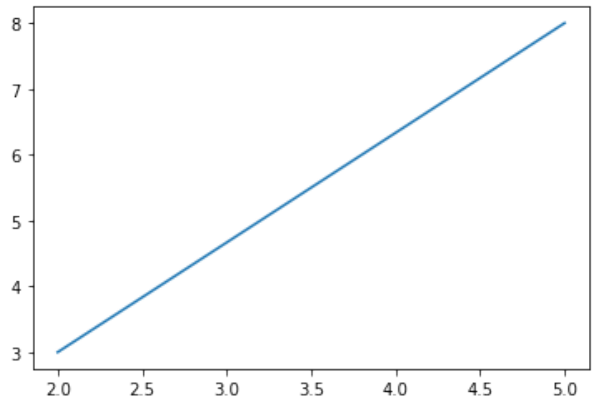
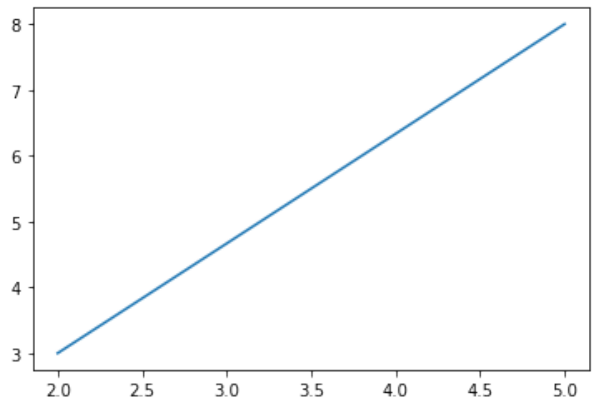
Chap.-10 Matplotlib

In [3]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5])
y = np.array([3,8])
plt.plot(x,y)
# plt.show()
```

Out[3]: [<matplotlib.lines.Line2D at 0x2568c952460>]

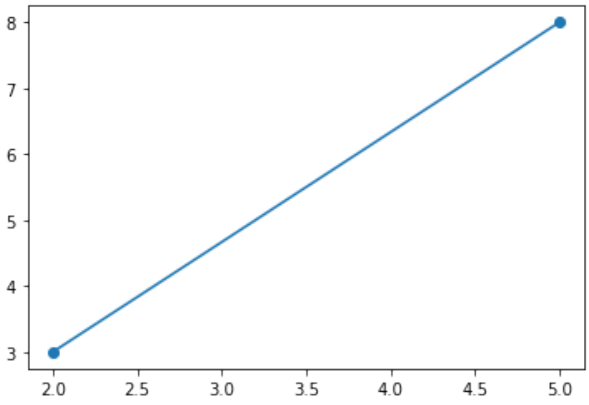


In [7]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5])
y = [3,8]
plt.plot(x,y)
plt.show()
```

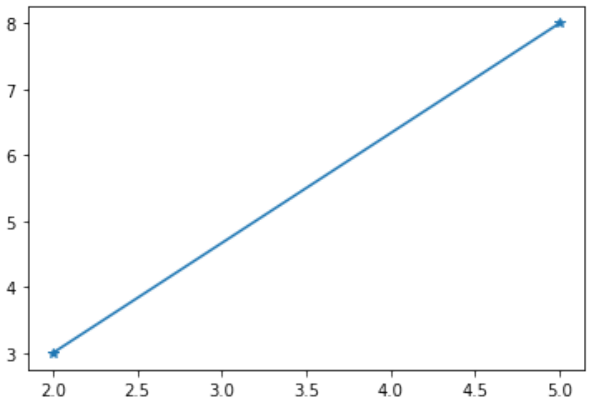


- **marker**
- **markersize (ms)**
- **markeredgecolor (mec)**
- **markerfacecolor (mfc)**
- **linestyle (ls)**
- **linewidth (lw)**
- **color (c)**

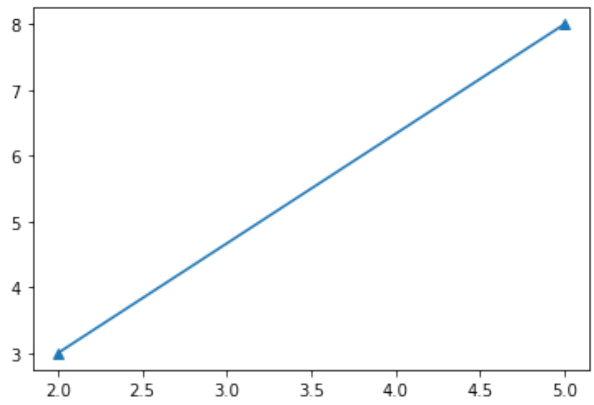
In [9]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5])
y = [3,8]
plt.plot(x,y, marker='o')
plt.show()
```



In [11]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5])
y = [3,8]
plt.plot(x,y, marker='*')
plt.show()
```



