In [1]:
```
1 import matplotlib
```

In [2]:
```
1 matplotlib.__version__
```

Out[2]:
```
'3.3.4'
```

In [ ]:
```
1
```

In [3]:
```
1 import numpy as np
2 import pandas as pd
```

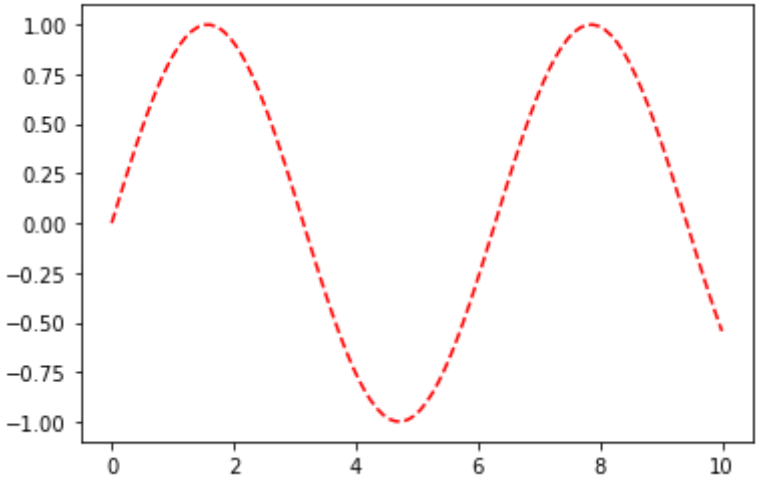
In [4]:
```
1 x1 = np.linspace(0,10,100)
```

In [5]:
```
1 x1
```

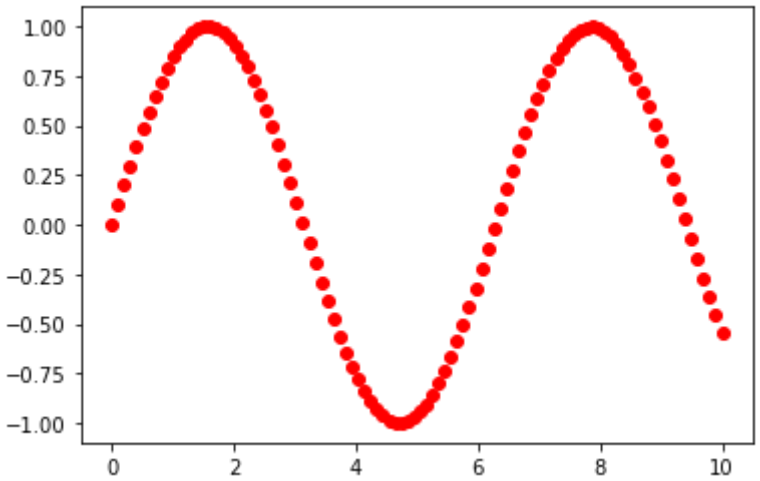
Out[5]:
```
array([ 0.        ,  0.1010101 ,  0.2020202 ,  0.3030303 ,  0.4040404 ,
        0.50505051,  0.60606061,  0.70707071,  0.80808081,  0.90909091,
        1.01010101,  1.11111111,  1.21212121,  1.31313131,  1.41414141,
        1.51515152,  1.61616162,  1.71717172,  1.81818182,  1.91919192,
        2.02020202,  2.12121212,  2.22222222,  2.32323232,  2.42424242,
        2.52525253,  2.62626263,  2.72727273,  2.82828283,  2.92929293,
        3.03030303,  3.13131313,  3.23232323,  3.33333333,  3.43434343,
        3.53535354,  3.63636364,  3.73737374,  3.83838384,  3.93939394,
        4.04040404,  4.14141414,  4.24242424,  4.34343434,  4.44444444,
        4.54545455,  4.64646465,  4.74747475,  4.84848485,  4.94949495,
        5.05050505,  5.15151515,  5.25252525,  5.35353535,  5.45454545,
        5.55555556,  5.65656566,  5.75757576,  5.85858586,  5.95959596,
        6.06060606,  6.16161616,  6.26262626,  6.36363636,  6.46464646,
        6.56565657,  6.66666667,  6.76767677,  6.86868687,  6.96969697,
        7.07070707,  7.17171717,  7.27272727,  7.37373737,  7.47474747,
        7.57575758,  7.67676768,  7.77777778,  7.87878788,  7.97979798,
        8.08080808,  8.18181818,  8.28282828,  8.38383838,  8.48484848,
        8.58585859,  8.68686869,  8.78787879,  8.88888889,  8.98989899,
        9.09090909,  9.19191919,  9.29292929,  9.39393939,  9.49494949,
        9.5959596 ,  9.6969697 ,  9.7979798 ,  9.8989899 , 10.        ])
```

In [6]:
```
1 import matplotlib.pyplot as plt
```

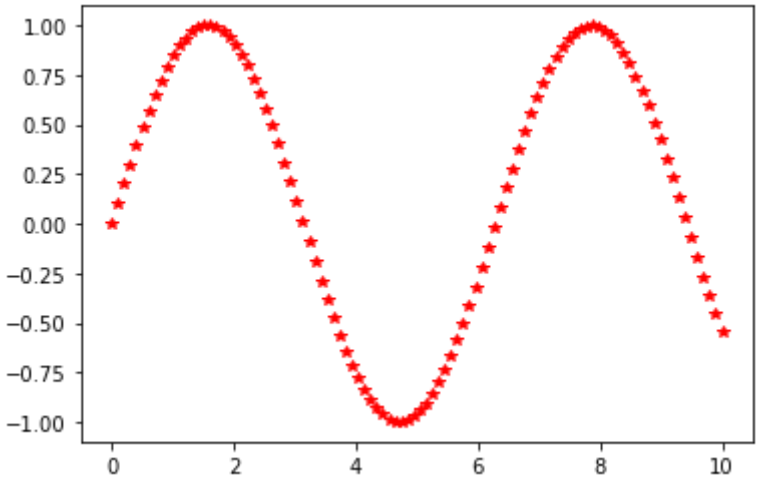
In [15]:
```
1 fig = plt.figure()
2 plt.plot(x1,np.sin(x1),'r--')
3 plt.show()
```



