

```
In [3]: import numpy as np
numbers = np.array([[1,2,3,4], [5,6,7,8], [9,10,11,12]])
numbers
```

Out[3]: array([[ 1, 2, 3, 4],
[ 5, 6, 7, 8],
[ 9, 10, 11, 12]])

```
In [4]: for i in numbers.flat:
print(i, end=' ')

1 2 3 4 5 6 7 8 9 10 11 12
```

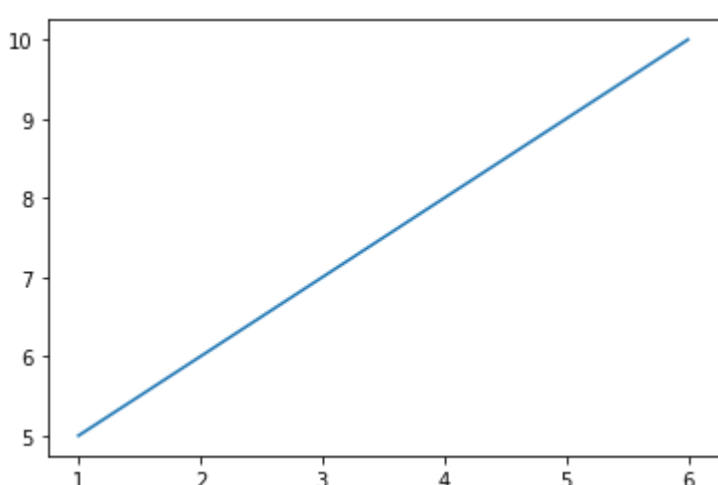
```
In [5]: for row in numbers:
for column in row:
column *= 2
print(column, end=' ')
print()
#I was not too sure whether you were asking for an array with the elements multiplied or not so I multiplied
# it here just in case

2 4 6 8
10 12 14 16
18 20 22 24
```

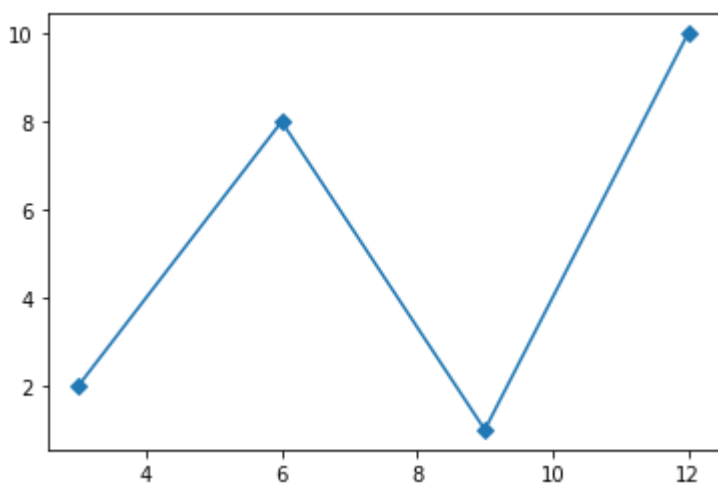
```
In [6]: for i in numbers.flat:
i *= 2
print(i, end=' ')
#also was not sure if the flat was suppose to be the original or the multiplied array so I did both just in case

2 4 6 8 10 12 14 16 18 20 22 24
```

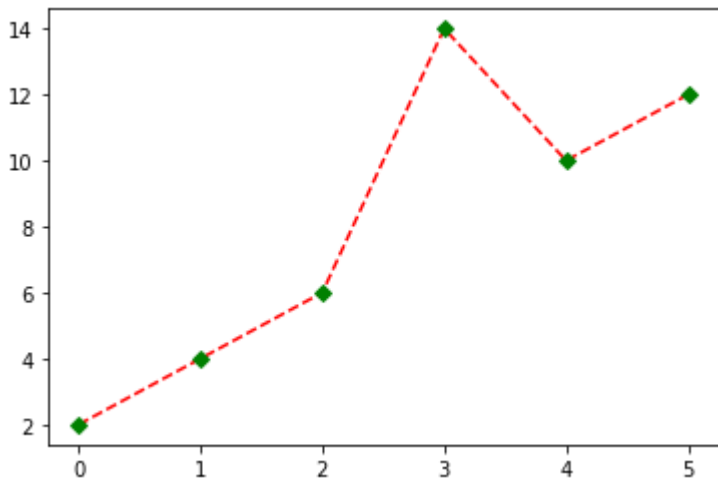
```
In [7]: import matplotlib.pyplot as plt
import numpy as np
x = np.array([1,2,3,4,5,6])
y = np.array([5,6,7,8,9,10])
plt.plot(x,y)
plt.show()
```



