

# Matplotlib Library

In [2]:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

In [3]:

```
x = np.linspace(0,10,20)
```

In [4]:

```
x
```

Out[4]:

```
array([ 0.          ,  0.52631579,  1.05263158,  1.57894737,  2.10526316,
        2.63157895,  3.15789474,  3.68421053,  4.21052632,  4.73684211,
        5.26315789,  5.78947368,  6.31578947,  6.84210526,  7.36842105,
        7.89473684,  8.42105263,  8.94736842,  9.47368421, 10.          ])
```

In [5]:

```
y = x * x
```

In [6]:

```
y
```

Out[6]:

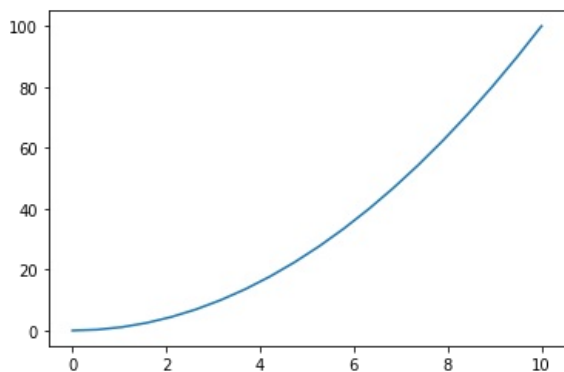
```
array([ 0.          ,  0.27700831,  1.10803324,  2.49307479,
        4.43213296,  6.92520776,  9.97229917, 13.5734072 ,
       17.72853186, 22.43767313, 27.70083102, 33.51800554,
       39.88919668, 46.81440443, 54.29362881, 62.32686981,
       70.91412742, 80.05540166, 89.75069252, 100.          ])
```

In [7]:

```
plt.plot(x,y)
```

Out[7]:

```
[<matplotlib.lines.Line2D at 0x1bd281a89c8>]
```

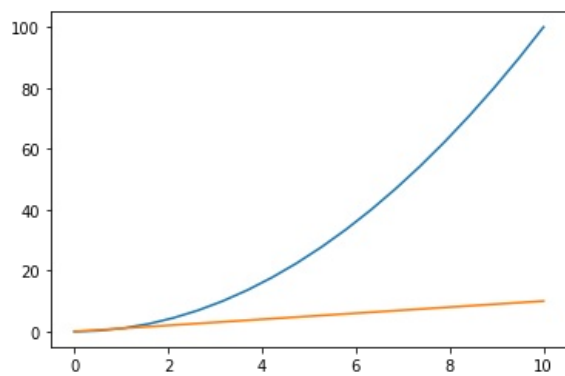


In [8]:

```
plt.plot(x,y,x,x)
```

Out[8]:

```
[<matplotlib.lines.Line2D at 0x1bd28256f88>,  
<matplotlib.lines.Line2D at 0x1bd28264b08>]
```

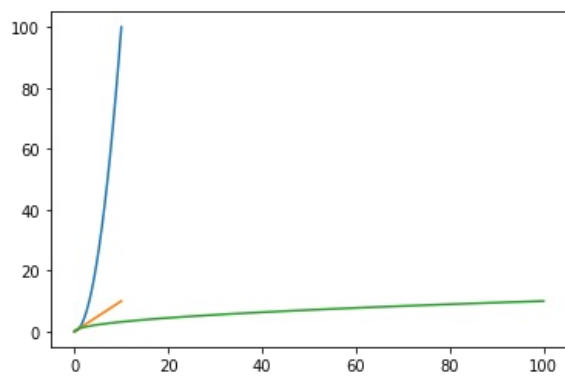


In [9]:

```
plt.plot(x,y,x,x,y,x)
```

Out[9]:

```
[<matplotlib.lines.Line2D at 0x1bd282da7c8>,  
<matplotlib.lines.Line2D at 0x1bd282da988>,  
<matplotlib.lines.Line2D at 0x1bd282dab88>]
```

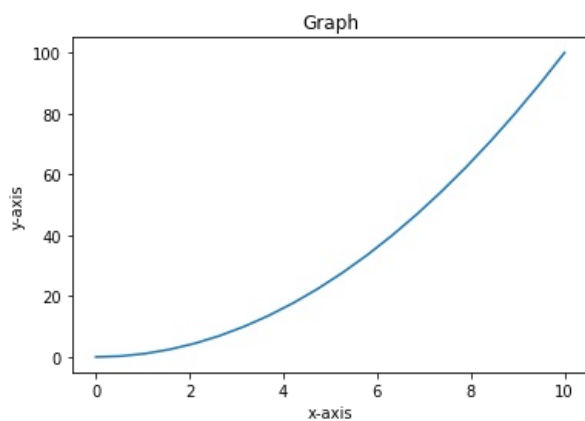


In [12]:

```
plt.plot(x,y)  
plt.xlabel('x-axis')  
plt.ylabel('y-axis')  
plt.title('Graph')
```

Out[12]:

```
Text(0.5, 1.0, 'Graph')
```



## Subplots

In [13]:

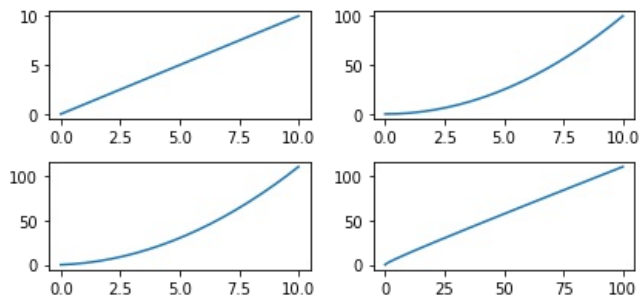
```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

In [14]:

```
x = np.linspace(0,10,20)
y = x * x
z = x + y
```

In [15]:

```
plt.subplot(3,2,1)
plt.plot(x,x)
plt.subplot(3,2,2)
plt.plot(x,y)
plt.subplot(3,2,3)
plt.plot(x,z)
plt.subplot(3,2,4)
plt.plot(y,z)
plt.tight_layout()
```



## Types of plots

In [16]:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

In [17]:

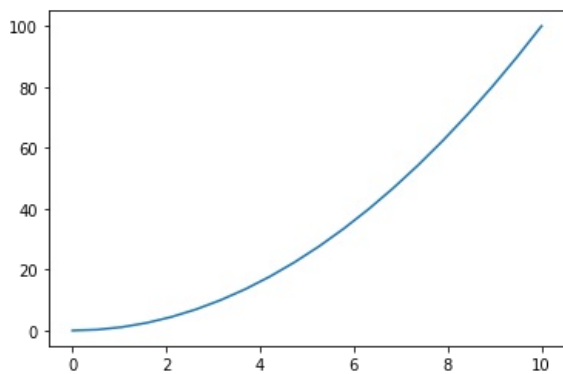
```
x = np.linspace(0,10,20)
y = x * x
```

In [18]:

```
plt.plot(x,y)
```

Out[18]:

[<matplotlib.lines.Line2D at 0x1bd285c6248>]

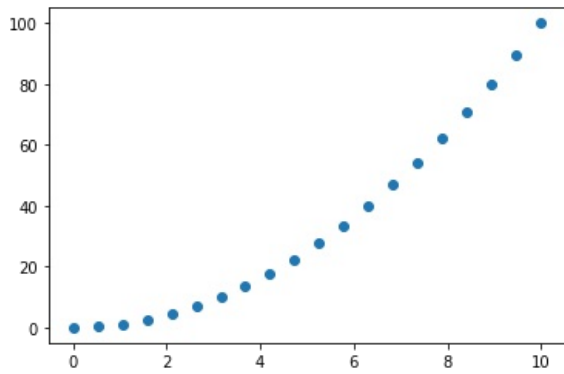


In [19]:

```
plt.scatter(x,y)
```

Out[19]:

<matplotlib.collections.PathCollection at 0x1bd2711eb48>

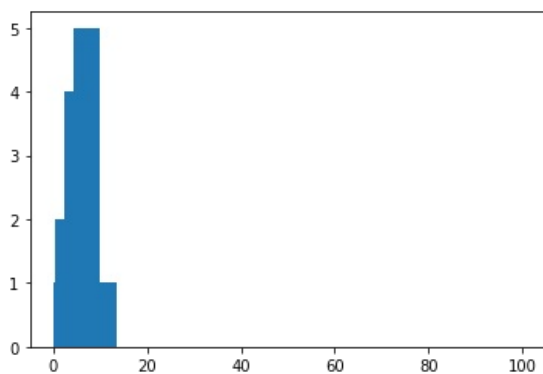


In [20]:

```
plt.hist(x,y)
```

Out[20]:

```
(array([1., 2., 2., 4., 5., 5., 1., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0.],
      0., 0.]),
array([ 0.,          0.27700831,   1.10803324,   2.49307479,
        4.43213296,   6.92520776,   9.97229917,  13.5734072 ,
        17.72853186,  22.43767313,  27.70083102,  33.51800554,
        39.88919668,  46.81440443,  54.29362881,  62.32686981,
        70.91412742,  80.05540166,  89.75069252, 100.          ]),
<a list of 19 Patch objects>)
```

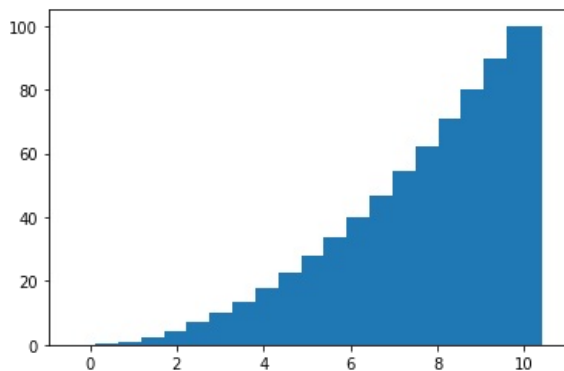


In [21]:

```
plt.bar(x,y)
```

Out[21]:

<BarContainer object of 20 artists>

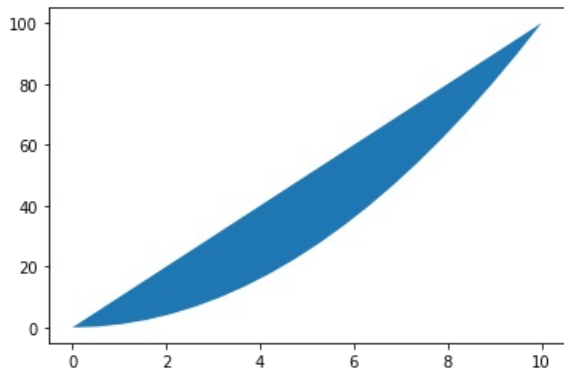


In [22]:

```
plt.fill(x,y)
```

Out[22]:

[<matplotlib.patches.Polygon at 0x1bd29798ac8>]

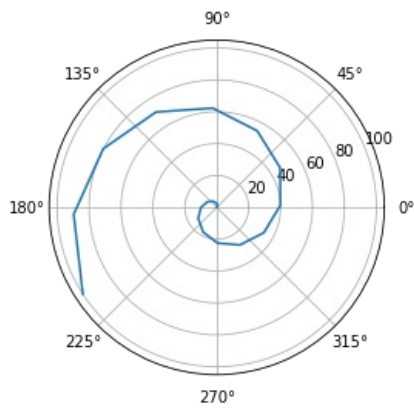


In [23]:

```
plt.polar(x,y)
```

Out[23]:

[<matplotlib.lines.Line2D at 0x1bd297c69c8>]



## Legends

In [24]:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

In [25]:

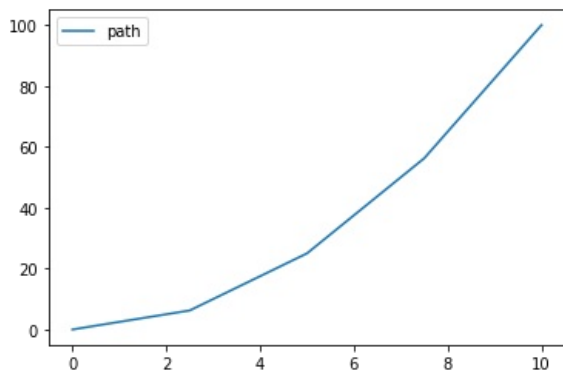
```
x = np.linspace(0,10,5)
y = x * x
```

In [26]:

```
plt.plot(x,y,label = 'path')  
plt.legend()
```

Out[26]:

<matplotlib.legend.Legend at 0x1bd2983ad48>

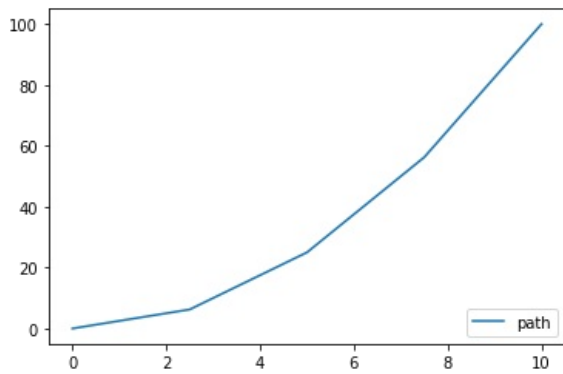


In [27]:

```
plt.plot(x,y,label = 'path')  
plt.legend(loc = 4)
```

Out[27]:

<matplotlib.legend.Legend at 0x1bd298b6dc8>



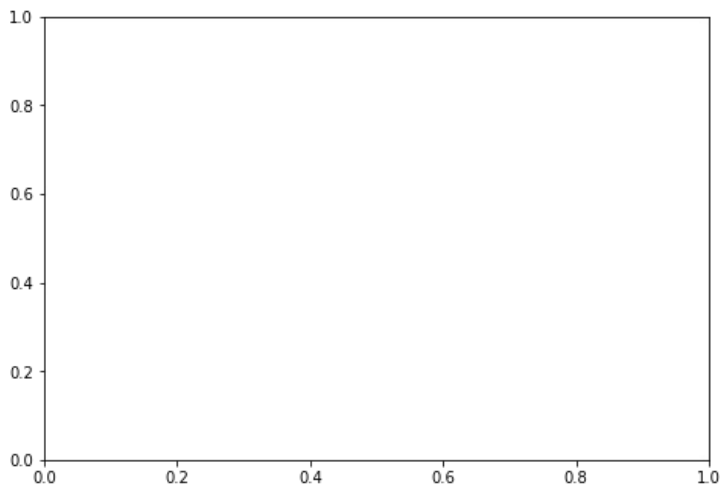
## Object Oriented Plots

In [28]:

```
import matplotlib.pyplot as plt  
import numpy as np  
import pandas as pd
```

In [29]:

```
fig = plt.figure()
axes = fig.add_axes([0.1,0.1,1,1])
```

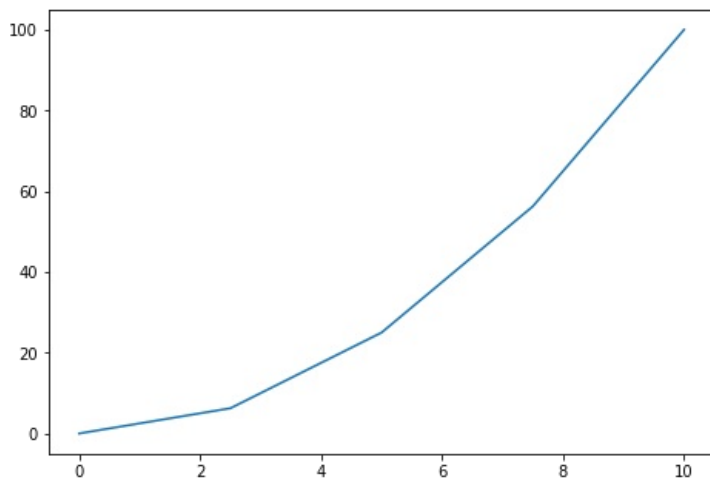


In [30]:

```
fig = plt.figure()
axes = fig.add_axes([0.1,0.1,1,1])
axes.plot(x,y)
```

Out[30]:

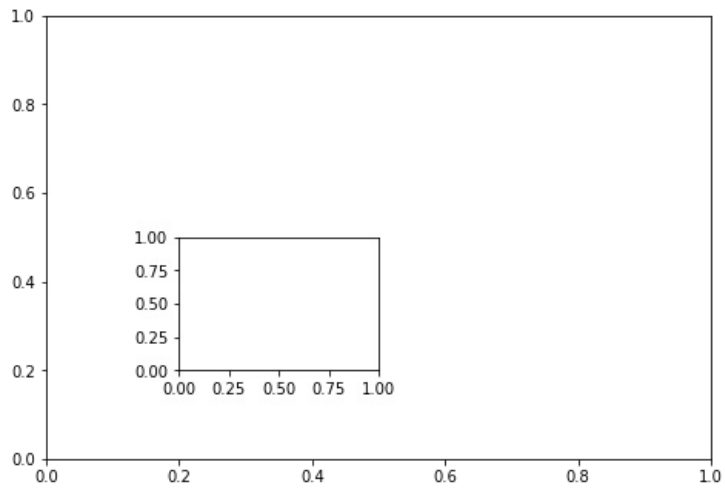
[<matplotlib.lines.Line2D at 0x1bd298b6188>]



## Multiple Plots

In [31]:

```
fig = plt.figure()
x1 = fig.add_axes([0.1,0.1,1,1])
x2 = fig.add_axes([0.3,0.3,0.3,0.3])
```

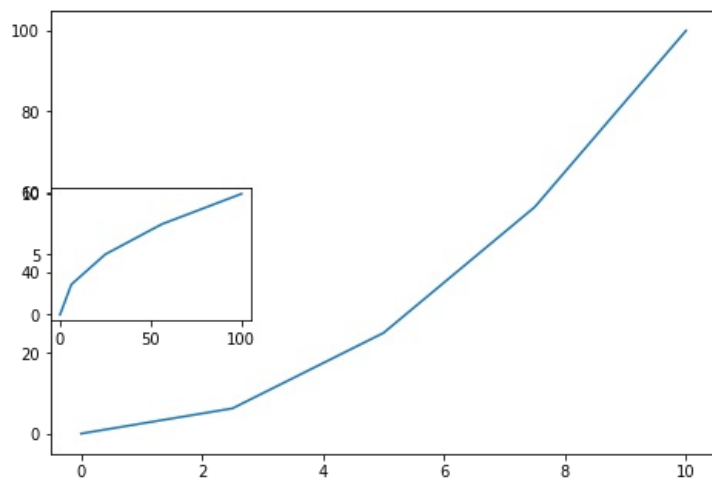


In [35]:

```
fig = plt.figure()
x1 = fig.add_axes([0.1,0.1,1,1])
x1.plot(x,y)
x2 = fig.add_axes([0.1,0.4,0.3,0.3])
x2.plot(y,x)
```

Out[35]:

[<matplotlib.lines.Line2D at 0x1bd29b68788>]



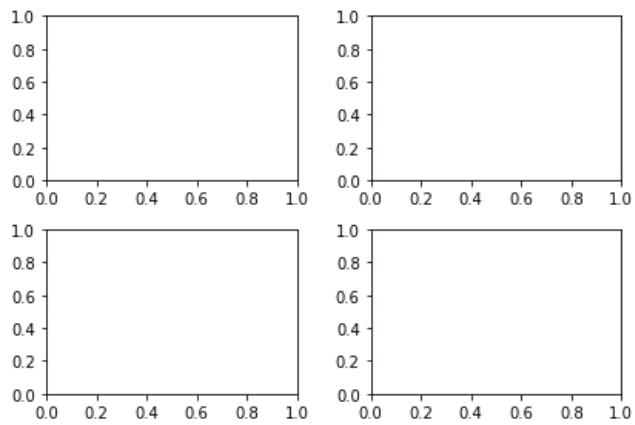
If you write x2 first and then x1, the bigger x1 will overlap the smaller x2.

## Subplots using Object Oriented



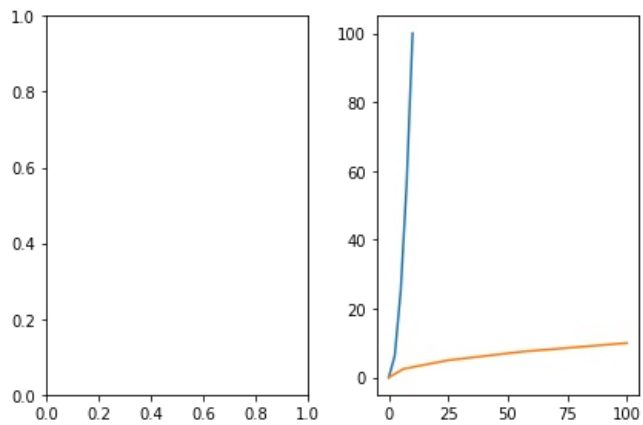
In [36]:

```
fig, axes = plt.subplots(2,2)
plt.tight_layout()
```



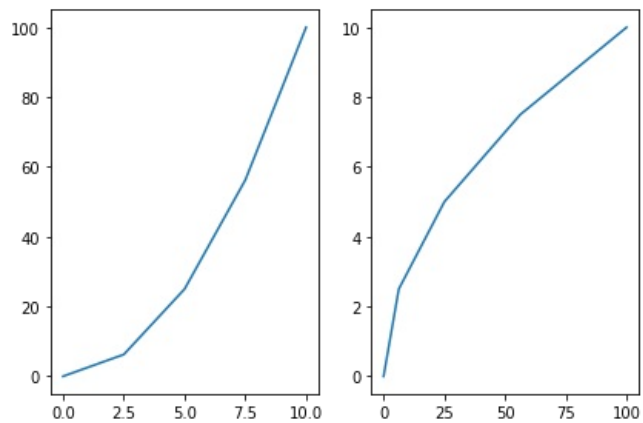
In [37]:

```
fig, axes = plt.subplots(1,2)
axes[0] = plt.plot(x,y)
axes[1] = plt.plot(y,x)
plt.tight_layout()
```



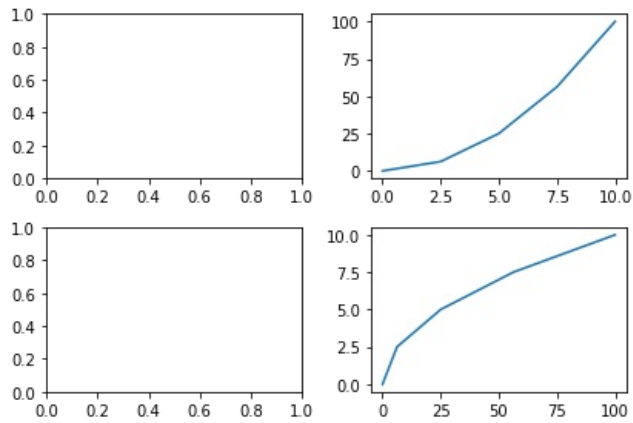
In [39]:

```
fig, axes = plt.subplots(1,2)
axes[0].plot(x,y)
axes[1].plot(y,x)
plt.tight_layout()
```



In [40]:

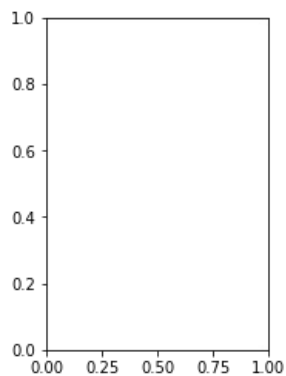
```
fig, axes = plt.subplots(2,2)
axes[(0,1)].plot(x,y)
axes[(1,1)].plot(y,x)
plt.tight_layout()
```



## Figure Size

In [41]:

```
fig = plt.figure(figsize = (2,3))
x1 = fig.add_axes([0,0,1,1])
```

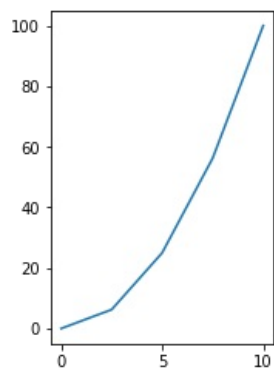


In [42]:

```
fig = plt.figure(figsize = (2,3))
x1 = fig.add_axes([0,0,1,1])
x1.plot(x,y)
```

Out[42]:

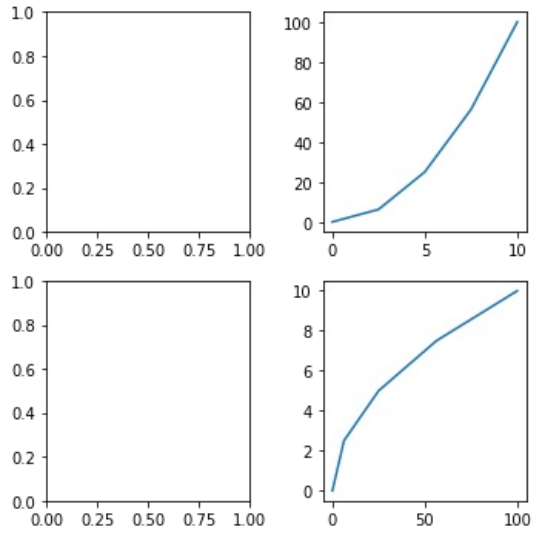
[<matplotlib.lines.Line2D at 0x1bd29cb0408>]



Note: Don't write each line of code on different cell otherwise you wont get output.

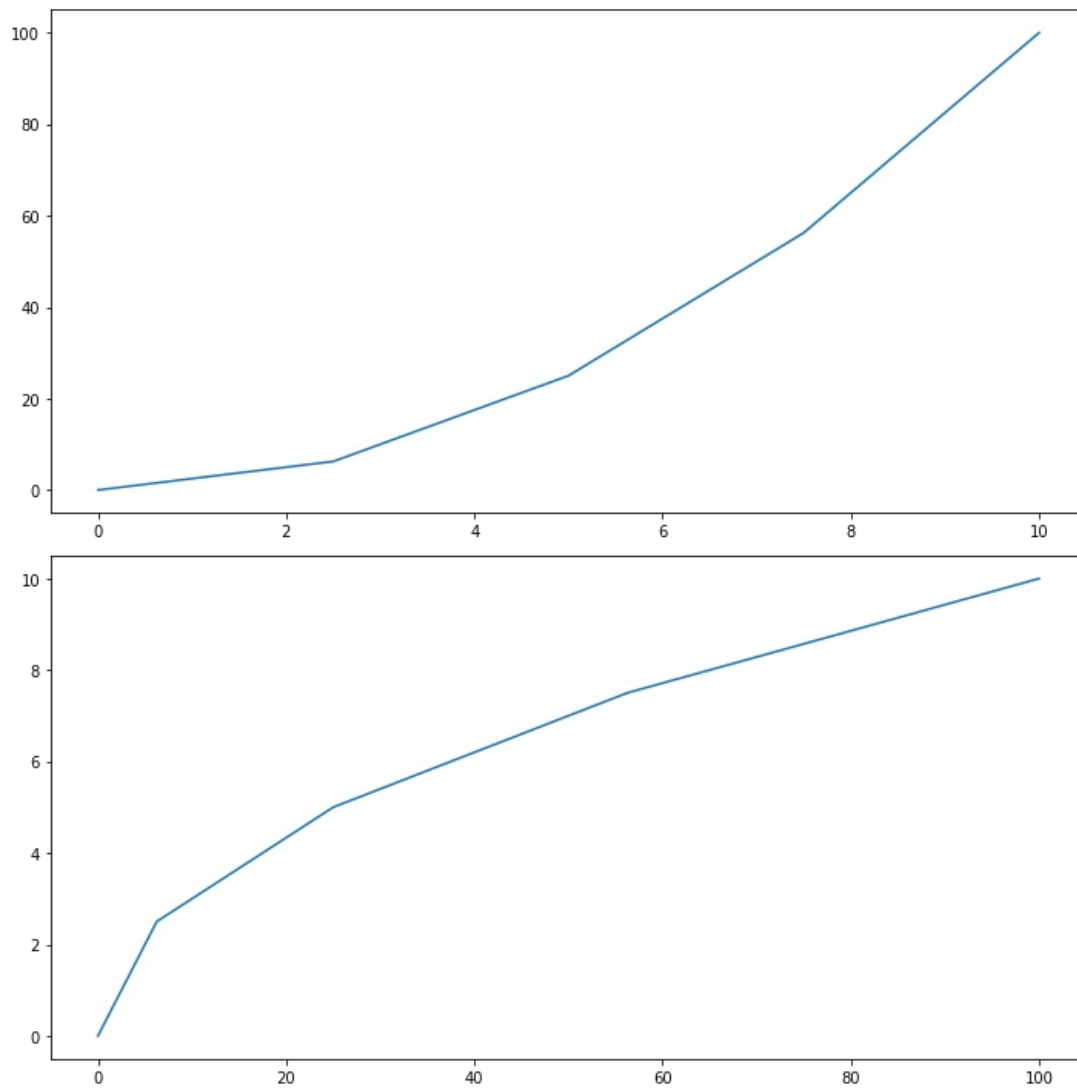
In [43]:

```
fig, axes = plt.subplots(2,2, figsize = (5,5))
axes[(0,1)].plot(x,y)
axes[(1,1)].plot(y,x)
plt.tight_layout()
```



In [45]:

```
fig, axes = plt.subplots(2,1, figsize = (10,10))
axes[0].plot(x,y)
axes[1].plot(y,x)
plt.tight_layout()
```



# Setting Labels with Object Oriented Techniques

In [3]:

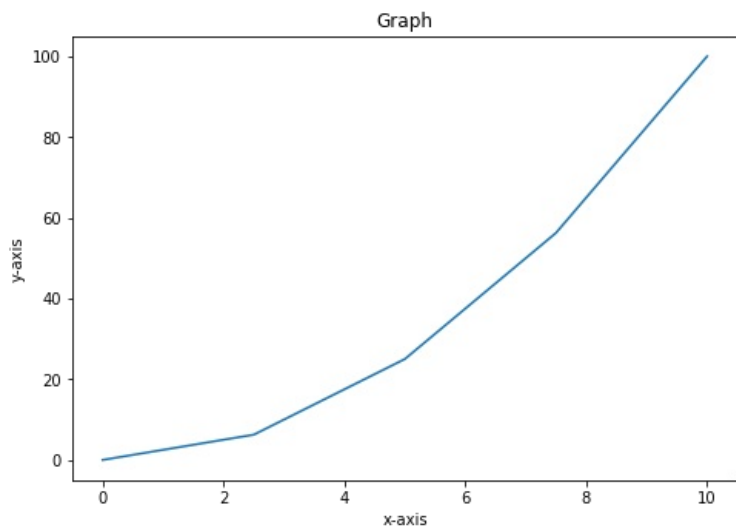
```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
x = np.linspace(0,10,5)
y = x * x
```

In [4]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.set_xlabel('x-axis')
axes.set_ylabel('y-axis')
axes.set_title('Graph')
axes.plot(x,y)
```

Out[4]:

[<matplotlib.lines.Line2D at 0x1df4ed2bb88>]