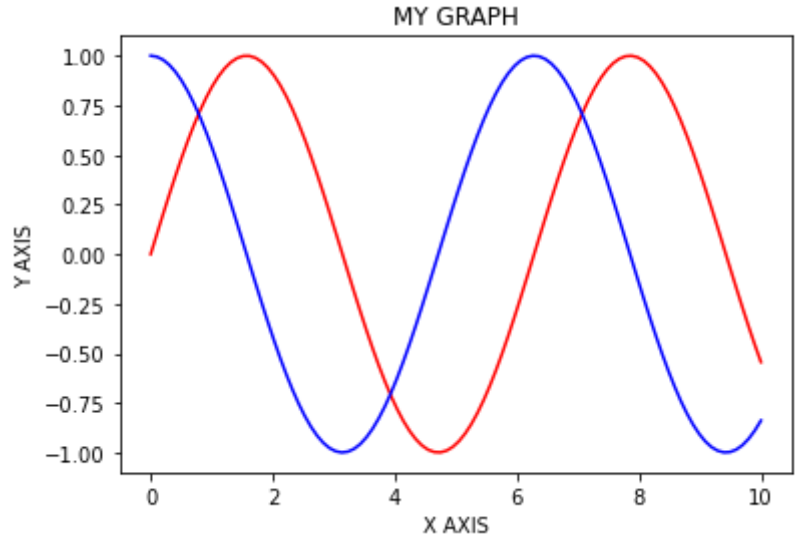
In [16]:
```
1 fig = plt.figure()
2 plt.plot(x1,np.sin(x1),'ro')
3 plt.show()
```



In [17]:
```
1 fig = plt.figure()
2 plt.plot(x1,np.sin(x1),'r*')
3 plt.show()
```

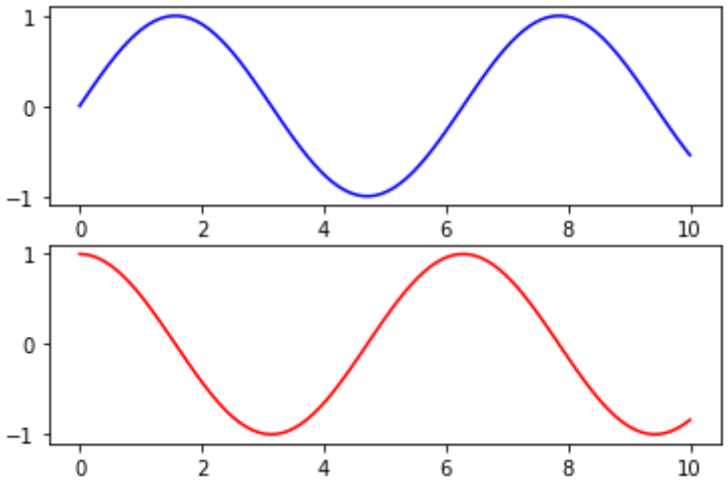


In [23]:
```
1 fig = plt.figure()
2 plt.plot(x1,np.sin(x1),'r')
3 plt.plot(x1,np.cos(x1),'b')
4 plt.xlabel("X AXIS")
5 plt.ylabel("Y AXIS")
6 plt.title("MY GRAPH")
7 plt.show()
```



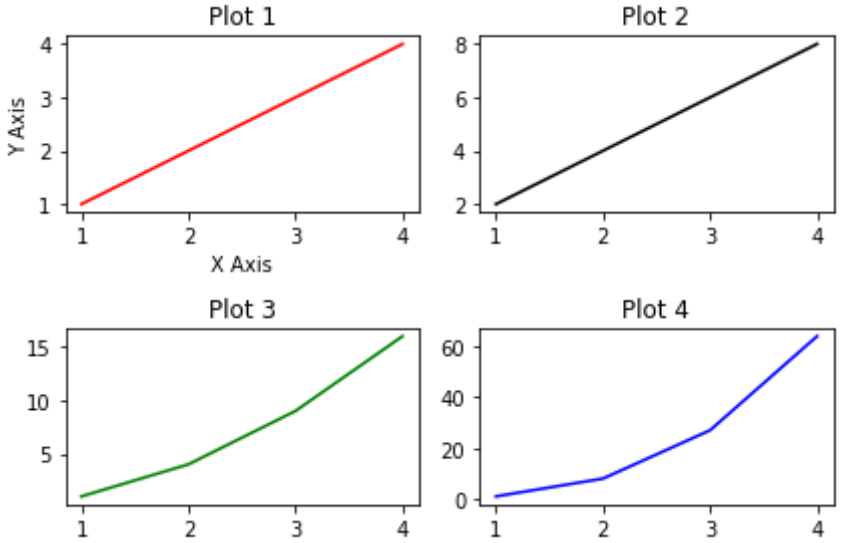
In [ ]:
```
1
```

In [28]:
```
fig1 = plt.figure()
plt.subplot(2,1,1)
plt.plot(x1,np.sin(x1),'b')
plt.subplot(2,1,2)
plt.plot(x1,np.cos(x1),'r')
plt.show()
```



