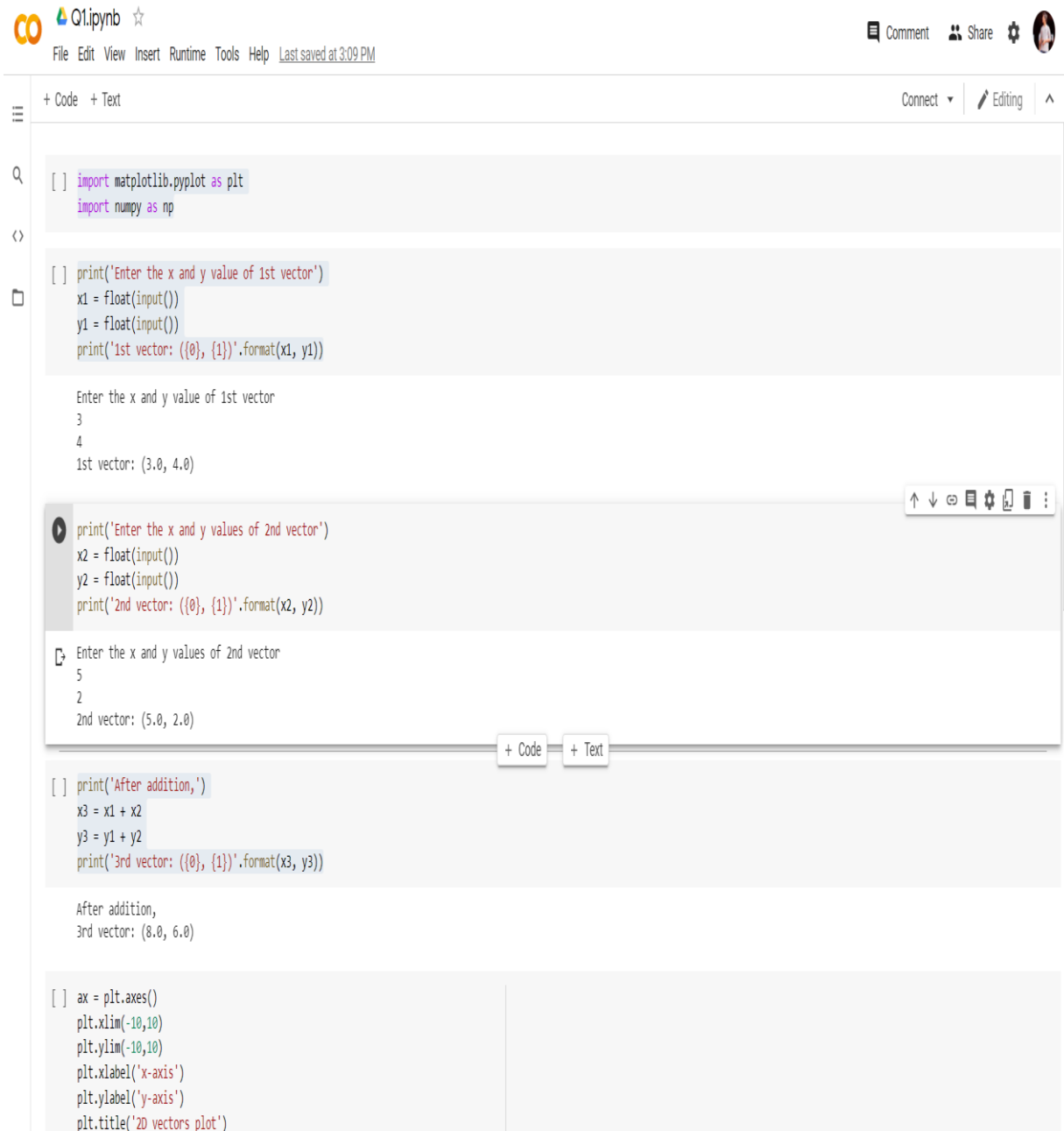


1. Make a program that takes two vectors, adds them together, and plots all three.

Code:



The screenshot shows a Jupyter Notebook titled 'Q1.ipynb' with a menu bar (File, Edit, View, Insert, Runtime, Tools, Help) and a status bar ('Last saved at 3:09 PM'). The notebook contains three code cells. The first cell imports matplotlib.pyplot as plt and numpy as np. The second cell prompts the user for the first vector's components (3 and 4) and prints '1st vector: (3.0, 4.0)'. The third cell prompts for the second vector's components (5 and 2) and prints '2nd vector: (5.0, 2.0)'. Below the third cell is a '+ Code + Text' button. The fourth cell prints 'After addition,' and the fifth cell prints '3rd vector: (8.0, 6.0)'. The sixth cell sets up a 2D plot with axes labeled 'x-axis' and 'y-axis', titled '2D vectors plot'.