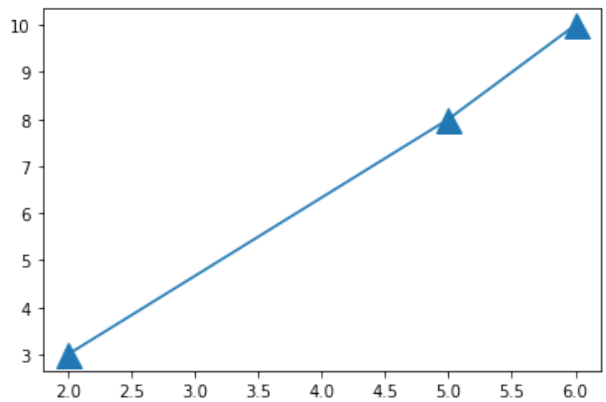
In [19]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5])
y = [3,8]
plt.plot(x,y, marker='^')
plt.show()
```



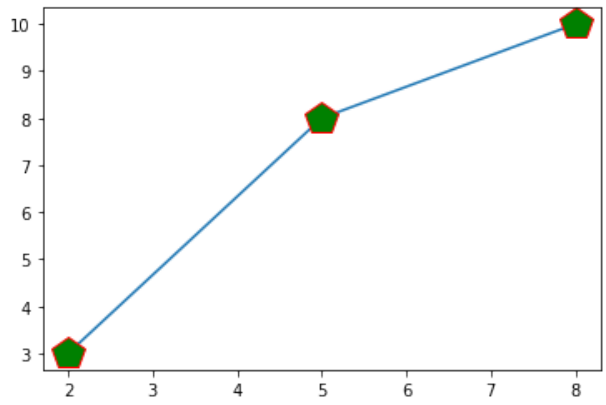
In [14]:
```
import matplotlib
help(matplotlib.markers)
```

```
    ,                           |m01|  pixel
    ``"o"``                     |m02|  circle
    ``"v"``                     |m03|  triangle_down
    ``"^"``                     |m04|  triangle_up
    ``"<"``                     |m05|  triangle_left
    ``">"``                     |m06|  triangle_right
    ``"1"``                     |m07|  tri_down
    ``"2"``                     |m08|  tri_up
    ``"3"``                     |m09|  tri_left
    ``"4"``                     |m10|  tri_right
    ``"8"``                     |m11|  octagon
    ``"s"``                     |m12|  square
    ``"p"``                     |m13|  pentagon
    ``"P"``                     |m23|  plus (filled)
    ``"*"``                     |m14|  star
    ``"h"``                     |m15|  hexagon1
    ``"H"``                     |m16|  hexagon2
    ``"+"``                     |m17|  plus
    ``"x"``                     |m18|  x
    ``"X"``                     |m24|  x (filled)
```

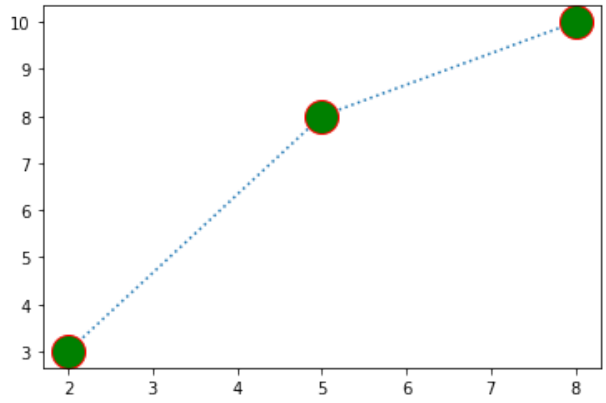
In [29]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,6])
y = [3,8,10]
plt.plot(x,y,marker='^',ms='15')
plt.show()
```