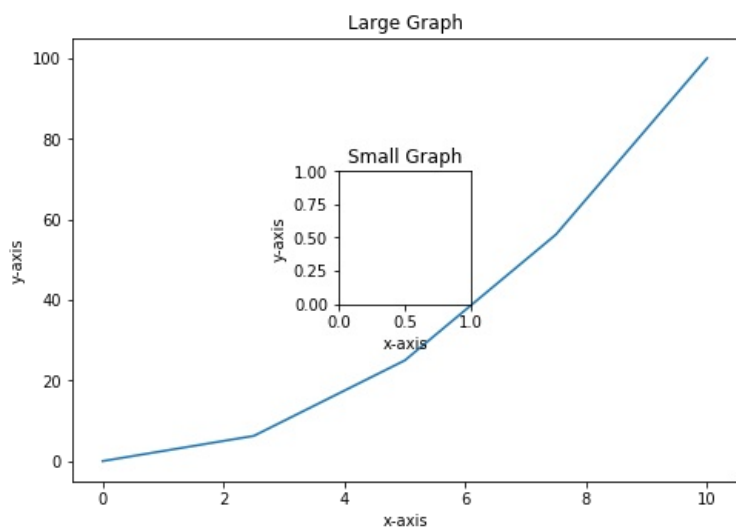


In [5]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes2 = fig.add_axes([0.4,0.4,0.2,0.3])
axes.set_xlabel('x-axis')
axes.set_ylabel('y-axis')
axes.set_title('Large Graph')
axes2.set_xlabel('x-axis')
axes2.set_ylabel('y-axis')
axes2.set_title('Small Graph')
axes.plot(x,y)
```

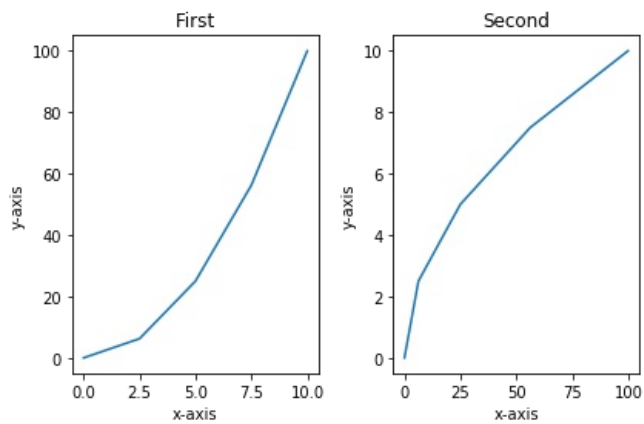
Out[5]:

[<matplotlib.lines.Line2D at 0x1df4eda1ec8>]



In [6]:

```
fig, axes = plt.subplots(1,2)
axes[0].plot(x,y)
axes[1].plot(y,x)
axes[0].set_xlabel('x-axis')
axes[0].set_ylabel('y-axis')
axes[0].set_title('First')
axes[1].set_xlabel('x-axis')
axes[1].set_ylabel('y-axis')
axes[1].set_title('Second')
plt.tight_layout()
```



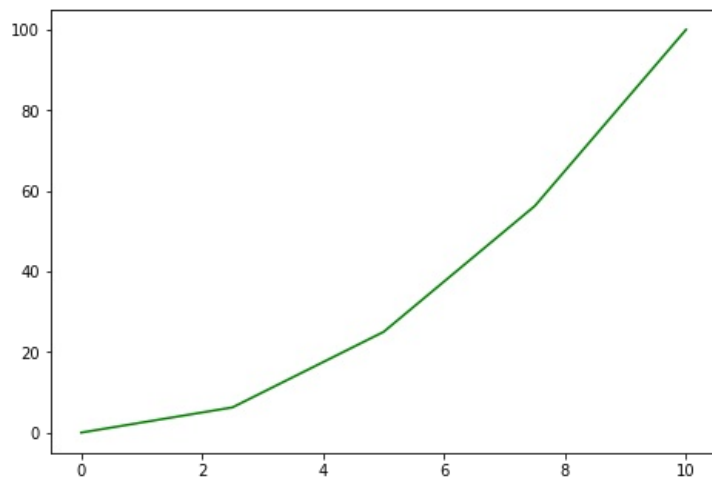
## Styling Plots

In [7]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, color='g')
```

Out[7]:

[<matplotlib.lines.Line2D at 0x1df4eef1448>]

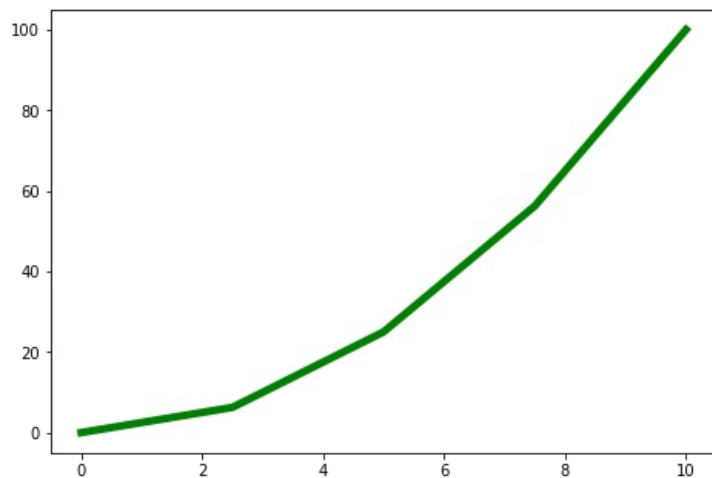


In [8]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, color='g', lw=5)
```

Out[8]:

[<matplotlib.lines.Line2D at 0x1df4ef50e88>]

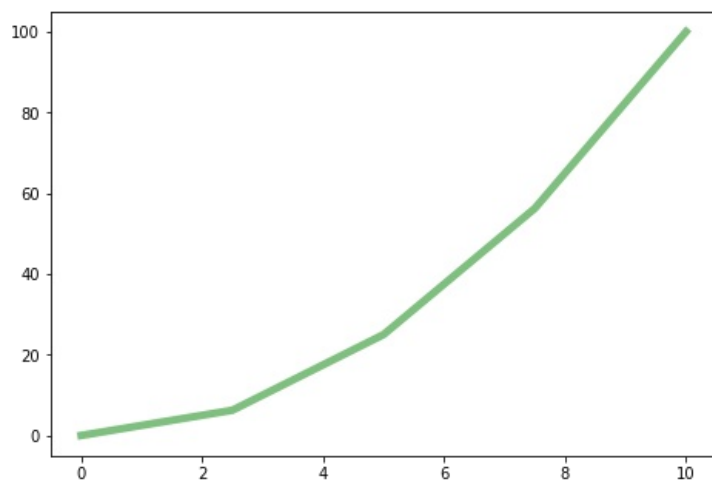


In [9]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, color='g', lw=5, alpha=0.5)
```

