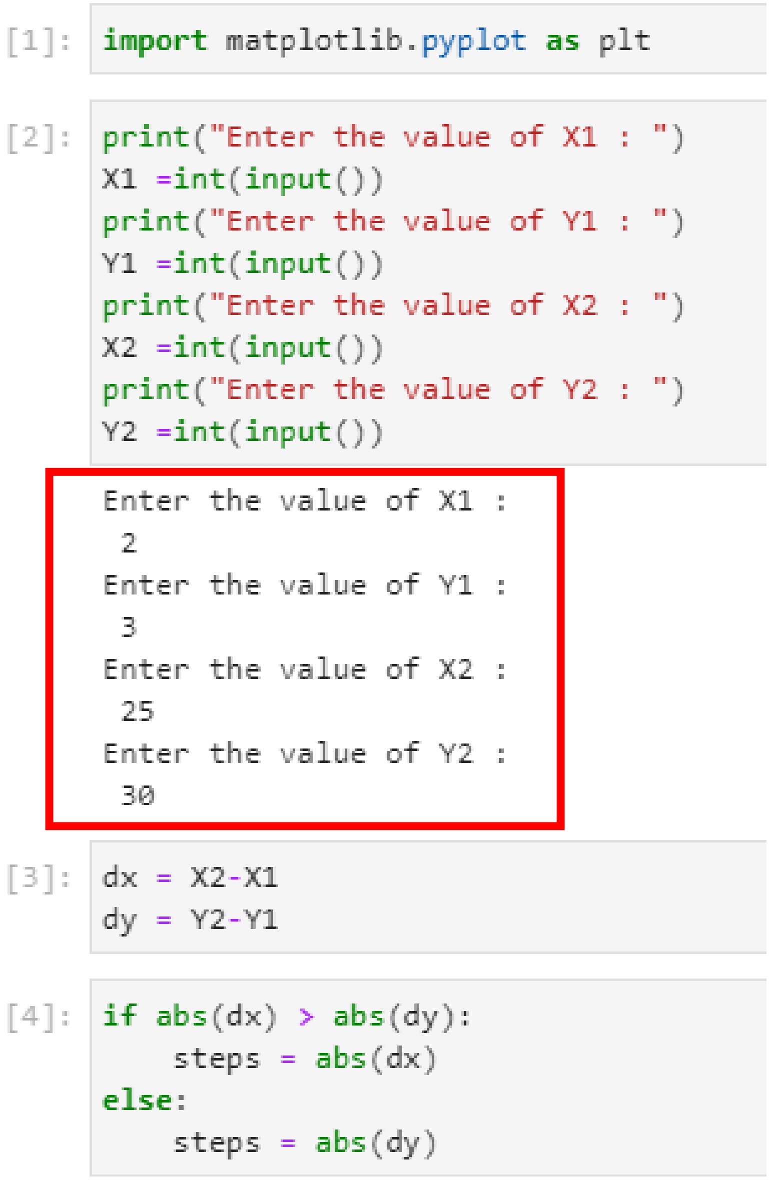
Digital Differential Analyzer (DDA) – Line Algorithym



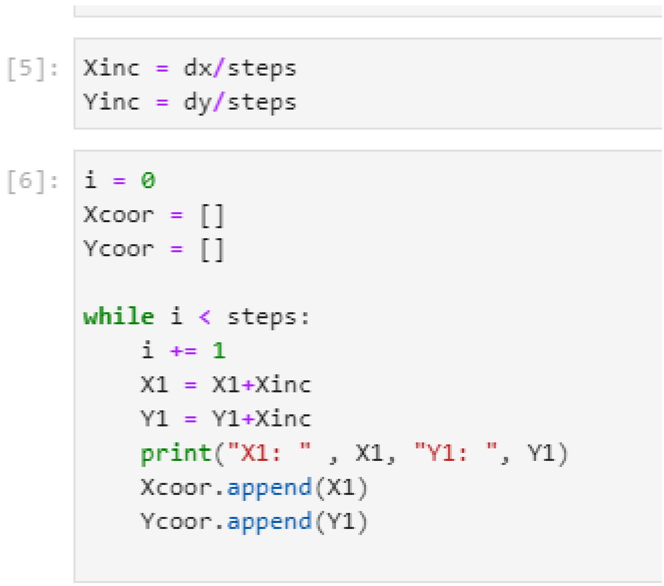
```
[1]: import matplotlib.pyplot as plt
```

```
[2]: print("Enter the value of X1 : ")
     X1 =int(input())
     print("Enter the value of Y1 : ")
     Y1 =int(input())
     print("Enter the value of X2 : ")
     X2 =int(input())
     print("Enter the value of Y2 : ")
     Y2 =int(input())
```

```
Enter the value of X1 :
 2
Enter the value of Y1 :
 3
Enter the value of X2 :
 25
Enter the value of Y2 :
 30
```