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

[ ] print('Enter the x and y value of 1st vector')
x1 = float(input())
y1 = float(input())
print('1st vector: ({0}, {1})'.format(x1, y1))

Enter the x and y value of 1st vector
3
4
1st vector: (3.0, 4.0)

[ ] print('Enter the x and y values of 2nd vector')
x2 = float(input())
y2 = float(input())
print('2nd vector: ({0}, {1})'.format(x2, y2))

Enter the x and y values of 2nd vector
5
2
2nd vector: (5.0, 2.0)

[ ] print('After addition,')
x3 = x1 + x2
y3 = y1 + y2
print('3rd vector: ({0}, {1})'.format(x3, y3))

After addition,
3rd vector: (8.0, 6.0)

[ ] ax = plt.axes()
plt.xlim(-10,10)
plt.ylim(-10,10)
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('2D vectors plot')
```

Output:

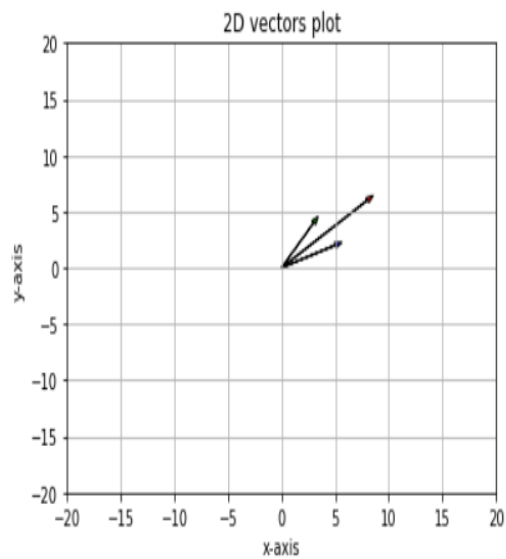


Q1.ipynb ☆

File Edit View Insert Runtime Tools Help [Last saved at 3:09 PM](#)

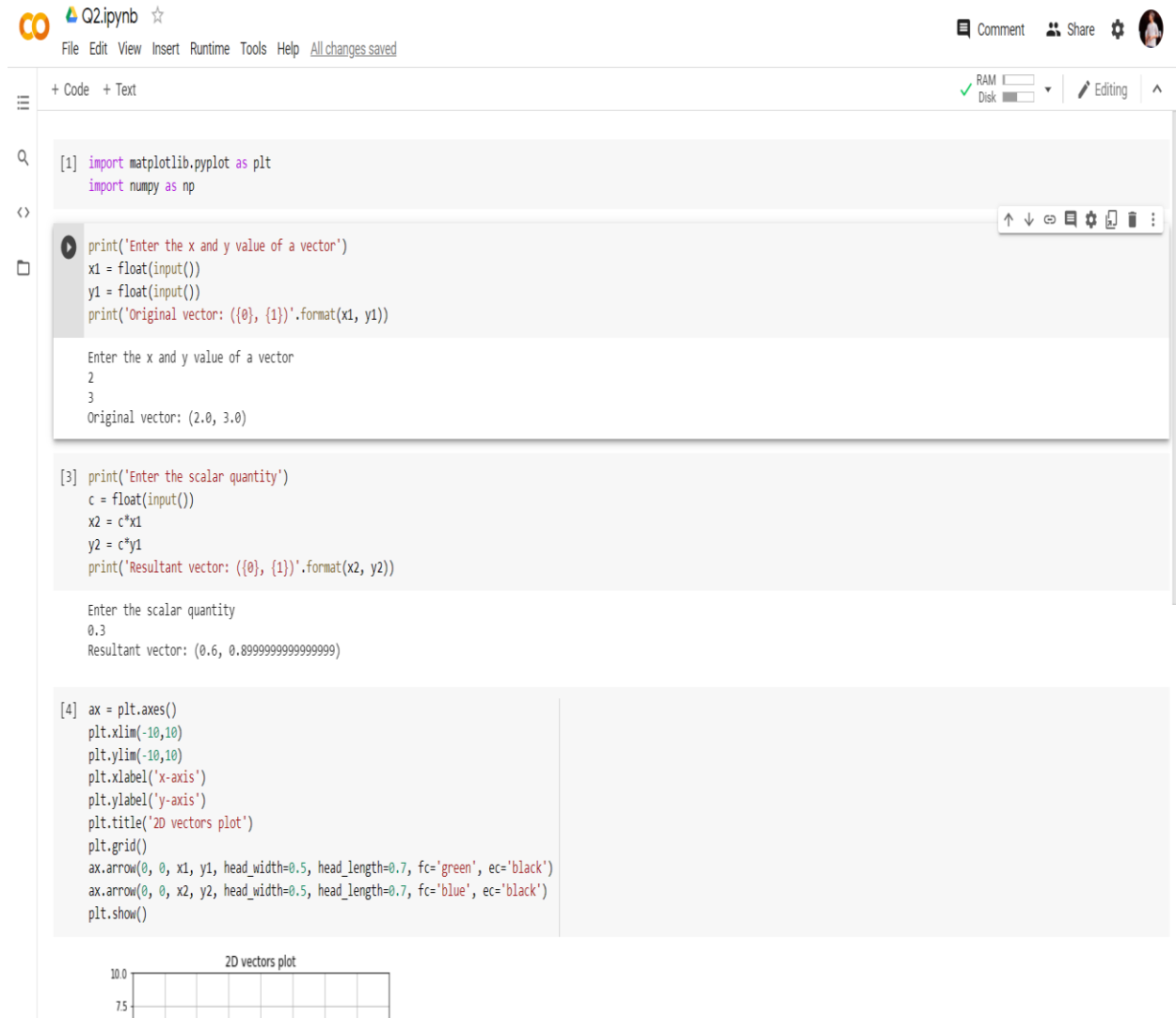
+ Code + Text