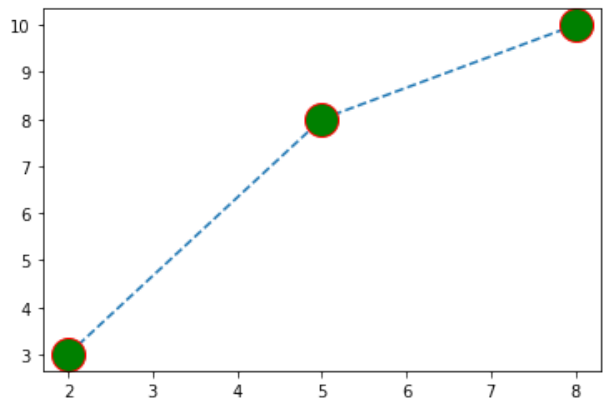
In [51]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='p',ms='20', mec='r', mfc='g')
plt.show()
```



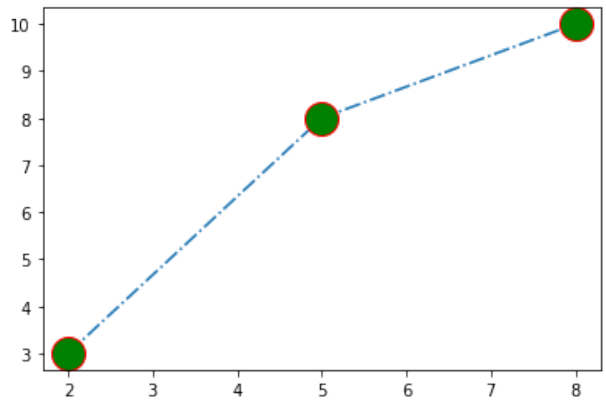
In [41]:
```
import matplotlib.pyplot as plt
import numpy as np
# dotted
x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='o',ms='20', mec='r', mfc='g', ls=':')
plt.show()
```



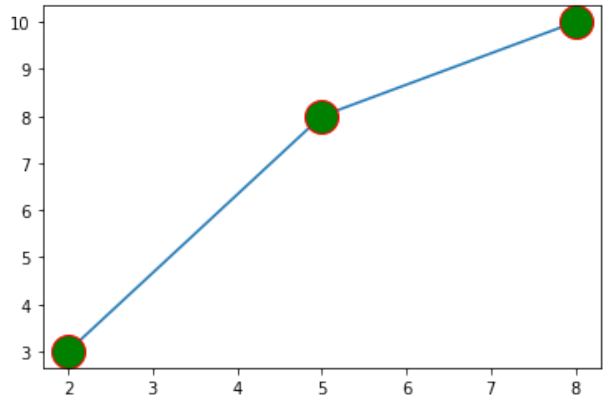
In [42]:
```
import matplotlib.pyplot as plt
import numpy as np
# dashed
x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='o',ms='20', mec='r', mfc='g', ls='--')
plt.show()
```



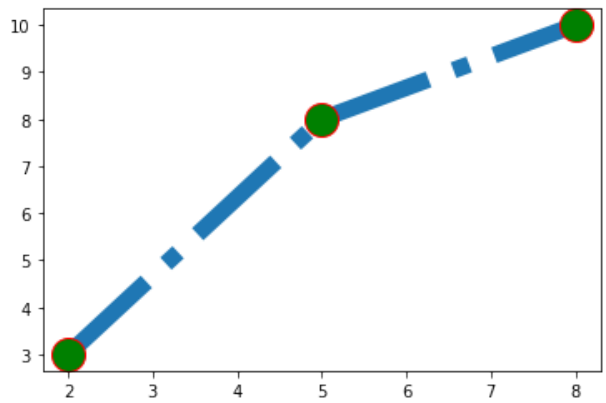
In [43]:
```
import matplotlib.pyplot as plt
import numpy as np
# dashdot
x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='o',ms='20', mec='r', mfc='g', ls='-.')
plt.show()
```



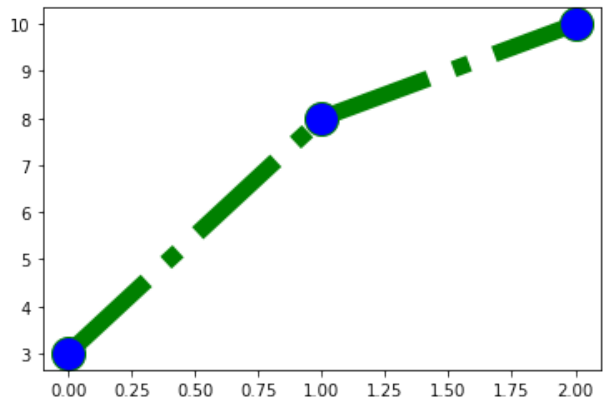
In [44]:
```
import matplotlib.pyplot as plt
import numpy as np
# solid
x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='o',ms='20', mec='r', mfc='g', ls='-')
plt.show()
```



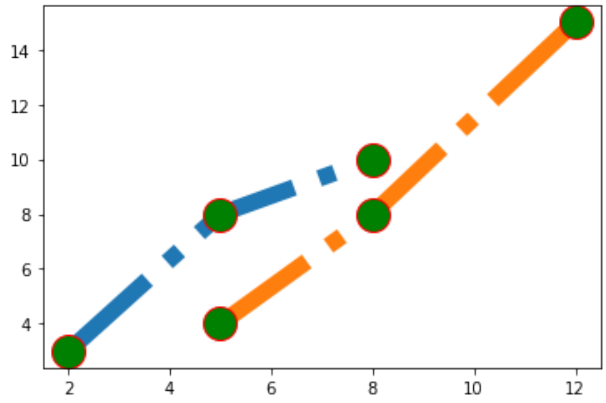
In [45]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
plt.plot(x,y,marker='o',ms='20', mec='r', mfc='g', ls='-.',lw='10')
plt.show()
```



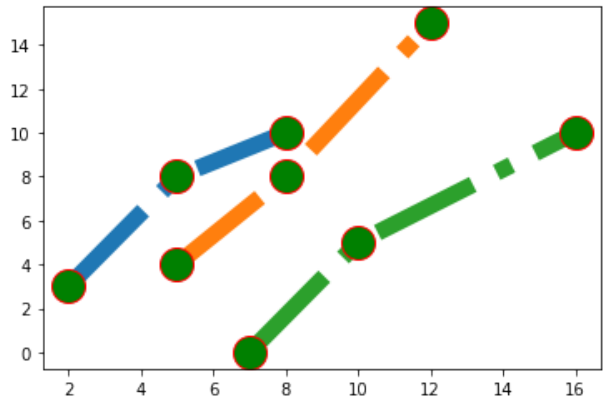
In [76]:
```
import matplotlib.pyplot as plt
import numpy as np

# x = np.array([2,5,8])
y = [3,8,10]
plt.plot(y,marker='o',ms='20',mfc='b',ls='-.',lw='10',c='g')
plt.show()
```