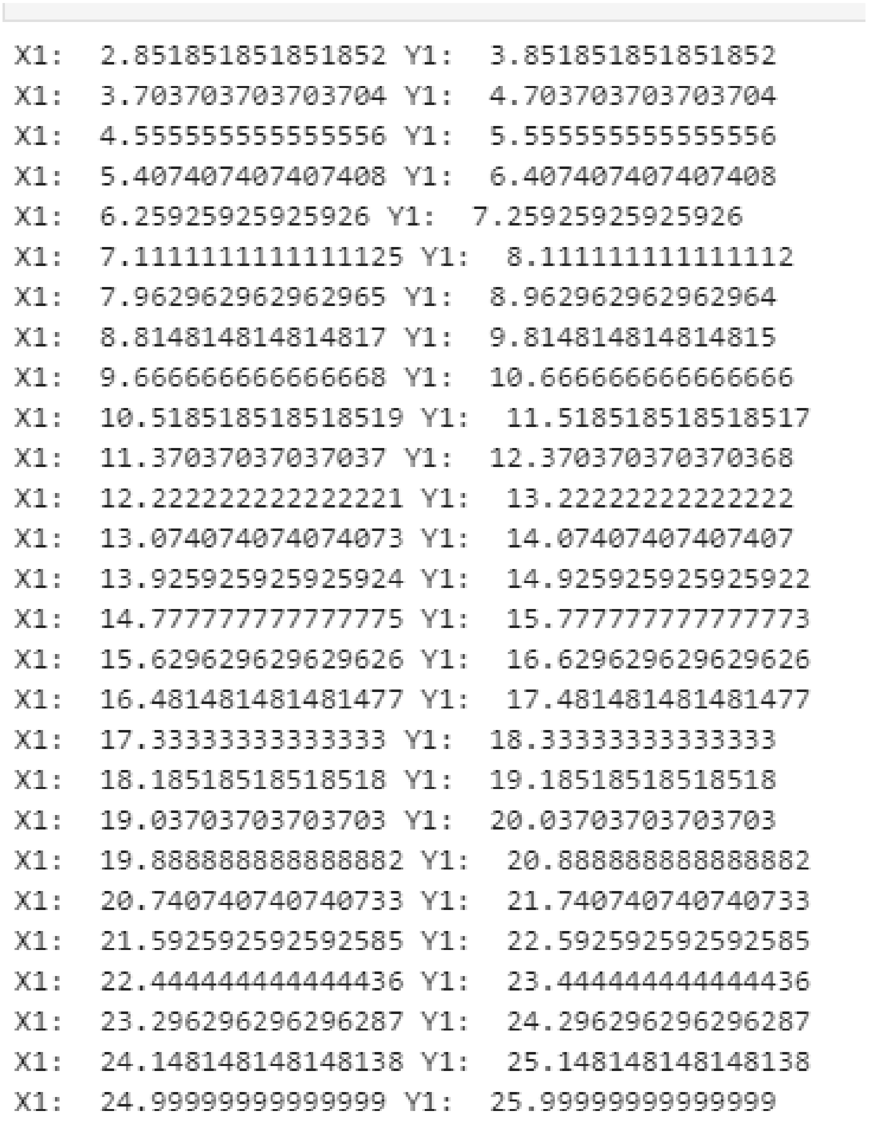
```
[3]: dx = X2-X1
     dy = Y2-Y1
```

```
[4]: if abs(dx) > abs(dy):
         steps = abs(dx)
     else:
         steps = abs(dy)
```

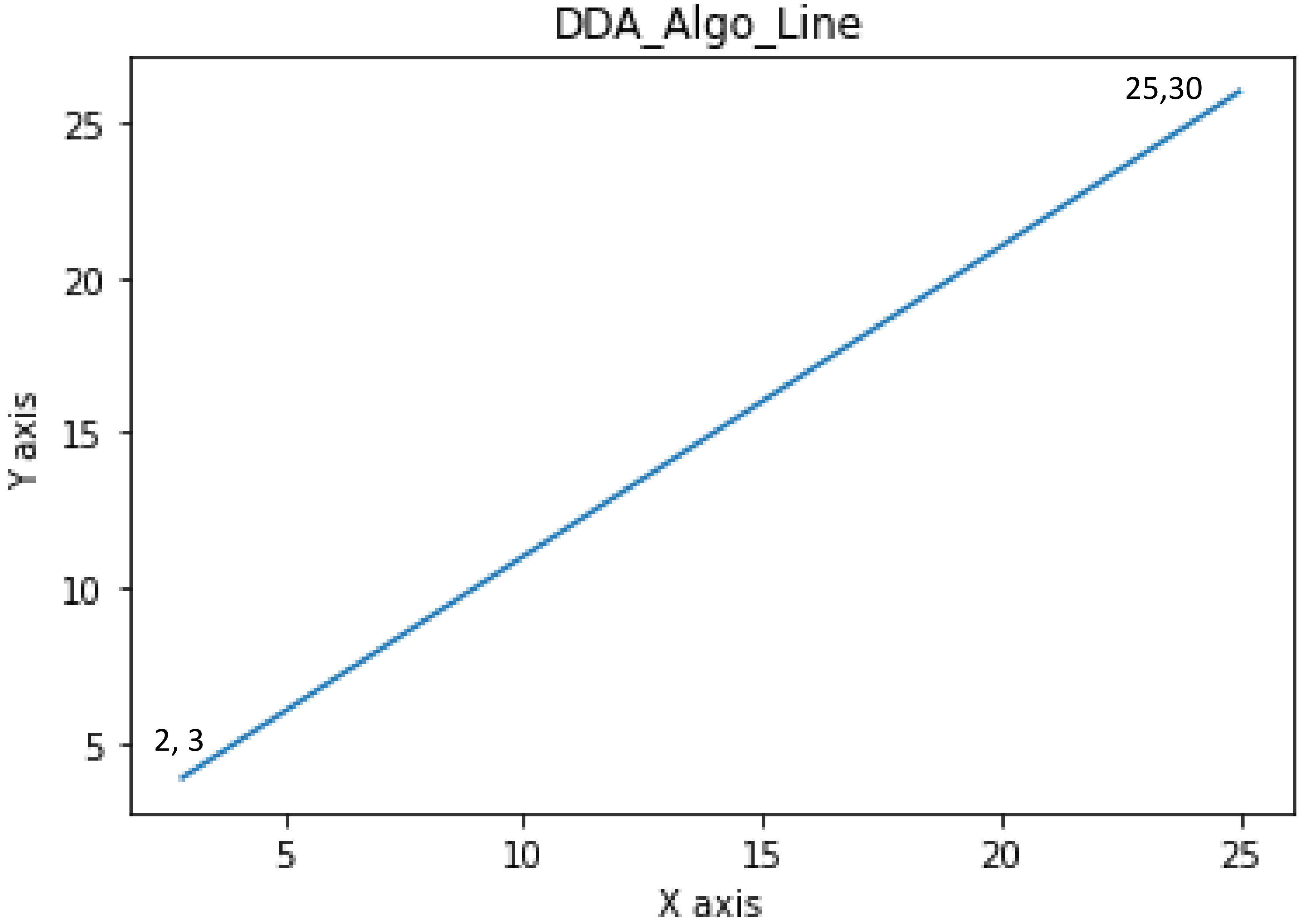


```
[5]: Xinc = dx/steps
     Yinc = dy/steps
```

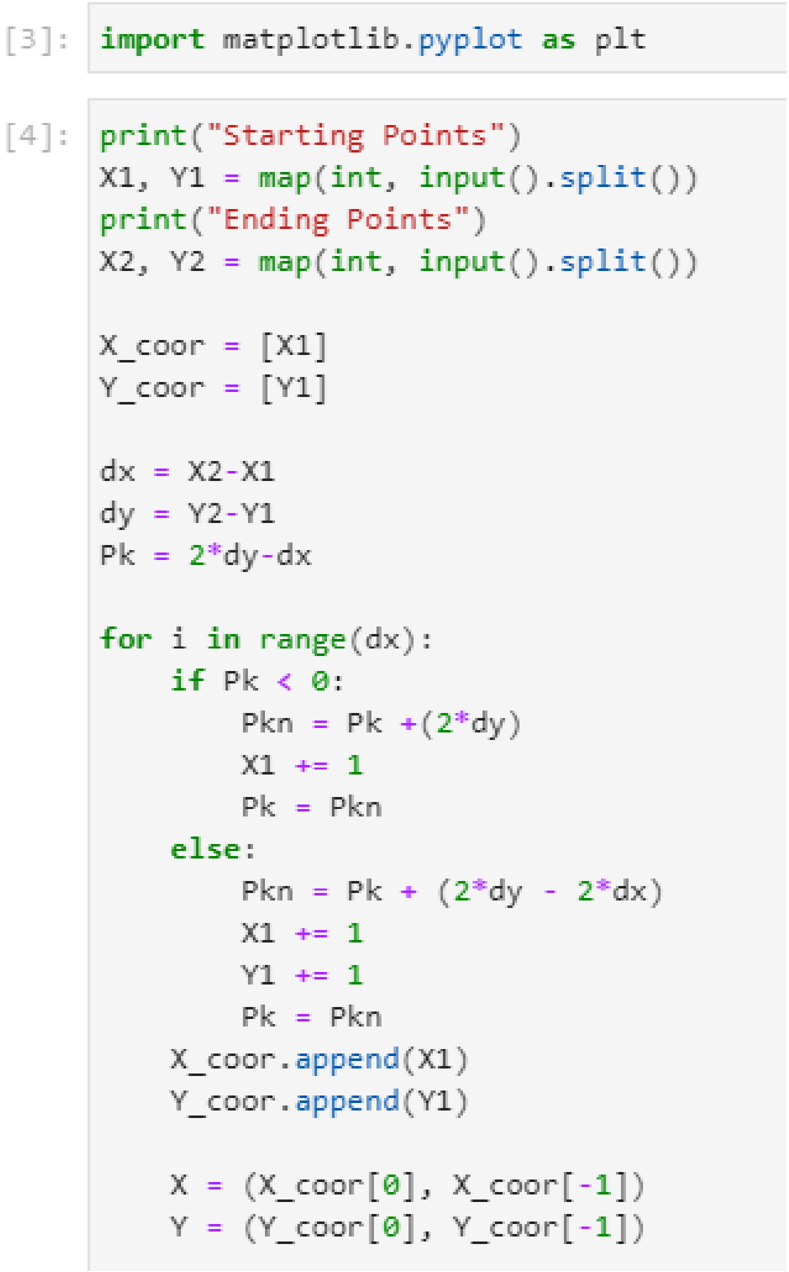
```
[6]: i = 0
     Xcoor = []
     Ycoor = []

     while i < steps:
         i += 1
         X1 = X1+Xinc
         Y1 = Y1+Xinc
         print("X1: " , X1, "Y1: ", Y1)
         Xcoor.append(X1)
         Ycoor.append(Y1)
```



```
X1:  2.851851851851852 Y1:  3.851851851851852