```
[ ] plt.grid()
    ax.arrow(0, 0, x1, y1, head_width=0.5, head_length=0.7, fc='green', ec='black')
    ax.arrow(0, 0, x2, y2, head_width=0.5, head_length=0.7, fc='blue', ec='black')
    ax.arrow(0, 0, x3, y3, head_width=0.5, head_length=0.7, fc='red', ec='black')
    plt.show()
```



2. Make a program that takes a vector, multiplies it with a scalar quantity, and plots the original and resultant vector.

Code:



The screenshot shows a Jupyter Notebook with three code cells. The first cell imports matplotlib.pyplot as plt and numpy as np. The second cell prompts the user to enter the x and y values of a vector, which are 2 and 3 respectively, and prints the original vector as (2.0, 3.0). The third cell prompts the user to enter a scalar quantity, which is 0.3, and prints the resultant vector as (0.6, 0.8999999999999999). Below the code cells, a plot titled '2D vectors plot' is shown, displaying the original vector in green and the resultant vector in blue on a 2D coordinate system.

```
[1] import matplotlib.pyplot as plt
import numpy as np

print('Enter the x and y value of a vector')
x1 = float(input())
y1 = float(input())
print('Original vector: ({0}, {1})'.format(x1, y1))

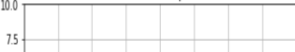
Enter the x and y value of a vector
2
3
Original vector: (2.0, 3.0)

[3] print('Enter the scalar quantity')
c = float(input())
x2 = c*x1
y2 = c*y1
print('Resultant vector: ({0}, {1})'.format(x2, y2))