In [ ]:
```
1
```

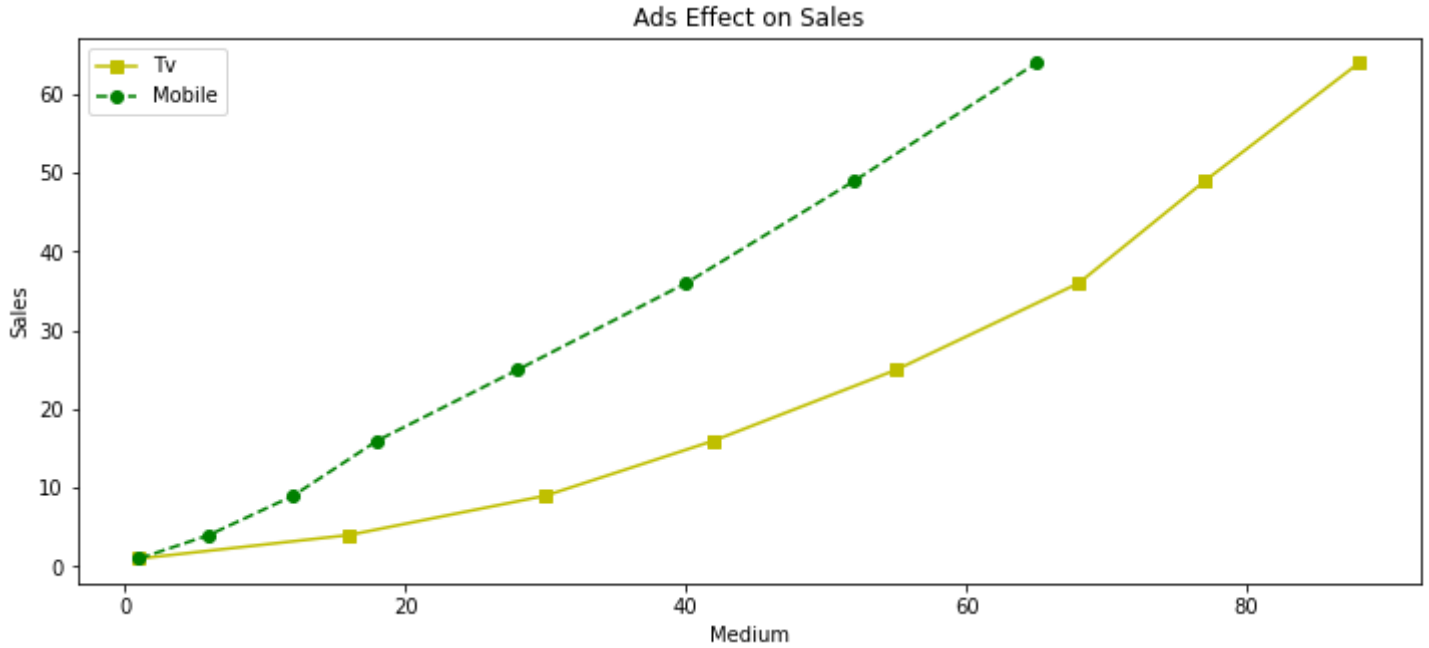
In [53]:
```
fig,ax = plt.subplots(2,2)
x = np.array([1,2,3,4])
ax[0,0].plot(x,x,'r')
ax[0,1].plot(x,x*2,'k')
ax[1,0].plot(x,x*x,'g')
ax[1,1].plot(x,x**3,'b')

ax[0,0].set_title('Plot 1')
ax[0,0].set_xlabel('X Axis')
ax[0,0].set_ylabel('Y Axis')
ax[0,1].set_title('Plot 2')
ax[1,0].set_title('Plot 3')
ax[1,1].set_title('Plot 4')

plt.tight_layout()
plt.show()
```



In [ ]:
```
1
```

In [ ]:
```
1
```

In [55]:
```
y = [1,4,9,16,25,36,49,64]
x1 = [1,16,30,42,55,68,77,88]
x2 = [1,6,12,18,28,40,52,65]

fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(5)

plt.plot(x1,y,'ys-')
plt.plot(x2,y,'go--')
plt.legend(['Tv','Mobile'])
plt.title('Ads Effect on Sales')
plt.xlabel('Medium')
plt.ylabel('Sales')
plt.show()
```