X1:  3.703703703703704 Y1:  4.703703703703704
X1:  4.555555555555556 Y1:  5.555555555555556
X1:  5.407407407407408 Y1:  6.407407407407408
X1:  6.2592592592592 6 Y1:  7.2592592592592 6
X1:  7.111111111111125 Y1:  8.11111111111112
X1:  7.962962962962965 Y1:  8.962962962962964
X1:  8.814814814814817 Y1:  9.814814814814815
X1:  9.666666666666668 Y1:  10.666666666666666
X1:  10.518518518518519 Y1:  11.518518518518517
X1:  11.37037037037037 Y1:  12.370370370370368
X1:  12.222222222222221 Y1:  13.2222222222222
X1:  13.074074074074073 Y1:  14.07407407407407
X1:  13.925925925925924 Y1:  14.925925925925922
X1:  14.777777777777775 Y1:  15.777777777777773
X1:  15.629629629629626 Y1:  16.629629629629626
X1:  16.481481481481477 Y1:  17.481481481481477
X1:  17.33333333333333 Y1:  18.33333333333333
X1:  18.18518518518518 Y1:  19.18518518518518
X1:  19.03703703703703 Y1:  20.03703703703703
X1:  19.888888888888882 Y1:  20.888888888888882
X1:  20.740740740740733 Y1:  21.740740740740733
X1:  21.592592592592585 Y1:  22.592592592592585
X1:  22.444444444444436 Y1:  23.444444444444436
X1:  23.296296296296287 Y1:  24.296296296296287