In [78]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

x1 = (5,8,12)
y1 = [4,8,15]
plt.plot(x,y,x1,y1,marker='o',ms='20', mec='r', mfc='g', ls='-.', lw='10')
plt.show()
```

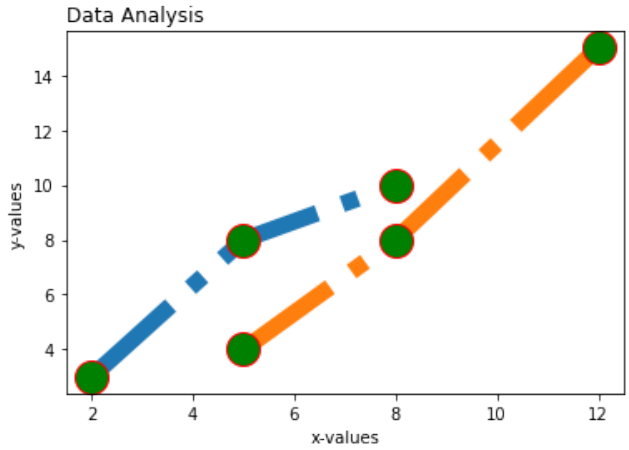


In [80]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

x1 = (5,8,12)
y1 = [4,8,15]

x2 = (7,10,16)
y2 = [0,5,10]
plt.plot(x,y,x1,y1,x2,y2,marker='o',ms='20', mec='r', mfc='g', ls='-.', lw='10')
plt.show()
```

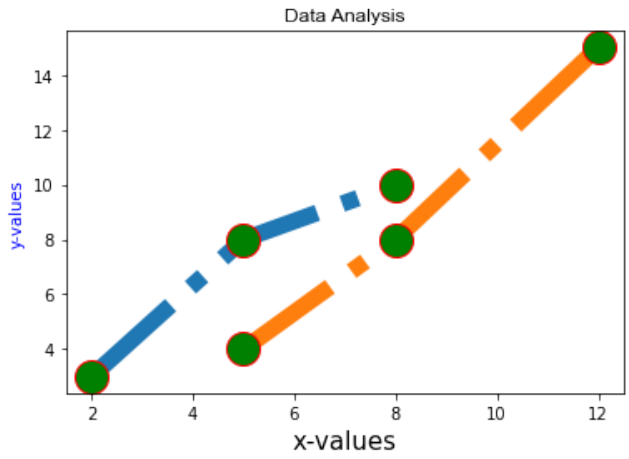


- **loc - size || color || family**

In [84]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

x1 = (5,8,12)
y1 = [4,8,15]

plt.xlabel("x-values")
plt.ylabel("y-values")
plt.title("Data Analysis", loc="left")
plt.plot(x,y,x1,y1,marker='o',ms='20', mec='r', mfc='g', ls='-.', lw='10')
plt.show()
```

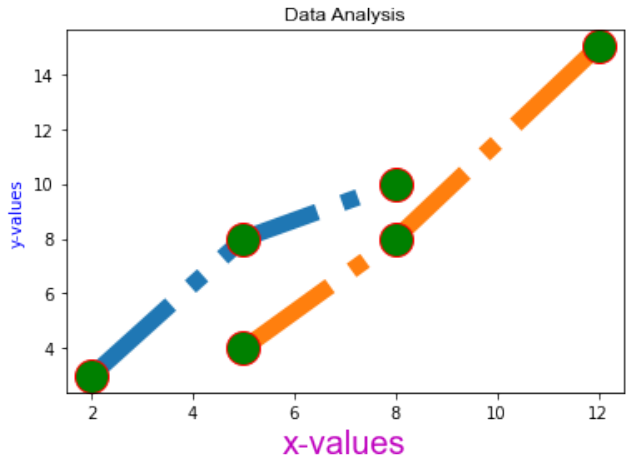


In [104]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

x1 = (5,8,12)
y1 = [4,8,15]

plt.xlabel("x-values", size=15)
plt.ylabel("y-values", color='b')
plt.title("Data Analysis", family="Arial")
plt.plot(x,y,x1,y1,marker='o',ms=20, mec='r', mfc='g', ls='-.', lw=10)
plt.show()
```