Out[9]:

[<matplotlib.lines.Line2D at 0x1df4eebaac8>]

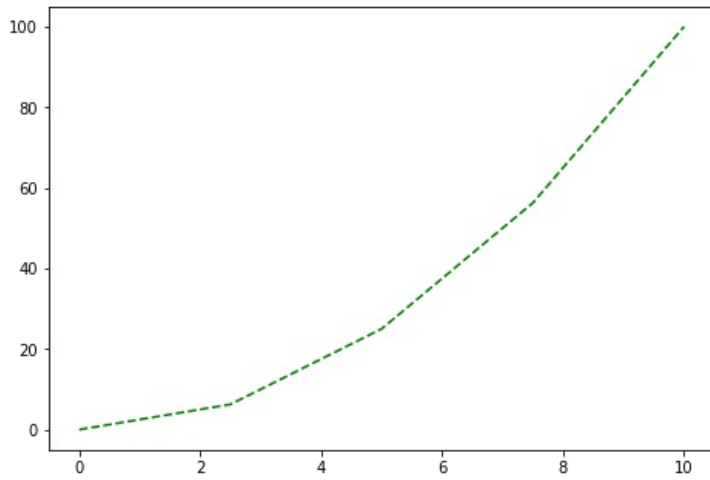


In [10]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, color='g', ls='dashed')
```

Out[10]:

[<matplotlib.lines.Line2D at 0x1df4ef6c3c8>]

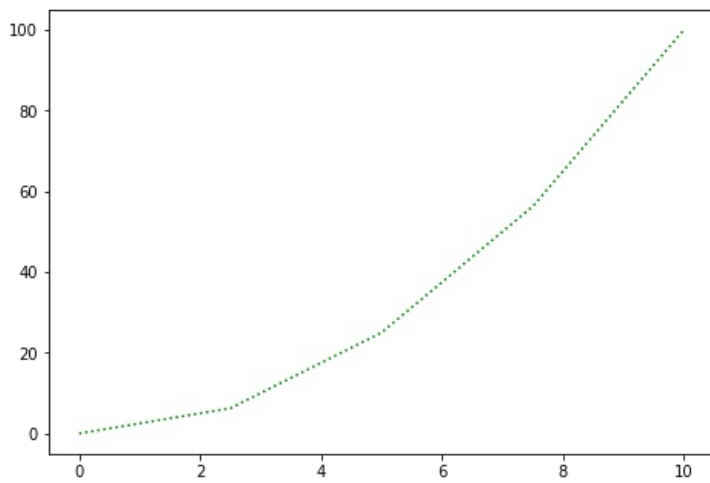


In [11]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, color='g', ls=':')
```

Out[11]:

[<matplotlib.lines.Line2D at 0x1df4efa9ec8>]



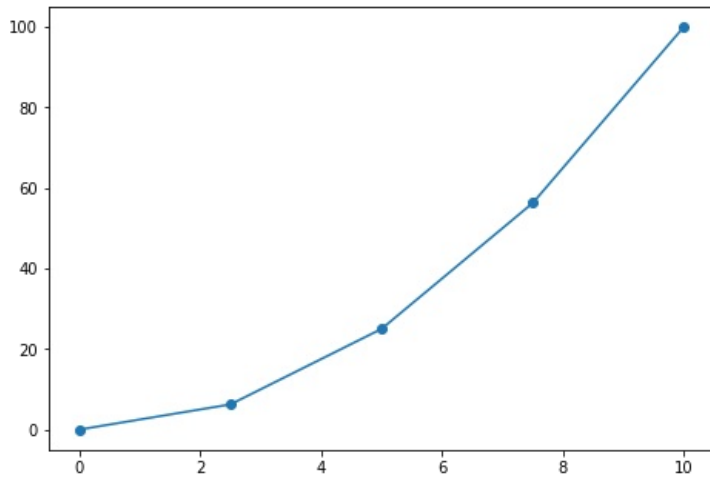
## Marker

In [12]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, marker='o')
```

Out[12]:

[<matplotlib.lines.Line2D at 0x1df4eb2e108>]

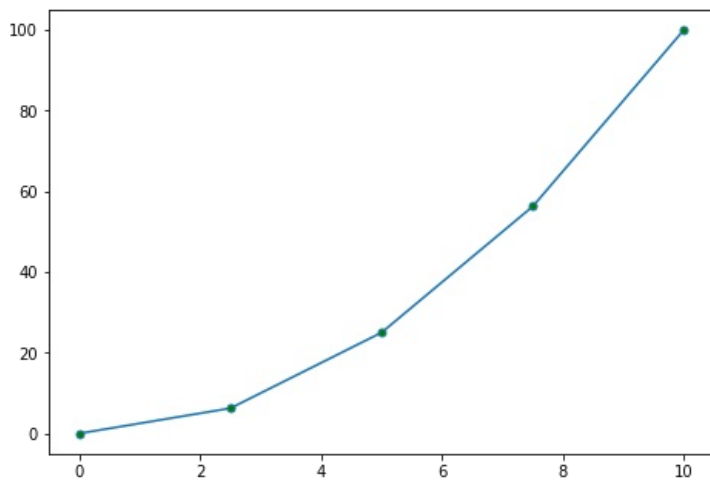


In [13]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, marker='o', markersize=5, markerfacecolor='g')
```

Out[13]:

[<matplotlib.lines.Line2D at 0x1df4ec28848>]