X1:  24.148148148148138 Y1:  25.148148148148138
X1:  24.99999999999999 Y1:  25.99999999999999
```

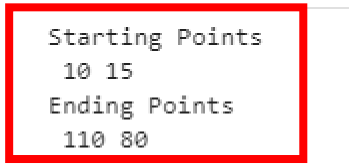

DDA_Algo_Line
25,30
2, 3
Y axis
25
20
15
10
5
X axis
5
10
15
20
25

Bresenham's – Line Algorithym

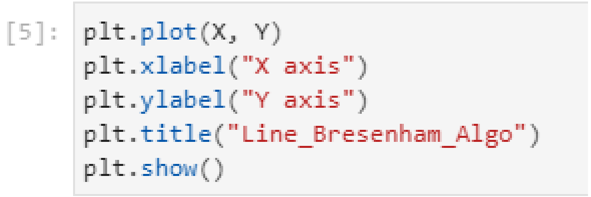


```
[3]: import matplotlib.pyplot as plt
```

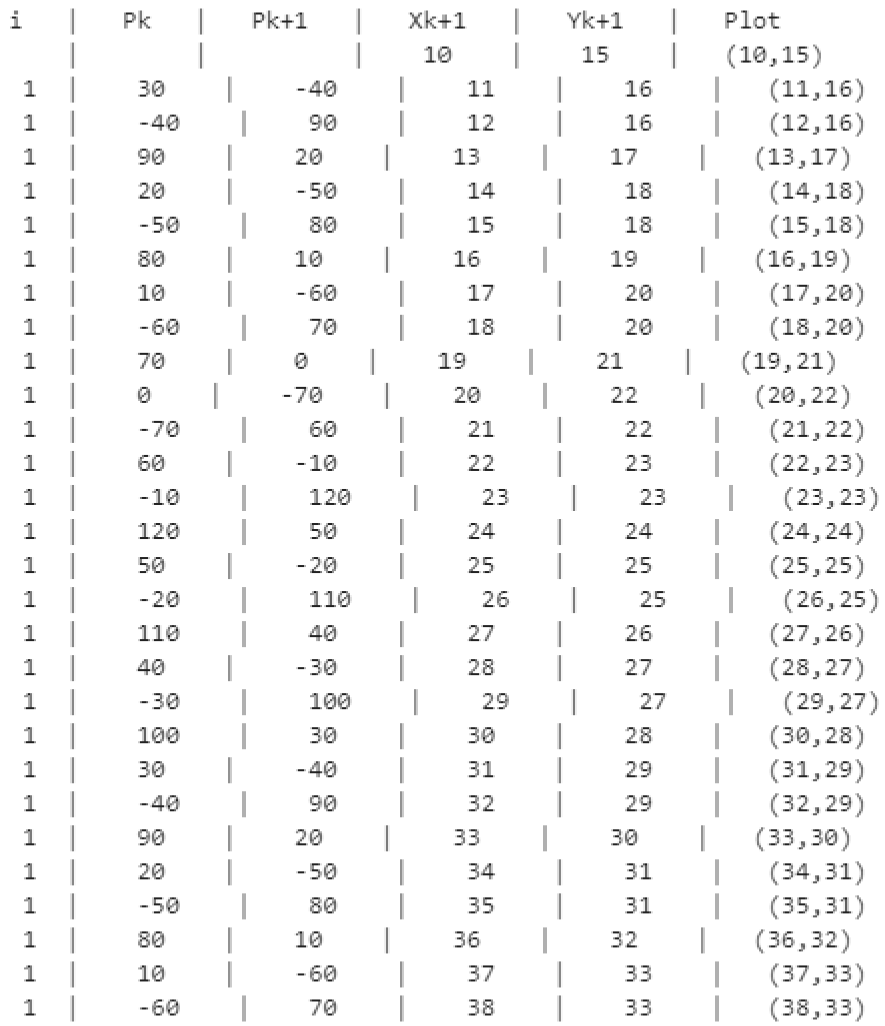
```
[4]: print("Starting Points")
     X1, Y1 = map(int, input().split())
     print("Ending Points")
     X2, Y2 = map(int, input().split())

     X_coor = [X1]
     Y_coor = [Y1]

     dx = X2-X1