In [57]:
```
1 fig.savefig('Advertisment_Plot.png')
```

In [ ]:
```
1
```

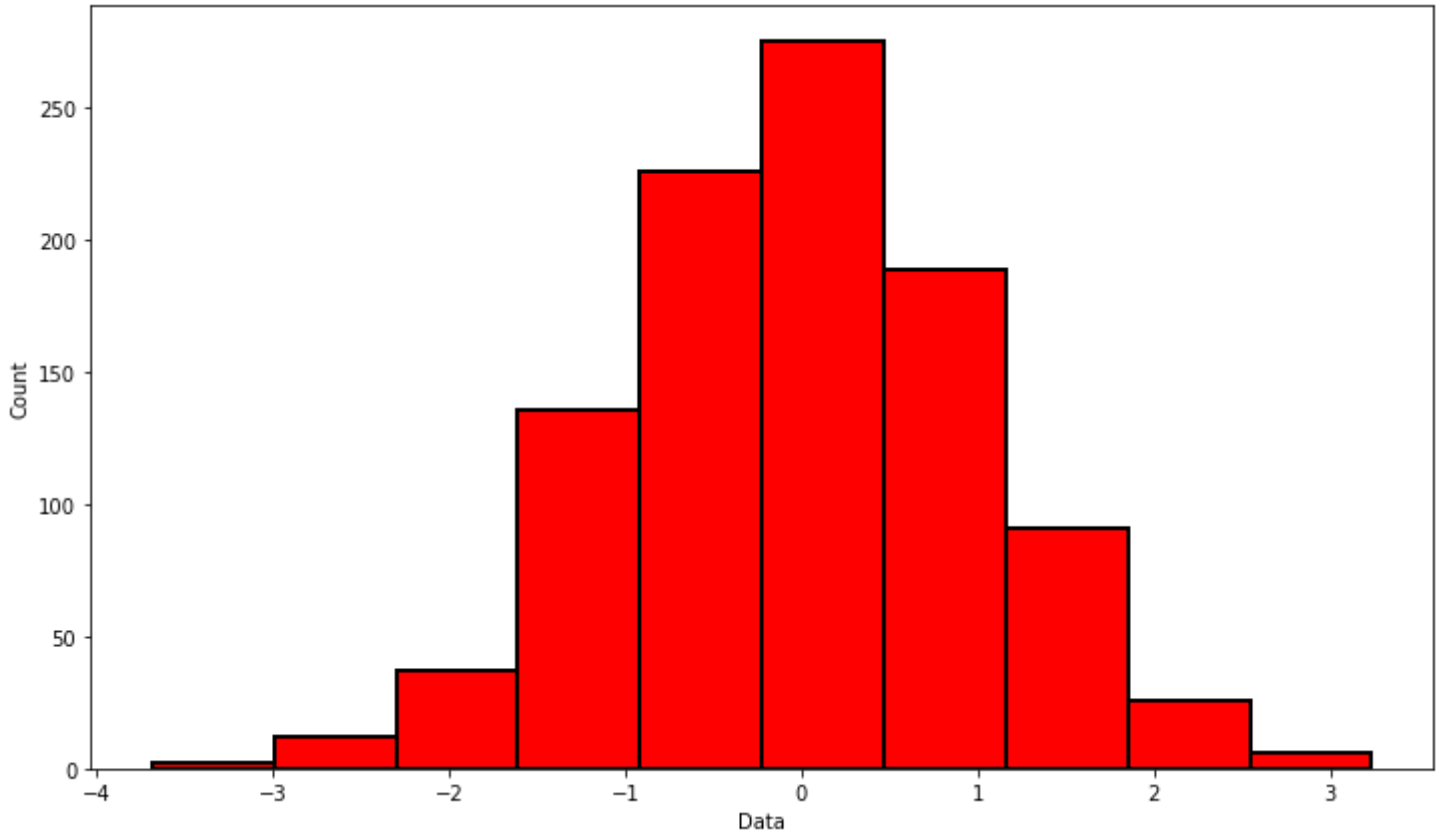
In [ ]:
```
1
```

histogram

In [58]:
```
1 data = np.random.randn(1000)
```

In [ ]:
```
1
```

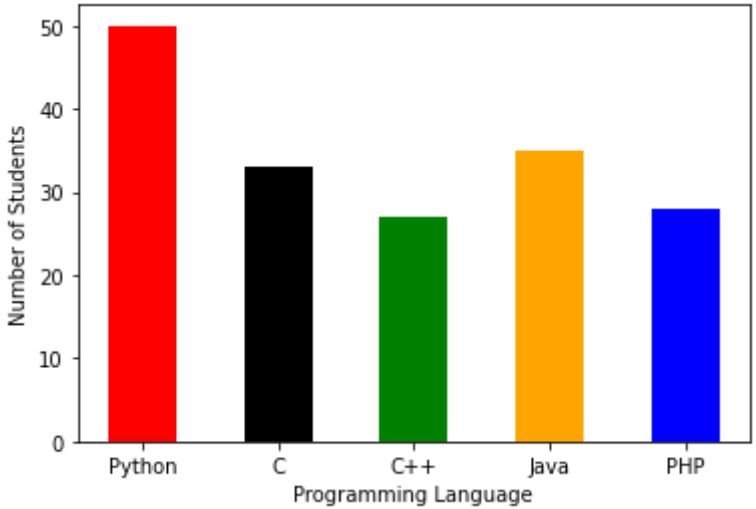
In [67]:
```
fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(7)
plt.hist(data,color='r',edgecolor='black',linewidth=2)
plt.xlabel('Data')
plt.ylabel('Count')
plt.show()
```



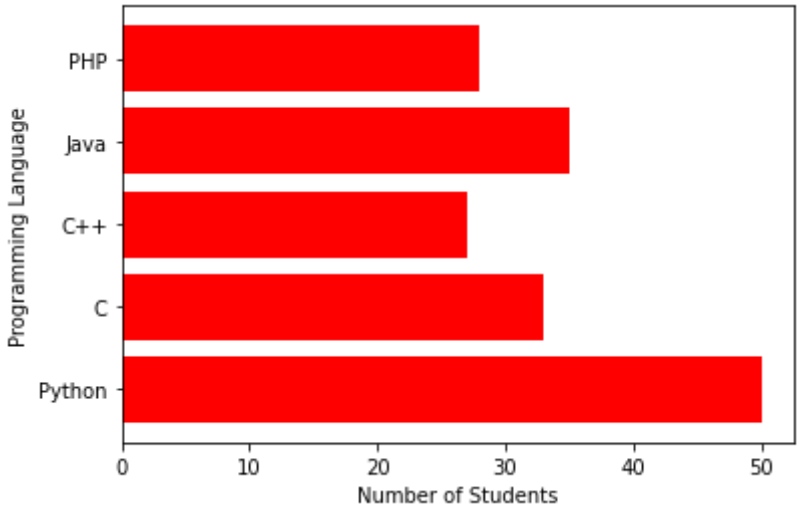
In [ ]:
```
1
```

Barchart

In [77]:
```
prog_lang = ['Python','C','C++','Java','PHP']
students = [50,33,27,35,28]
c = ['red','black','green','orange','blue']
plt.bar(prog_lang,students,width=0.5,color=c)
plt.xlabel('Programming Language')
plt.ylabel('Number of Students')
plt.show()
```