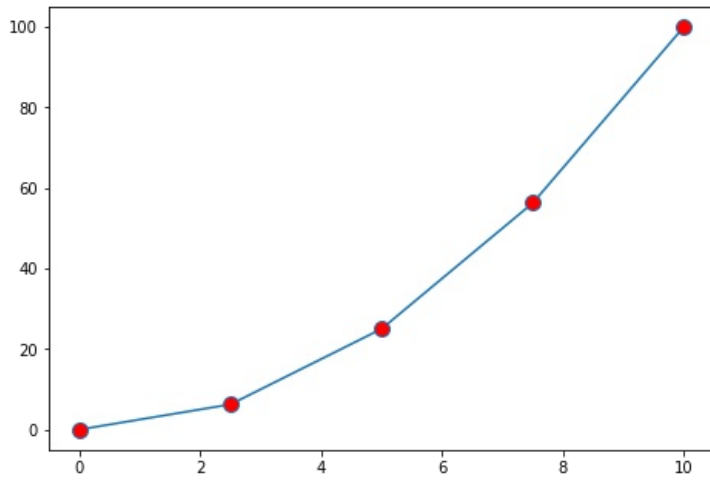


In [14]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, marker='o', markersize=10, markerfacecolor='r')
```

Out[14]:

[<matplotlib.lines.Line2D at 0x1df4ec94a08>]

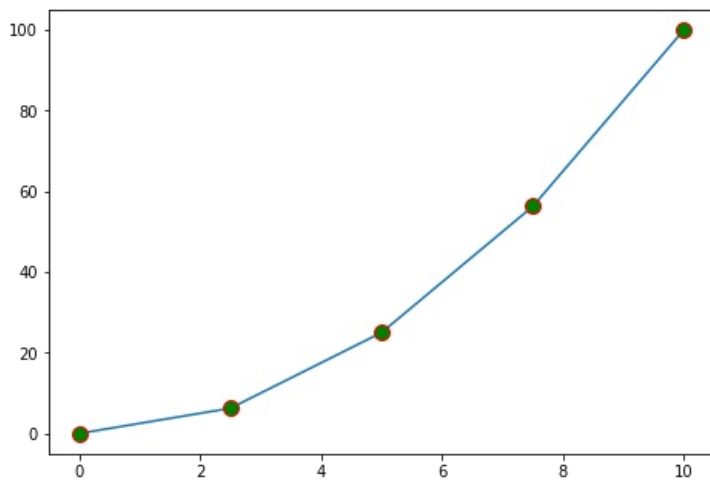


In [15]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, marker='o', markersize=10, markerfacecolor='g', markeredgcolor='r')
```

Out[15]:

[<matplotlib.lines.Line2D at 0x1df4ffa7888>]

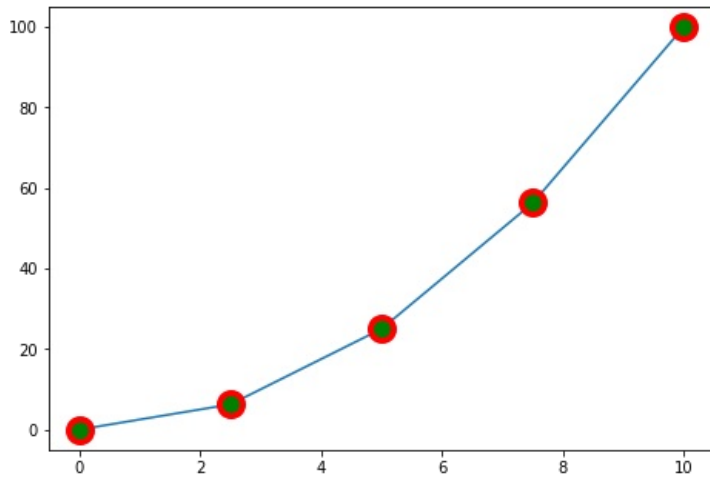


In [17]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y, marker='o', markersize=15, markerfacecolor='g', markeredgewidth=4)
```

Out[17]:

[<matplotlib.lines.Line2D at 0x1df501ddf08>]



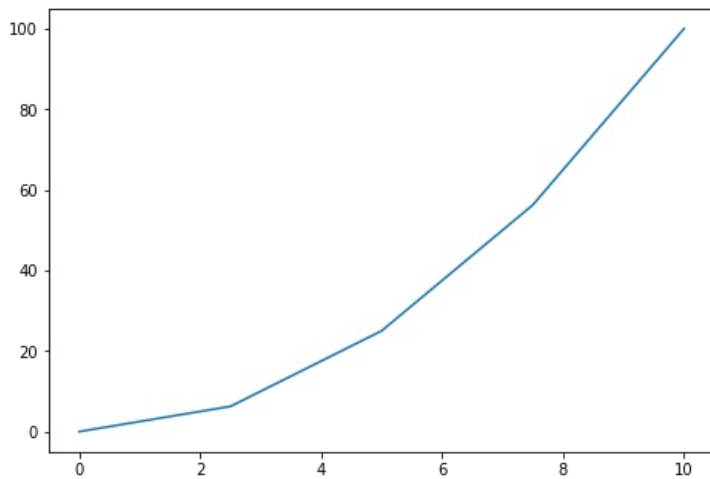
## Setting Limits

In [18]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y)
```

Out[18]:

[<matplotlib.lines.Line2D at 0x1df5021d7c8>]

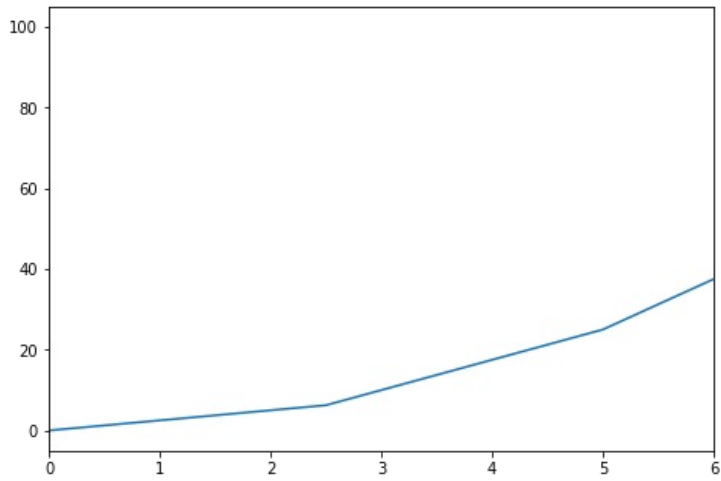


In [19]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y)
axes.set_xlim([0,6])
```

Out[19]:

(0, 6)



In [20]:

```
fig = plt.figure()
axes = fig.add_axes([0,0,1,1])
axes.plot(x,y)
axes.set_ylim([0,60])
```

Out[20]:

(0, 60)