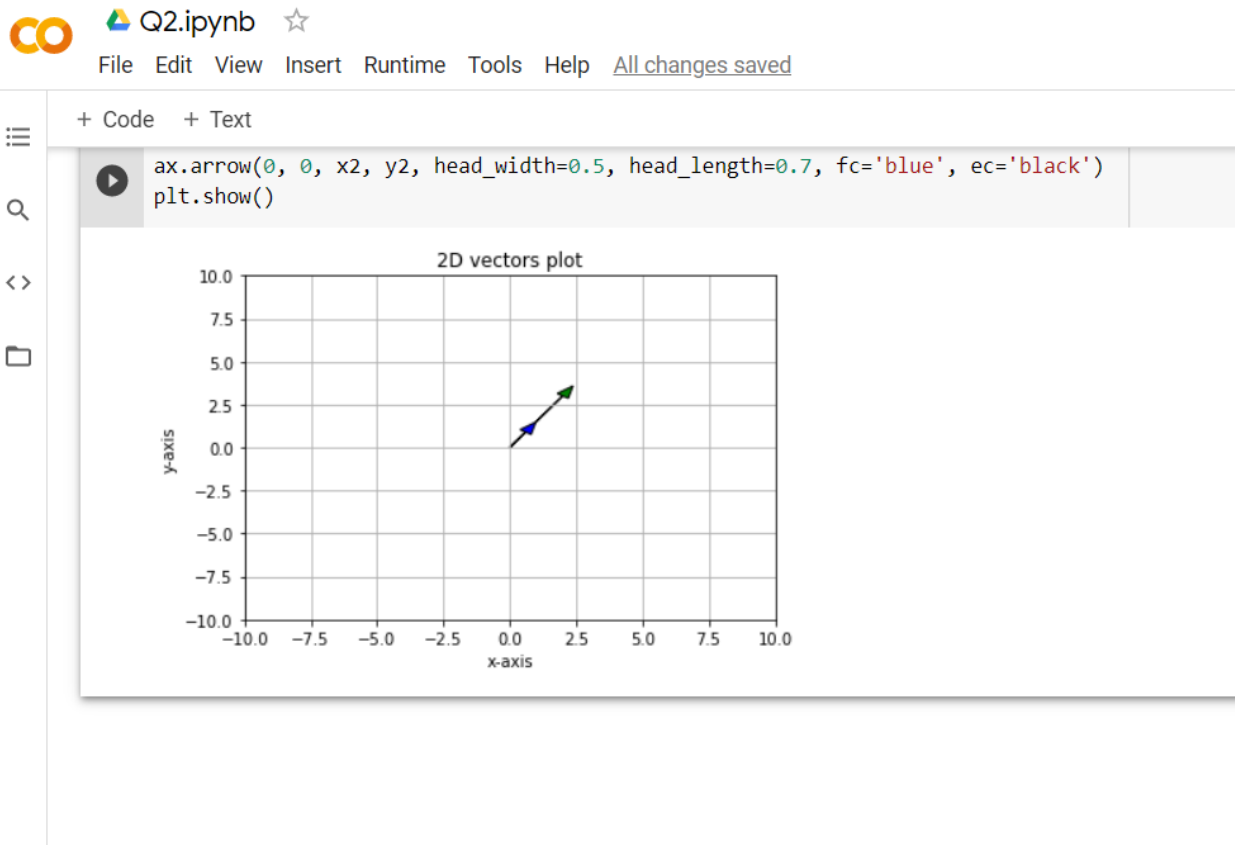
Enter the scalar quantity
0.3
Resultant vector: (0.6, 0.8999999999999999)