In [74]:
```
prog_lang = ['Python','C','C++','Java','PHP']
students = [50,33,27,35,28]

plt.barh(prog_lang,students,color='red',height=0.8)
plt.xlabel('Number of Students')
plt.ylabel('Programming Language')
plt.show()
```



In [ ]:
```
1
```

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [14]:
```
data = [
    [100,200,300,400,500],
    [250,350,450,550,650],
    [40,35,50,25,65],
    [45,25,55,20,37]

]

x = np.arange(2021,2026)
```

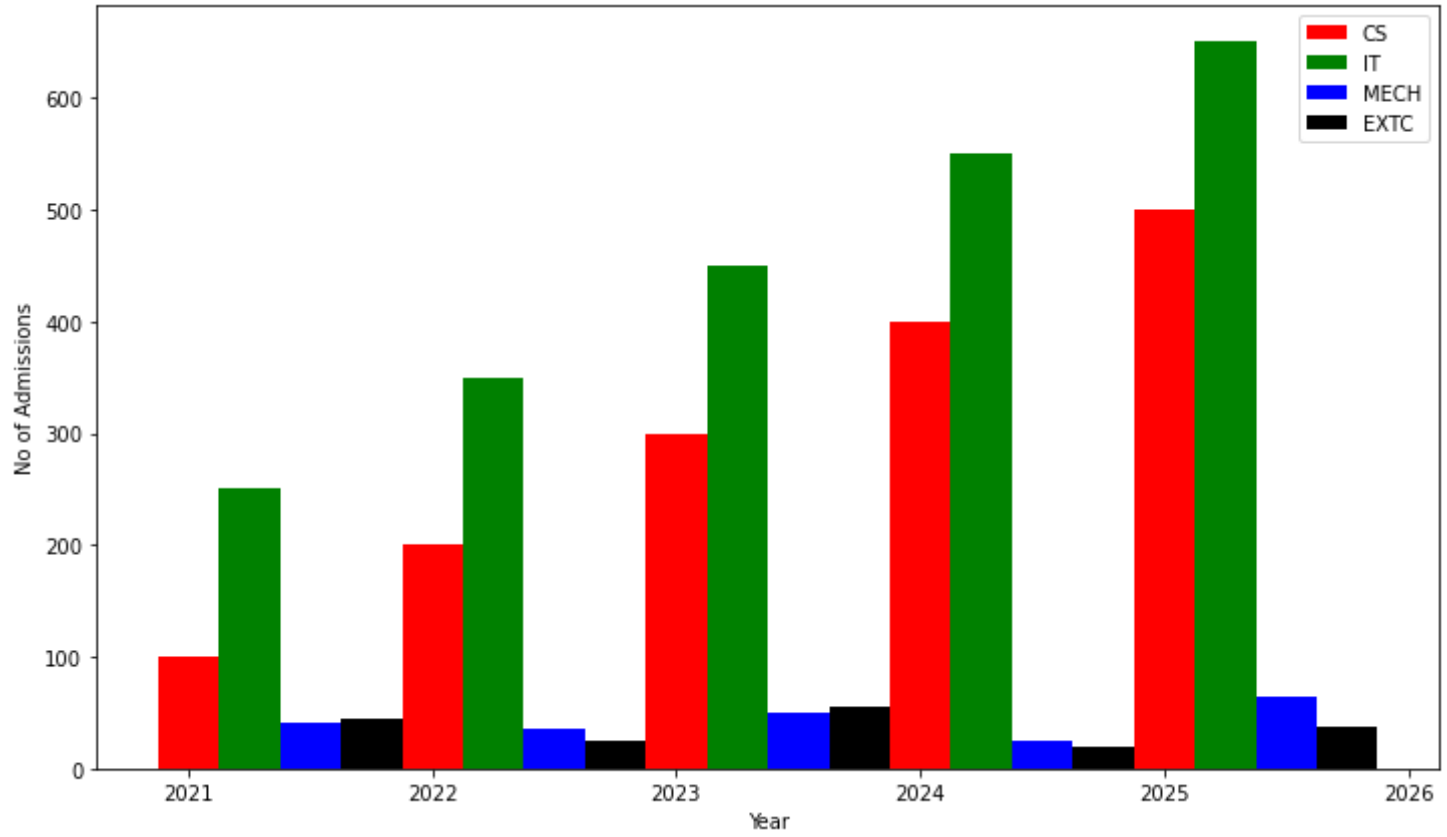
In [16]:
```
data
```

Out[16]:
```
[[100, 200, 300, 400, 500],
 [250, 350, 450, 550, 650],
 [40, 35, 50, 25, 65],
 [45, 25, 55, 20, 37]]
```