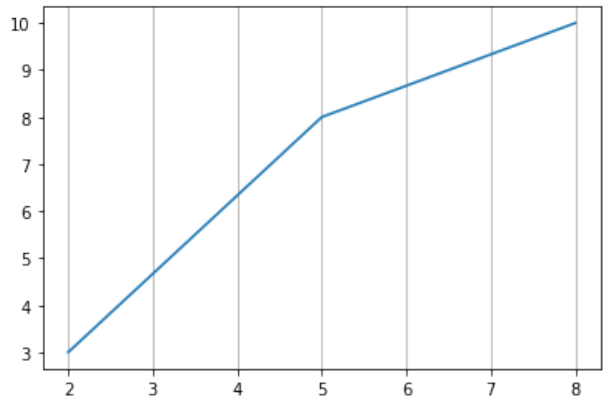


- **Use a fontdict to change color, size & font**

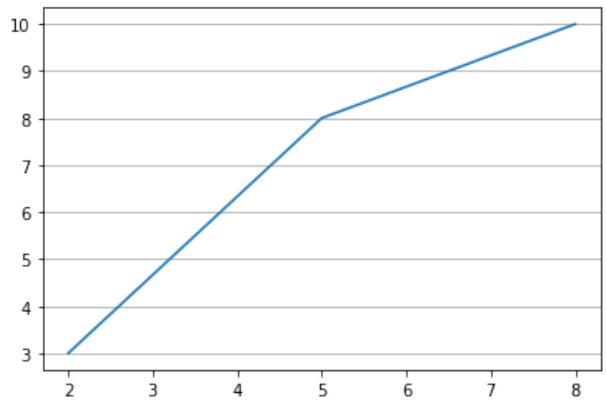
In [92]:
```
f = {'color':'m', 'size':20, 'family':'Serif'}

import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

x1 = (5,8,12)
y1 = [4,8,15]

plt.xlabel("x-values", fontdict=f)
plt.ylabel("y-values", color='b')
plt.title("Data Analysis", family="Arial")
plt.plot(x,y,x1,y1,marker='o',ms='20', mec='r', mfc='g', ls='-.', lw='10')
plt.show()
```



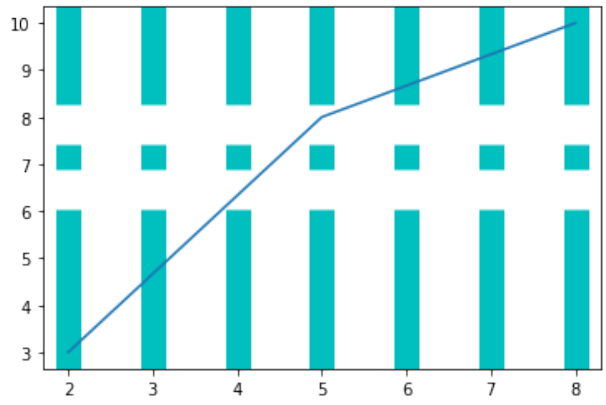
In [106]:
```
f = {'color':'m', 'size':20, 'family':'Serif'}
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

plt.plot(x,y)
plt.grid(axis='x')
plt.show()
```



In [102]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

plt.plot(x,y)
# plt.grid(axis='x')
plt.grid(axis='y')
plt.show()
```

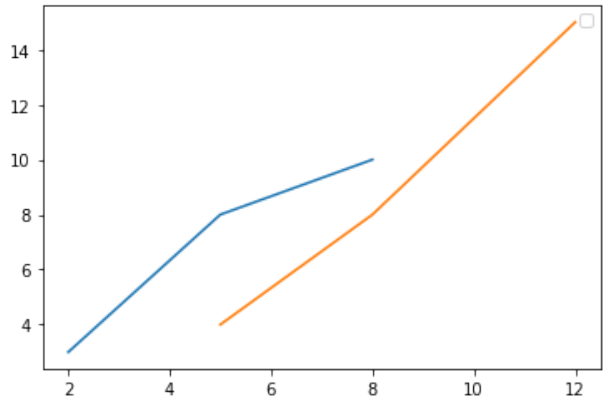


In [100]:
```
f = {'color':'m', 'size':20, 'family':'Serif'}
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]

plt.plot(x,y)
plt.grid(axis='x', ls='-.', lw=15,c='c')
plt.show()
```

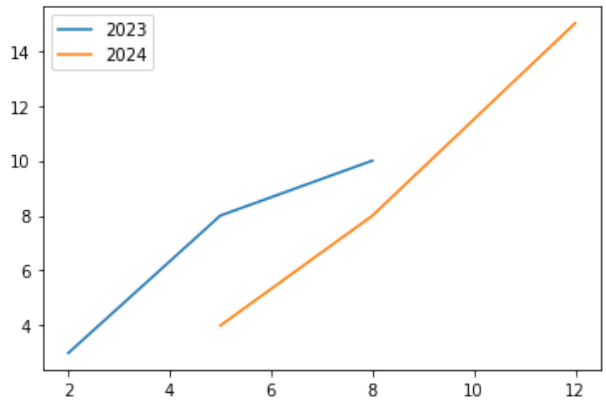


In [110]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.plot(x,y)
plt.plot(x1,y1)
plt.legend()
plt.show()
```

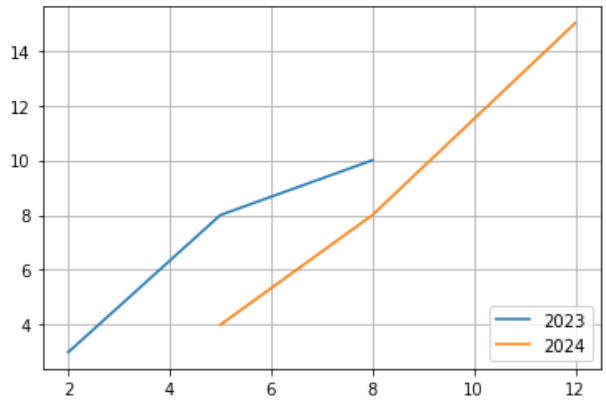
```
No handles with labels found to put in legend.
```



