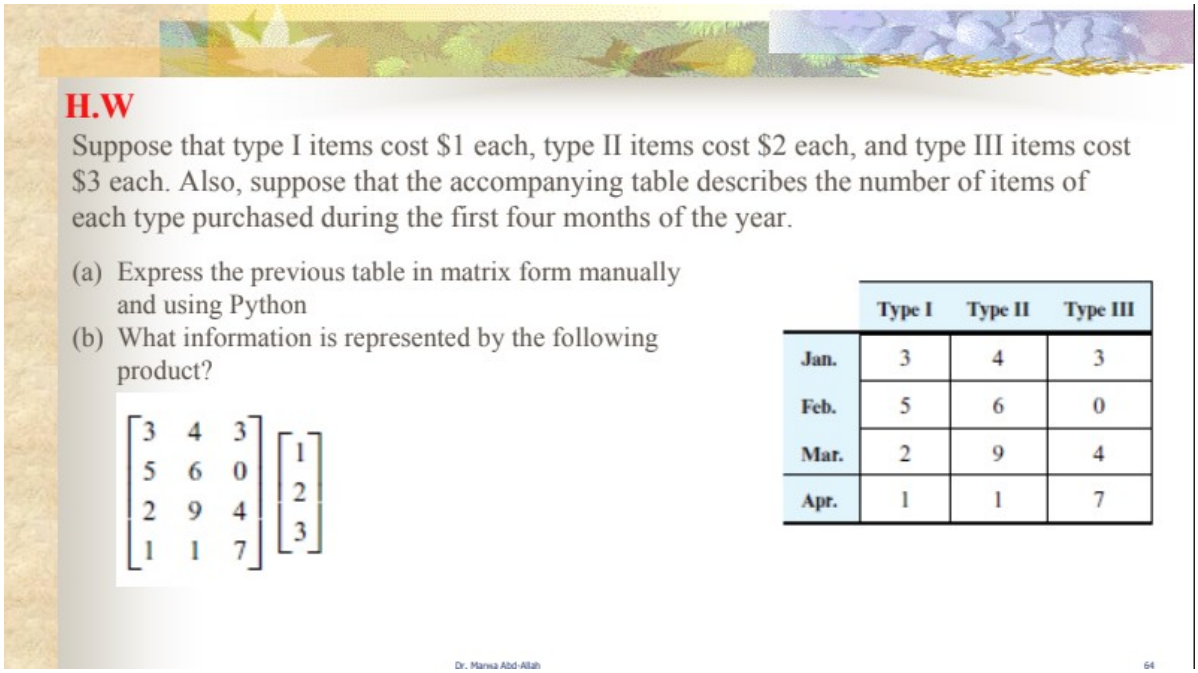
STUDENT CODE: 202200009

The first exercise



a)

In [32]:
```
import numpy as np
```

In [33]:
```
A= np.array([[3,4,3],[5,6,0],[2,9,4],[1,1,7]])
A
```

Out[33]:
```
array([[3, 4, 3],
       [5, 6, 0],
       [2, 9, 4],
       [1, 1, 7]])
```