In [17]:
```
x
```

Out[17]:
```
array([2021, 2022, 2023, 2024, 2025])
```

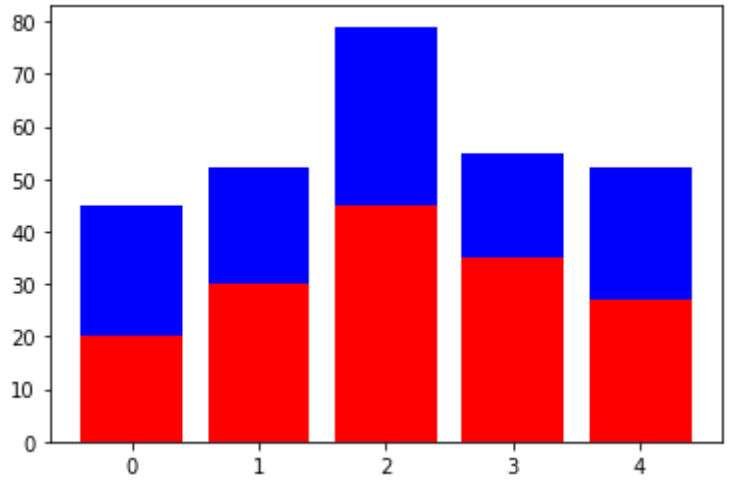
In [23]:
```
fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(7)

plt.bar(x+0.0, data[0],color='r',width=0.25)
plt.bar(x+0.25,data[1],color='g',width=0.25)
plt.bar(x+0.50,data[2],color='b',width=0.25)
plt.bar(x+0.75,data[3],color='black',width=0.25)
plt.legend(['CS','IT','MECH','EXTC'])
plt.xlabel('Year')
plt.ylabel('No of Admissions')
plt.show()
```



Stacked Bar Plot

In [24]:
```
n= np.arange(5)
boys_mean = (20,30,45,35,27)
girls_mean = (25,22,34,20,25)
```

In [32]:
```
1 plt.bar(n,boys_mean,color='red')
2 plt.bar(n,girls_mean,color='blue',bottom=boys_mean)
3 plt.show()
```

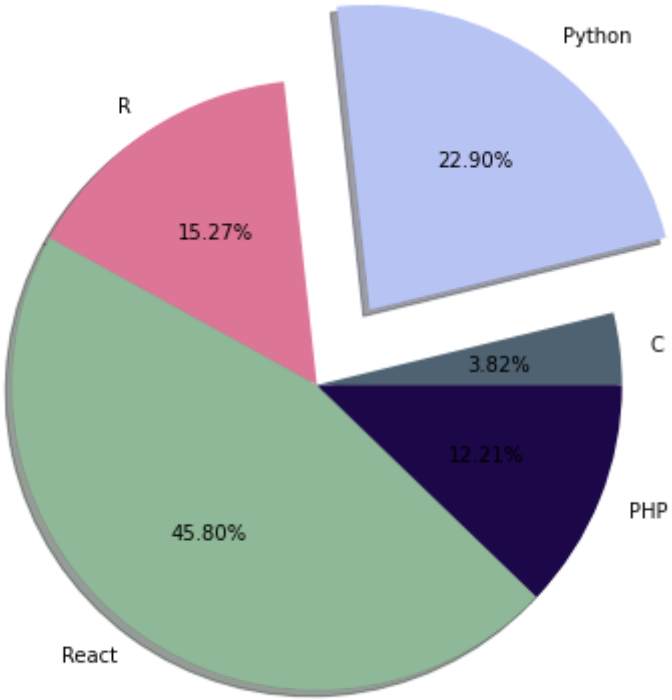


In [ ]:
```
1
```

Pie chart

In [47]:
```
1 lang = ['C','Python','R','React','PHP']
2 users = [10,60,40,120,32]
3 color = ['#4F6272', '#B7C3F3', '#DD7596', '#8EB897','#1C0848']
4 explode_data = [0.0,0.3,0.0,0.0,0.0]
```

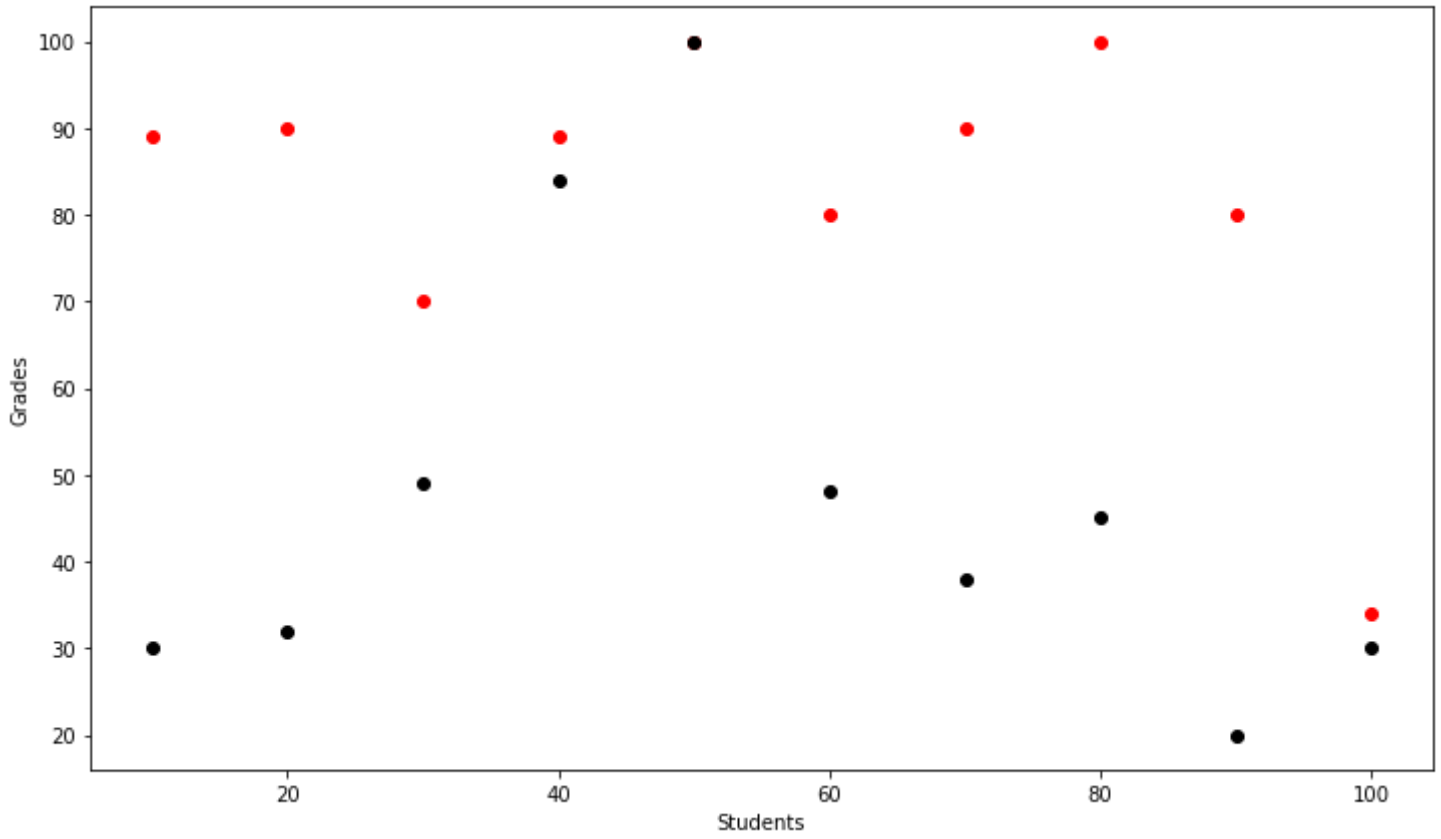
In [48]:
```
fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(7)
plt.pie(users,labels=lang,autopct='%1.2f%%',shadow=True,colors=color,explode=explode_data)
plt.show()
```