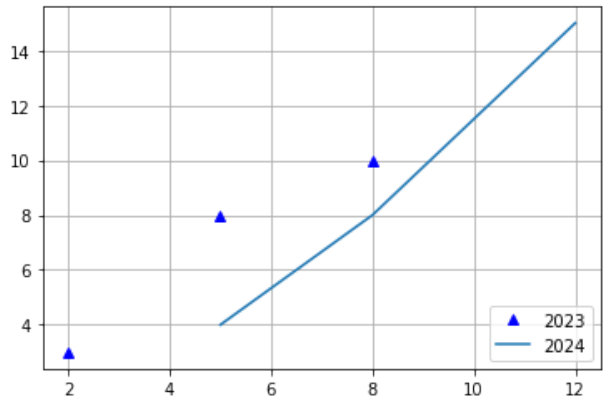
In [112]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.plot(x,y, label='2023')
plt.plot(x1,y1, label='2024')
plt.legend()
plt.show()
```



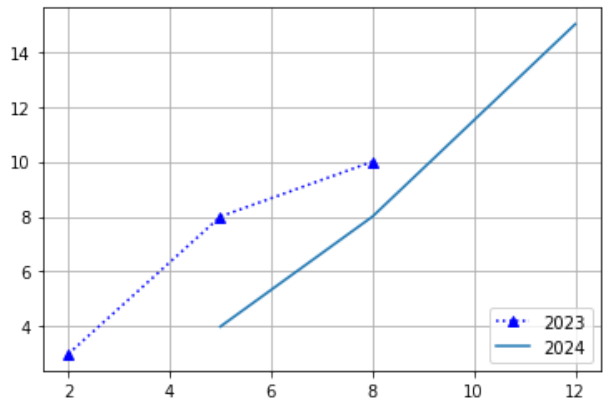
In [115]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.plot(x,y, label='2023')
plt.plot(x1,y1, label='2024')
plt.legend(loc='lower right')
plt.grid()
plt.show()
```



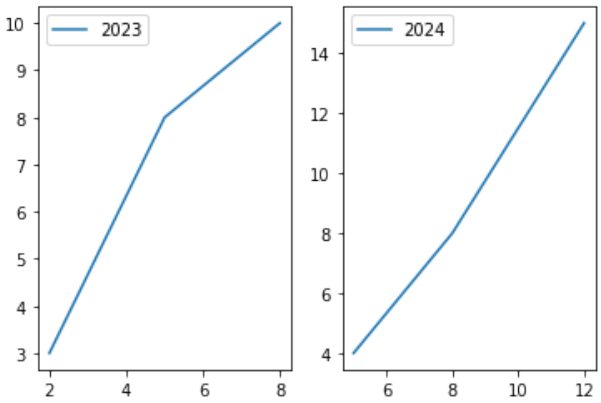
In [124]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.plot(x,y,'^b', label='2023')
plt.plot(x1,y1, label='2024')
plt.legend(loc='lower right')
plt.grid()
plt.show()
```



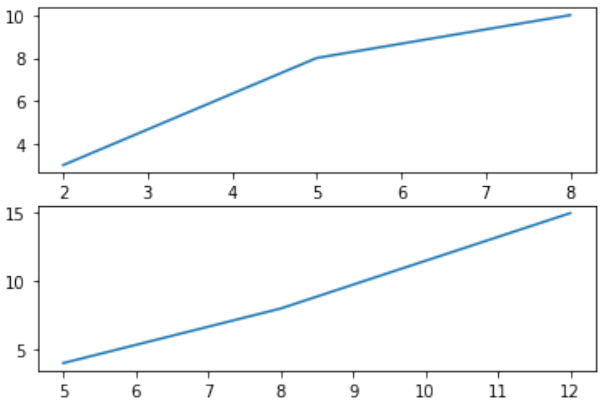
In [123]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.plot(x,y,'^:b', label='2023')
plt.plot(x1,y1, label='2024')
plt.legend(loc='lower right')
plt.grid()
plt.show()
```



In [133]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.subplot(1,2,1)
plt.plot(x,y, label='2023')
plt.legend()
plt.subplot(1,2,2)
plt.plot(x1,y1, label='2024')
plt.legend()
plt.show()
```

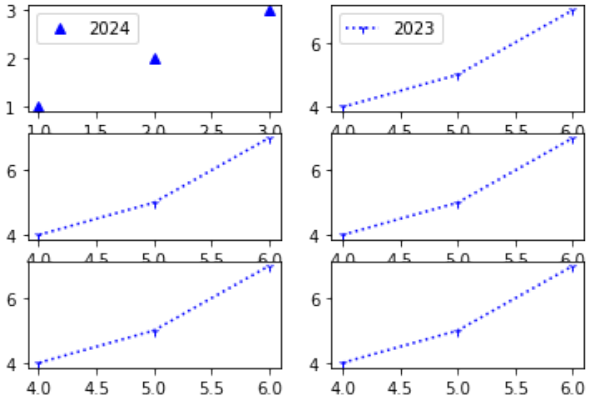


In [129]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([2,5,8])
y = [3,8,10]
x1 = (5,8,12)
y1 = [4,8,15]

plt.subplot(2,1,1)
plt.plot(x,y)
plt.subplot(2,1,2)
plt.plot(x1,y1)

plt.show()
```