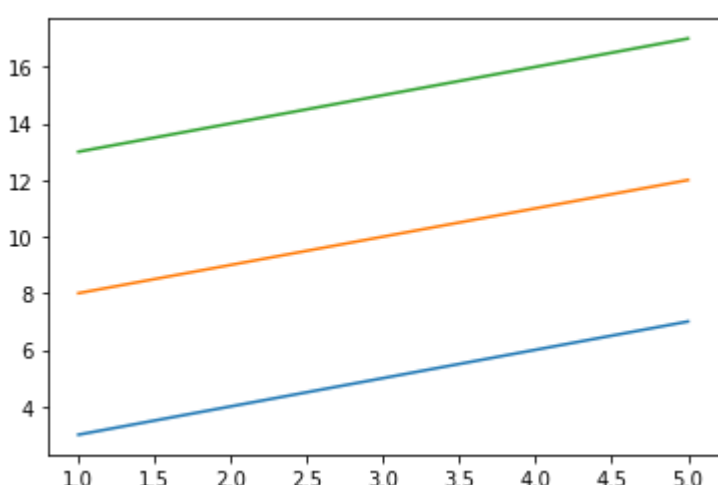
```
In [8]: import matplotlib.pyplot as plt
import numpy as np
x1= np.array([3,6,9,12])
y1= np.array([2,8,1,10])
plt.plot(x1,y1, marker = 'D')
plt.show()
```



```
In [9]: import matplotlib.pyplot as plt
import numpy as np
x2=np.array([0,1,2,3,4,5])
y2=np.array([2,4,6,14,10,12])
plt.plot(x2,y2, 'D--r', mec="green", mfc="green")
plt.show()
```



```
In [10]: import matplotlib.pyplot as plt
import numpy as np
x3=np.array([1,2,3,4,5])
y3=np.array([3,4,5,6,7])
x4=np.array([1,2,3,4,5])
y4=np.array([8,9,10,11,12])
x5=np.array([1,2,3,4,5])
y5=np.array([13,14,15,16,17])
plt.plot(x3,y3,x4,y4,x5,y5)
plt.show()
```

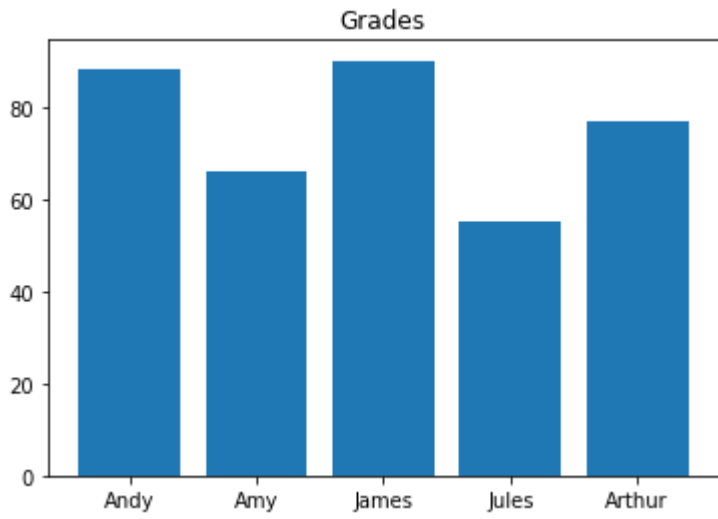


```
In [11]: import matplotlib.pyplot as plt
import numpy as np
marks = {'Andy':88, 'Amy':66, 'James':90, 'Jules':55, 'Arthur':77}
for m in marks:
print(marks[m])

88
66
90
55
77
```