In [ ]:
```
1
```

In [49]:
```
1 girls_grade = [89,90,70,89,100,80,90,100,80,34]
2 boys_grade = [30,32,49,84,100,48,38,45,20,30]
3 students = [10,20,30,40,50,60,70,80,90,100]
```

In [54]:
```
fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(7)
plt.scatter(students,girls_grade,color='r')
plt.scatter(students,boys_grade,color='k')
plt.xlabel('Students')
plt.ylabel('Grades')
plt.show()
```



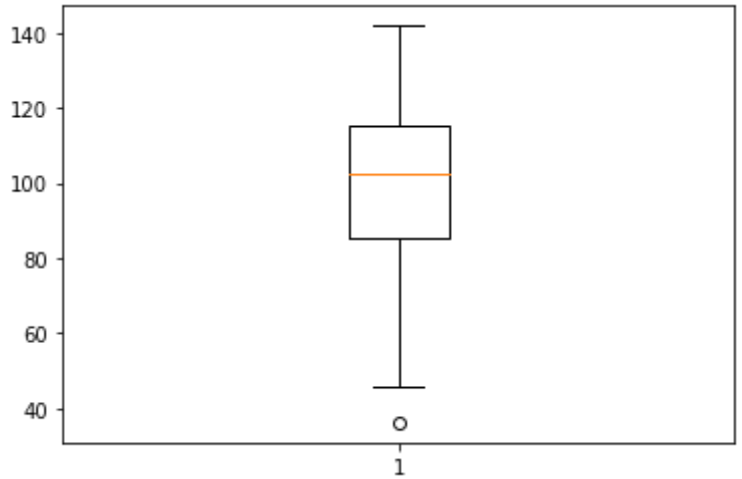
In [55]:
```
np.random.seed(20)
data = np.random.normal(100,20,200)
```