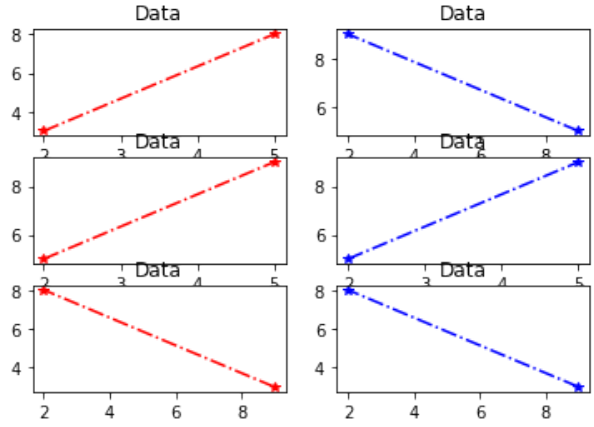
In [150]:

```
import matplotlib.pyplot as plt
import numpy as np
a1=np.array([1,2,3])
a2=np.array([1,2,3])
a3=np.array([4,5,6])
a4=np.array([4,5,7])
plt.subplot(3,2,1)
plt.plot(a1,a2,'^b',label='2024')
plt.legend()
plt.subplot(3,2,2)
plt.plot(a3,a4,'1:b',label='2023')
plt.legend()
plt.subplot(3,2,3)
plt.plot(a3,a4,'1:b',label='2023')
plt.subplot(3,2,4)
plt.plot(a3,a4,'1:b',label='2023')
plt.subplot(3,2,5)
plt.plot(a3,a4,'1:b',label='2023')
plt.subplot(3,2,6)
plt.plot(a3,a4,'1:b',label='2023')
plt.show()
```



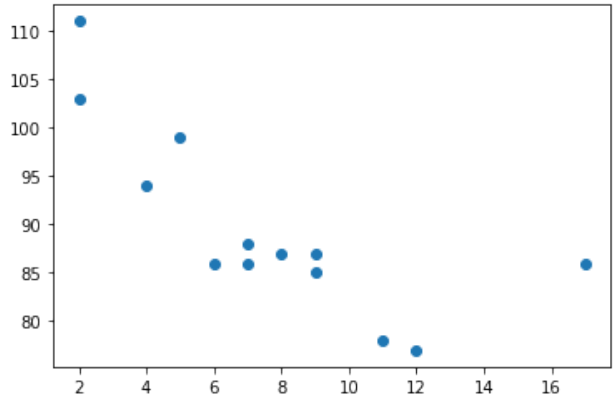
In [153]:

```
import matplotlib.pyplot as plt
import numpy as np
x1 = np.array([2,5])
y1 = np.array([3,8])
x2 = np.array([9,2])
y2 = np.array([5,9])

plt.subplot(3,2,1)
plt.title("Data")
plt.plot(x1,y1,'*-.r')
plt.subplot(3,2,2)
plt.title("Data")
plt.plot(x2,y2,'*-.b')
plt.subplot(3,2,3)
plt.title("Data")
plt.plot(x1,y2,'*-.r')
plt.subplot(3,2,4)
plt.title("Data")
plt.plot(x1,y2,'*-.b')
plt.subplot(3,2,5)
plt.title("Data")
plt.plot(x2,y1,'*-.r')
plt.subplot(3,2,6)
plt.title("Data")
plt.plot(x2,y1,'*-.b')
plt.show()
```



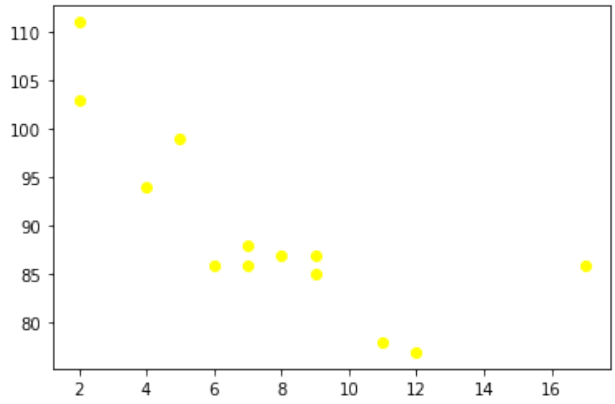
In [155]:

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

x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]

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



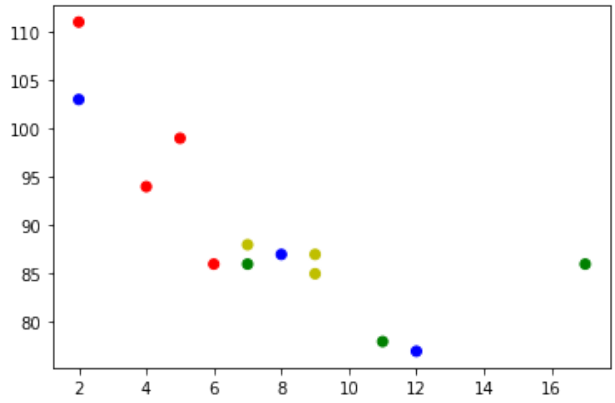
In [159]:

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

x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]

plt.scatter(x,y, color='yellow')
plt.show()
```

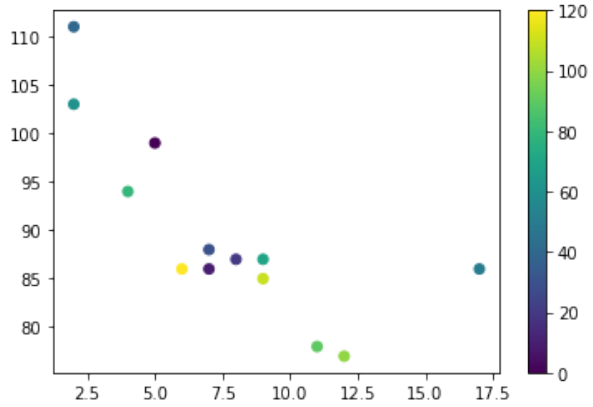


In [165]:

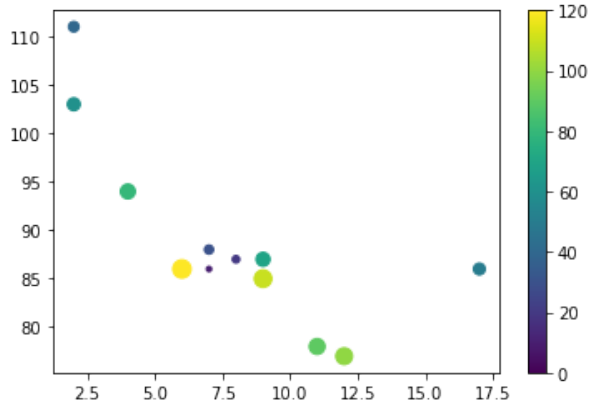
```
import matplotlib.pyplot as plt

l = ['r', 'g', 'b', 'y', 'r', 'g', 'b', 'y', 'r', 'g', 'b', 'y', 'r']

x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]

plt.scatter(x,y, color=l)
plt.show()
```



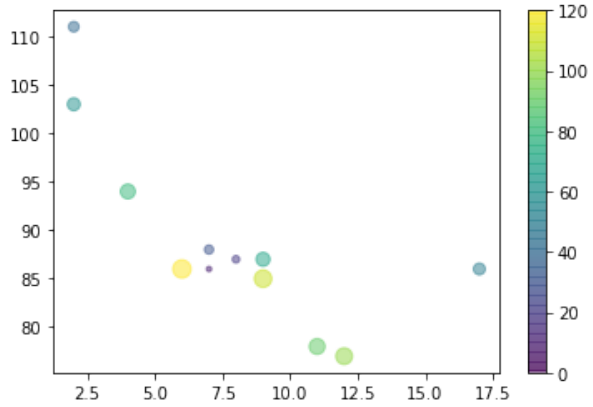
In [173]:
```
import matplotlib.pyplot as plt

colors = [0,10,20,30,40,50,60,70,80,90,100,110,120]
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
plt.scatter(x,y,c=colors, cmap='viridis')
plt.colorbar()
plt.show()
```



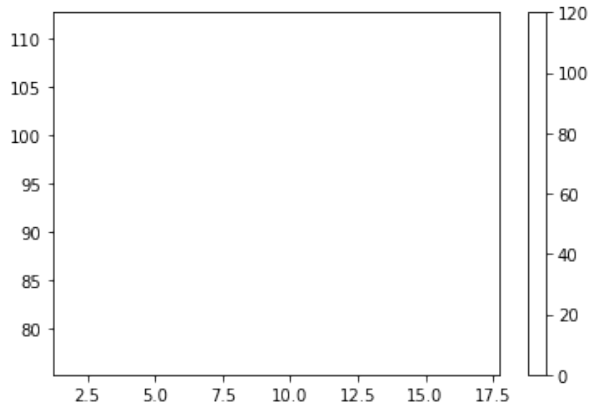
In [178]:
```
import matplotlib.pyplot as plt

colors = [0,10,20,30,40,50,60,70,80,90,100,110,120]
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
plt.scatter(x,y,c=colors, cmap='viridis',s=[0,10,20,30,40,50,60,70,80,90,100,110,120])
plt.colorbar()
plt.show()
```



In [180]:
```
import matplotlib.pyplot as plt

colors = [0,10,20,30,40,50,60,70,80,90,100,110,120]
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
plt.scatter(x,y,c=colors, cmap='viridis',s=[0,10,20,30,40,50,60,70,80,90,100,110,120],alpha=
plt.colorbar()
plt.show()
```



In [182]:
```
import matplotlib.pyplot as plt

colors = [0,10,20,30,40,50,60,70,80,90,100,110,120]
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
plt.scatter(x,y,c=colors, cmap='viridis',s=[0,10,20,30,40,50,60,70,80,90,100,110,120],alpha=
plt.colorbar()
plt.show()
```



In [ ]:
```

```