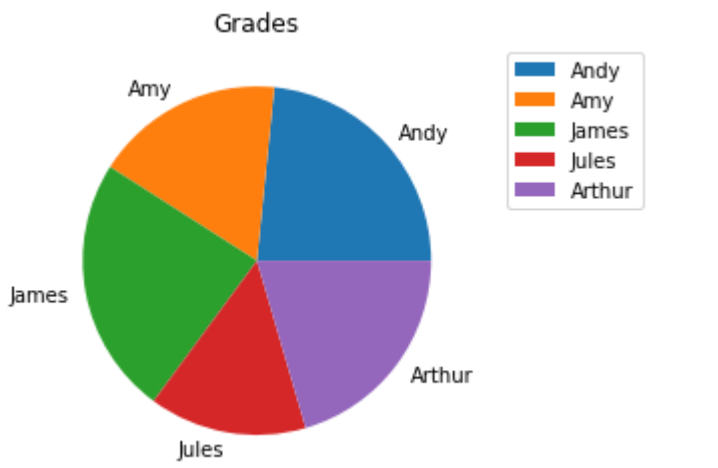
```
In [12]: import matplotlib.pyplot as plt
import numpy as np
marks = {'Andy':88, 'Amy':66, 'James':90, 'Jules':55, 'Arthur':77}

x= marks.keys()
y=marks.values()
plt.title("Grades")
plt.bar(x,y)
plt.show()
```



```
In [13]: import matplotlib.pyplot as plt
import numpy as np
marks = {'Andy':88, 'Amy':66, 'James':90, 'Jules':55, 'Arthur':77}

x=marks.keys()
y=marks.values()
plt.title("Grades")
plt.pie(y, labels = x)
plt.legend(bbox_to_anchor=(1.05,1.0), loc='upper left')
plt.show()
```



```
In [14]: import matplotlib.pyplot as plt
import numpy as np
x=np.array([1,2,3,4,5])
y1= np.array([1,2,3,4,5])
y2=np.array([6,7,8,9,10])
y3=np.array([11,12,13,14,15])
plt.subplot(2,3,1)
plt.plot(x,y1,x,y2,x,y3)
plt.title("Multiple lines")

x=np.array(["Apple", "Banana", "Strawberry"])
y=np.array([14,5,8])
plt.subplot(2,3,2)
plt.bar(x,y)
plt.title("Bar graph")

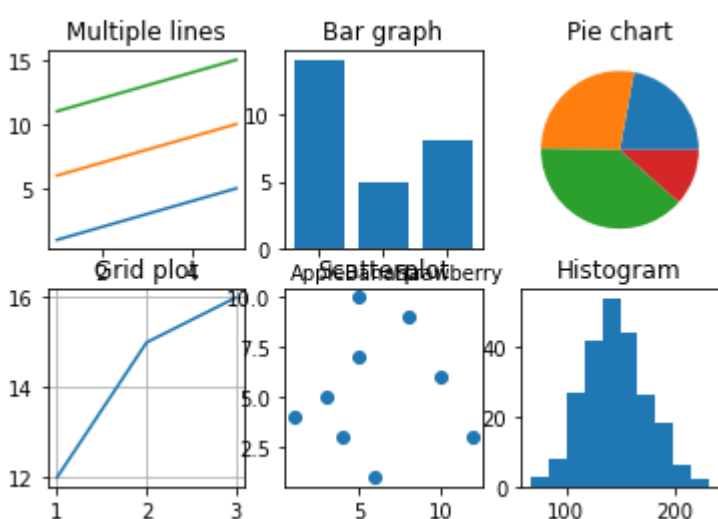
y=np.array([44,55,77,23])
plt.subplot(2,3,3)
plt.pie(y)
plt.title("Pie chart")

x=np.array([1,2,3])
y=np.array([12,15,16])
plt.subplot(2,3,4)
plt.grid()
plt.plot(x,y)
plt.title("Grid plot")

x=np.array([1,5,3,6,4,8,5,10,12])
y=np.array([4,7,5,1,3,9,10,6,3])
plt.subplot(2,3,5)
plt.scatter(x,y)
plt.title("Scatterplot")

x=np.random.normal(145,30,230)
plt.hist(x)
plt.title("Histogram")

plt.show()
```



In [ ] :