In [56]:
```
1 data
```

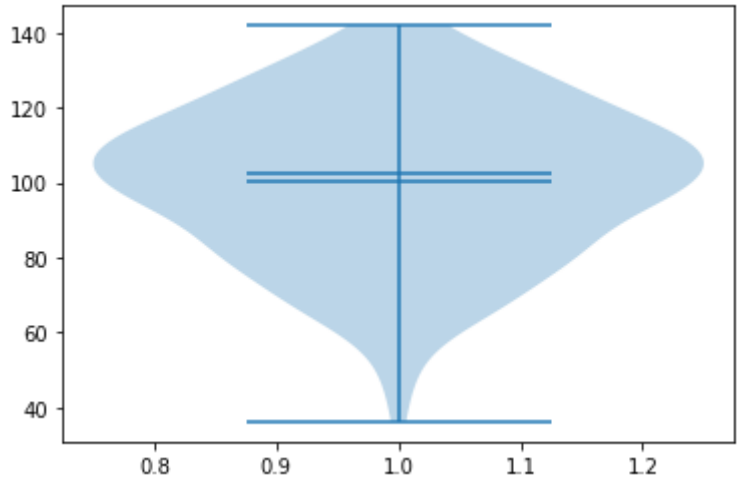
Out[56]:
```
array([117.67786225, 103.91730044, 107.15073032,  53.13476189,
        78.30334825, 111.19392579, 118.789387  ,  80.43037916,
       110.0619368 , 108.12828938, 106.4692202 ,  90.13178236,
        84.15966418,  83.15264132,  74.40994677, 104.91430339,
        99.11610399, 131.35265106, 121.02217359, 108.12736851,
        96.62707798,  36.20594422, 122.40264518, 126.65556416,
        95.13322468,  97.39938577,  97.81965257, 131.12372879,
       102.57556705,  58.66102555,  82.29013691,  77.90841033,
       118.65732693, 141.19676003,  81.30124084,  67.74019564,
       110.54139436,  68.97798529, 106.59226678,  77.2694692 ,
        93.23018791, 106.41941569,  87.95383964, 130.89456722,
       112.94068167, 111.86434425, 108.76048994, 127.1557803 ,
       124.0902255 , 127.03592374, 109.86874472,  45.91269505,
        88.89628406, 100.03017121, 117.14187634, 129.62287293,
        95.60677755, 130.06796313,  70.352299  ,  82.87671564,
        83.4261446 , 102.28095207, 110.55456941, 103.11676444,
       126.02858797,  80.10396185, 141.89330676, 107.18857988,
       113.82004237,  70.28560783, 101.97577229,  95.43357939,
        82.90449025,  89.73709788,  80.75568031,  90.35098177,
        95.21060485, 109.19488454, 112.92860332, 109.74805922,
       100.76384937, 119.78973117, 102.8724527 , 115.00595857,
        91.8085715 , 128.94814093,  91.90931952, 122.97850027,
        81.22179018,  61.97071897, 121.90866703,  93.32912427,
        71.16302851,  71.66666503,  67.40996964,  63.69488384,
        78.87662   , 111.08549866,  80.9996398 , 117.15998702,
        89.35841505, 122.51517712, 104.3731544 ,  92.14236085,
        95.4260547 ,  68.47490244, 103.31666018, 115.7759363 ,
        60.76215515,  62.95923513, 121.83773225, 118.6918171 ,
        85.76428887, 128.86166017, 115.04626641,  73.30158466,
       113.53279345, 116.62211556,  92.69885112, 109.9354049 ,
       105.79118301,  90.59581314, 132.11985279,  96.92676339,
        64.27662732,  97.76685402, 130.75287947,  79.36734957,
        97.88373895, 140.19803224, 100.22462683,  78.21141063,
        69.70978069,  88.80477385, 116.83245038, 105.03105781,
       116.50369247, 136.4441087 , 106.76252697, 102.18125559,
       106.96977728, 108.98236299,  77.70518754,  81.53585284,
       100.42738078, 111.88830865, 136.54283055,  78.26992453,
       121.16884185, 114.94330183, 112.19835604,  98.45544493,
        61.17467418, 106.8286942 , 137.2571027 ,  94.0953905 ,
```

```
109.56633012,  85.69619009, 124.74585854, 116.80777294,
114.48254559,  96.3968139 , 103.05158373, 124.59885876,
105.44153776, 101.5014802 , 101.7363854 ,  49.69291447,
137.00087757,  96.48387087, 118.06926001,  69.09681301,
128.82955792, 105.37664454, 108.58108072, 108.727768  ,
 91.23479608, 128.40996904, 139.10864201,  92.16849167,
102.41444416, 108.28050194, 127.33011451,  72.73560031,
100.3130732 , 118.0932042 ,  83.86197819,  85.87379292,
121.05783834,  98.13057427,  71.22098919,  93.7746218 ,
116.11338478,  99.74898122,  94.78354181,  82.21044532,
 67.68201575,  82.96070795,  99.17639712,  94.59346196])
```

In [57]:
```
1 plt.boxplot(data)
2 plt.show()
```



In [60]:
```
1 plt.violinplot(data,showmedians=True,showmeans=True)
2 plt.show()
```

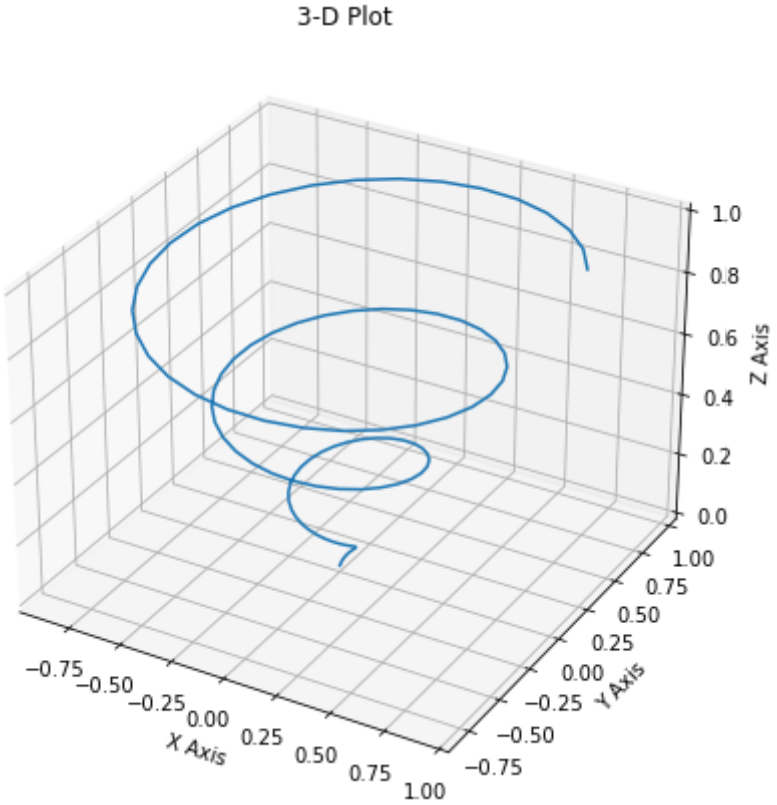


In [ ]:
```
1
```

In [61]:
```
1 from mpl_toolkits import mplot3d
```

In [62]:
```
1 z = np.linspace(0,1,100)
2 x = z*np.sin(20*z)
3 y = z*np.cos(20*z)
```

In [66]:
```
fig = plt.figure()
fig.set_figwidth(12)
fig.set_figheight(7)
ax = plt.axes(projection='3d')
ax.plot3D(x,y,z)
ax.set_xlabel('X Axis')
ax.set_ylabel('Y Axis')
ax.set_zlabel('Z Axis')
ax.set_title('3-D Plot')
plt.show()
```



In [ ]:
```
1
```