[4] ax = plt.axes()
plt.xlim(-10,10)
plt.ylim(-10,10)
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('2D vectors plot')
plt.grid()
ax.arrow(0, 0, x1, y1, head_width=0.5, head_length=0.7, fc='green', ec='black')
ax.arrow(0, 0, x2, y2, head_width=0.5, head_length=0.7, fc='blue', ec='black')
plt.show()
```

2D vectors plot

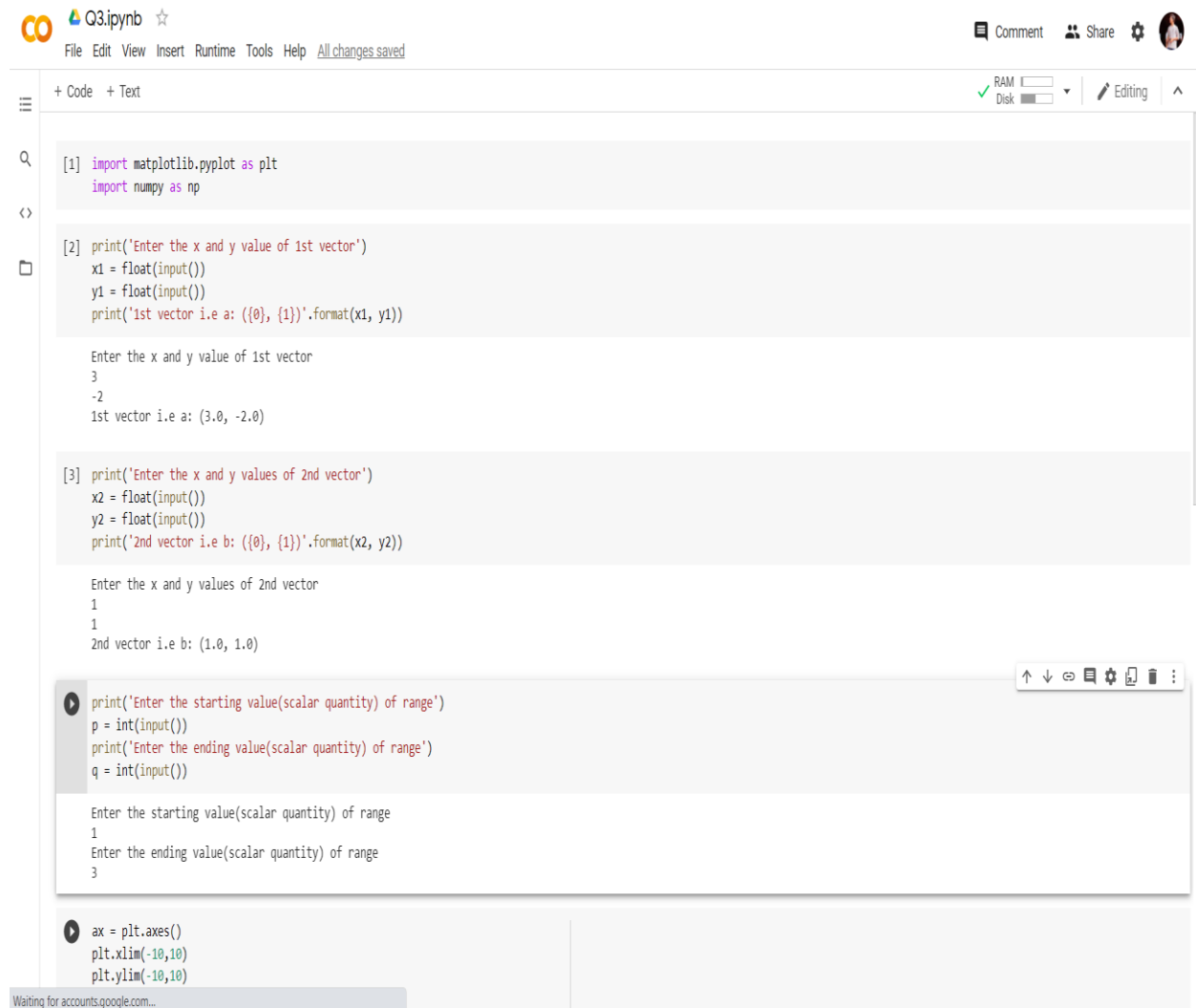


Output:



3. Make a program that takes two vectors a and b. Now, multiply one of them (let us say b) with a few scalar quantities between x to y generating n number of vectors. Add each generated vector to vector a. Plot all the resultant vectors.

Code:



The screenshot shows a Jupyter Notebook interface with the following code and output:

```
[1] import matplotlib.pyplot as plt
import numpy as np
```

```
[2] print('Enter the x and y value of 1st vector')
x1 = float(input())
y1 = float(input())
print('1st vector i.e a: ({0}, {1})'.format(x1, y1))
```

Enter the x and y value of 1st vector
3
-2
1st vector i.e a: (3.0, -2.0)

```
[3] print('Enter the x and y values of 2nd vector')
x2 = float(input())
y2 = float(input())
print('2nd vector i.e b: ({0}, {1})'.format(x2, y2))
```

Enter the x and y values of 2nd vector
1
1
2nd vector i.e b: (1.0, 1.0)

```
print('Enter the starting value(scalar quantity) of range')
p = int(input())
print('Enter the ending value(scalar quantity) of range')
q = int(input())
```

Enter the starting value(scalar quantity) of range
1
Enter the ending value(scalar quantity) of range
3

```
ax = plt.axes()
plt.xlim(-10,10)
plt.ylim(-10,10)
```

Waiting for accounts.google.com...

Output:



+ Code + Text



```
[5] plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('2D vectors plot')
plt.grid()

ax.arrow(0, 0, x1, y1, head_width=0.5, head_length=0.7, fc='red', ec='black')
ax.arrow(0, 0, x2, y2, head_width=0.5, head_length=0.7, fc='red', ec='black')

for i in range(p, (q+1)):
    x = x1 + (i * x2)
    y = y1 + (i * y2)
    ax.arrow(0, 0, x, y, head_width=0.5, head_length=0.7, fc='red', ec='black')
plt.show()
```

