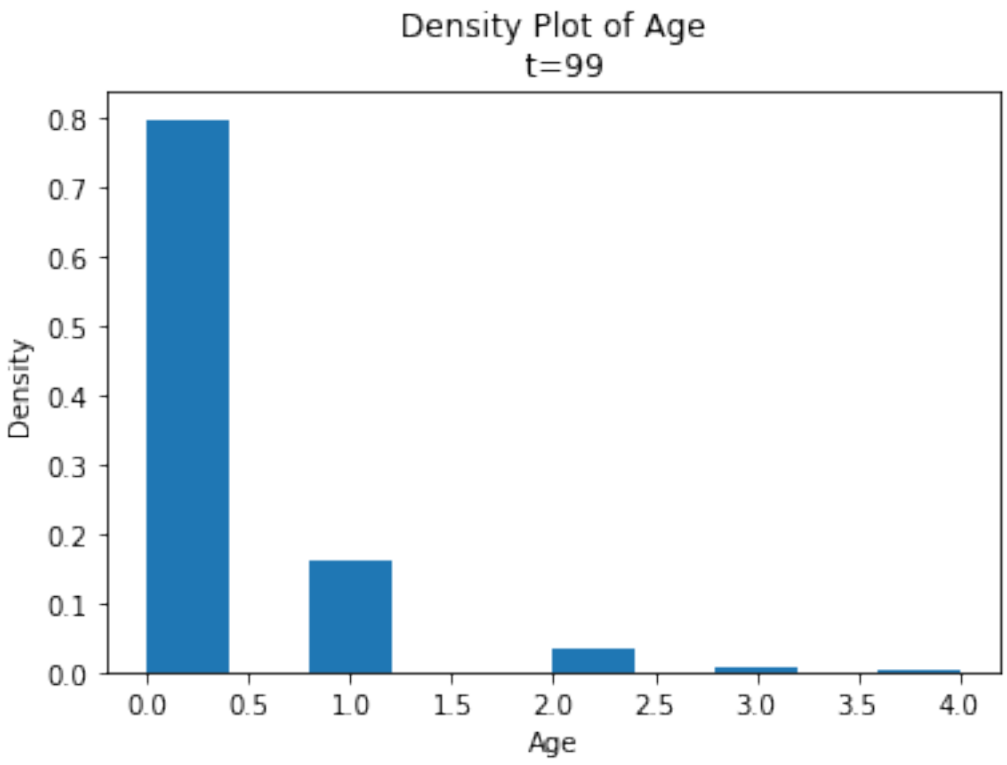
In [43]: agePlot(10)




```
In [44]: agePlot(20)
```



In [45]: agePlot(99)


Density Plot of Age
t=99
Density
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Age