In [34]:
```
A.shape
```

Out[34]:
```
(4, 3)
```

In [35]:
```
B= np.array([[1],[2],[3]])
B
```

Out[35]:
```
array([[1],
       [2],
       [3]])
```

In [36]:
```
B.shape
```

Out[36]:
```
(3, 1)
```

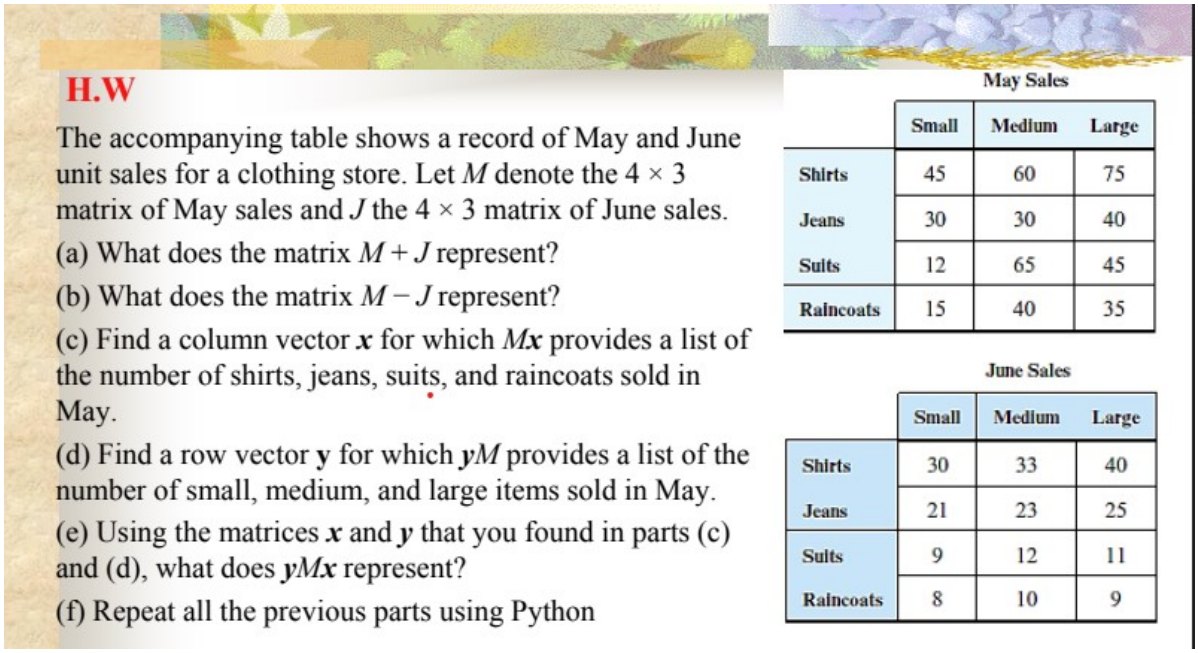
b)

In [37]:
```
AB = np.dot(A,B)
AB
```

Out[37]:
```
array([[20],
       [17],
       [32],
       [24]])
```

This information represents the total costs of products 20, 17, 32, and 24 in January, February, March, and April, respectively.

The second exercise



H.W

The accompanying table shows a record of May and June unit sales for a clothing store. Let M denote the 4×3 matrix of May sales and J the 4×3 matrix of June sales.

(a) What does the matrix $M + J$ represent?

(b) What does the matrix $M - J$ represent?

(c) Find a column vector $\boldsymbol{x}$ for which $M\boldsymbol{x}$ provides a list of the number of shirts, jeans, suits, and raincoats sold in May.

(d) Find a row vector $\mathbf{y}$ for which $\boldsymbol{y}M$ provides a list of the number of small, medium, and large items sold in May.

(e) Using the matrices $\boldsymbol{x}$ and $\boldsymbol{y}$ that you found in parts (c) and (d), what does $\boldsymbol{y}M\boldsymbol{x}$ represent?

(f) Repeat all the previous parts using Python

May Sales

	Small	Medium	Large
Shirts	45	60	75
Jeans	30	30	40
Suits	12	65	45
Raincoats	15	40	35

June Sales

	Small	Medium	Large
Shirts	30	33	40
Jeans	21	23	25
Suits	9	12	11
Raincoats	8	10	9

In [38]:
```
M= np.array([[45,60,75],[30,30,40],[12,65,45],[15,40,35]])
M
```

Out[38]:
```
array([[45, 60, 75],
       [30, 30, 40],
       [12, 65, 45],
       [15, 40, 35]])
```

In [39]:
```
J= np.array([[30,33,40],[21,23,25],[9,12,11],[8,10,9]])
J
```

Out[39]:
```
array([[30, 33, 40],
       [21, 23, 25],
       [ 9, 12, 11],
       [ 8, 10,  9]])
```

a)

In [40]:
```
totalSalesInMayAndJune = M + J
totalSalesInMayAndJune
```

Out[40]:
```
array([[ 75,  93, 115],
       [ 51,  53,  65],
       [ 21,  77,  56],
       [ 23,  50,  44]])
```

b)

In [41]:
```
maySalesSubtractionJuneSales=  M - J
maySalesSubtractionJuneSales
```

Out[41]:
```
array([[15, 27, 35],
       [ 9,  7, 15],
       [ 3, 53, 34],
       [ 7, 30, 26]])
```

In [42]:
```
#c)
x = np . array ([[1], [1], [1]])
x
```

Out[42]:
```
array([[1],
       [1],
       [1]])
```

In [43]:
```
Mx = np.dot(M,x)
Mx
```

Out[43]:
```
array([[180],
       [100],
       [122],
       [ 90]])
```

This information represents the total sales in May 180, 100, 122, and 90 of shirts, jeans, suits, and raincoats, respectively.

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d)

In [44]:
```
y = np.array([[1,1,1,1]])
```

In [45]:
```
yM = np.dot(y,M)
yM
```

Out[45]:
```
array([[102, 195, 195]])
```

This information represents the total sales in May 102, 195, and 195 of small, medium, and large, respectively.

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e)

In [46]:
```
yMx= np.dot(yM,x)
yMx
```

Out[46]:
```
array([[492]])
```

This information represents the total sales in May is 492.

Best regards to you