     dy = Y2-Y1
     Pk = 2*dy-dx

     for i in range(dx):
         if Pk < 0:
             Pkn = Pk +(2*dy)
             X1 += 1
             Pk = Pkn
         else:
             Pkn = Pk + (2*dy - 2*dx)
             X1 += 1
             Y1 += 1
             Pk = Pkn
         X_coor.append(X1)
         Y_coor.append(Y1)

         X = (X_coor[0], X_coor[-1])
         Y = (Y_coor[0], Y_coor[-1])
```



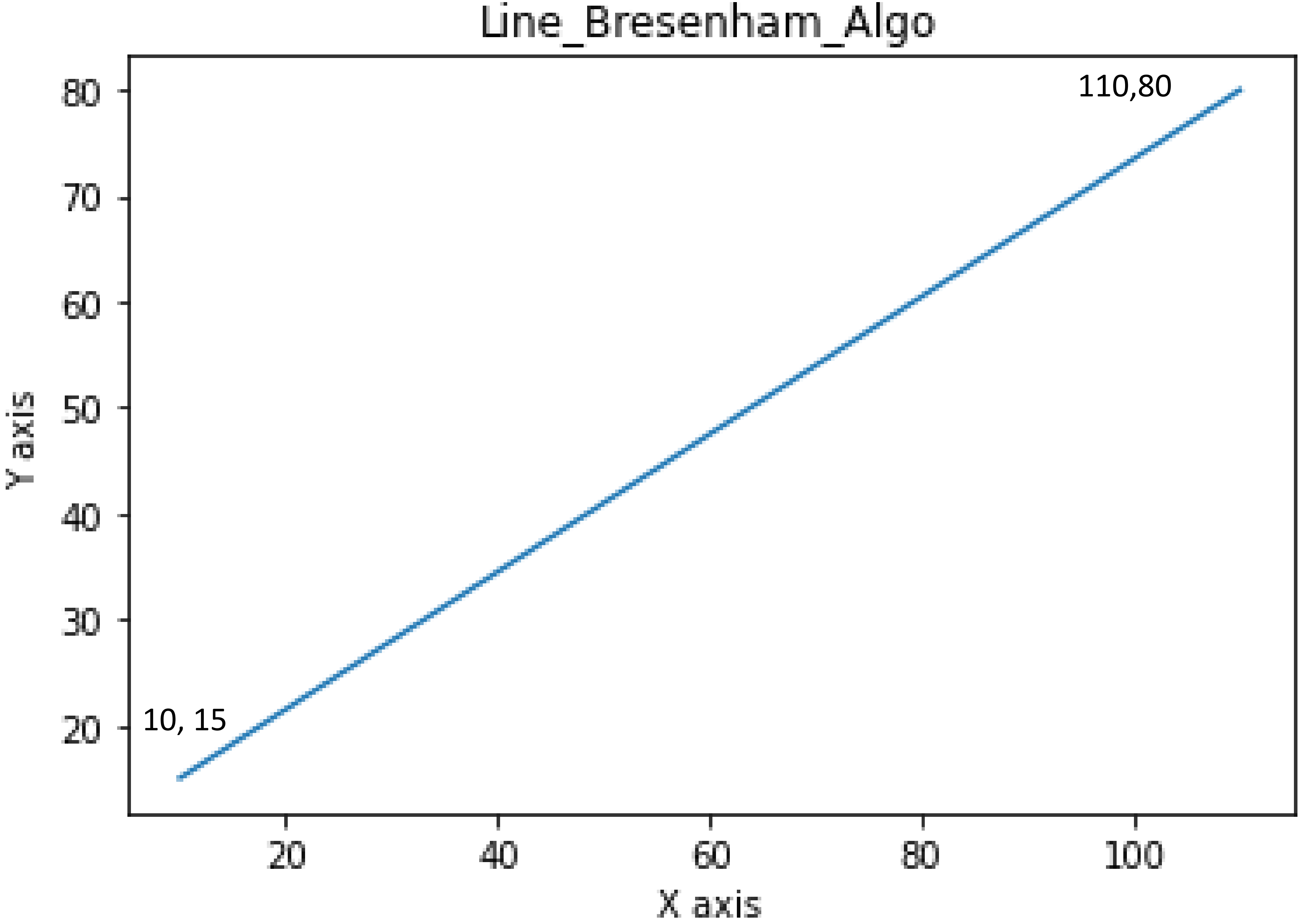
```
Starting Points
 10 15
Ending Points
 110 80
```



```
[5]: plt.plot(X, Y)
     plt.xlabel("X axis")
     plt.ylabel("Y axis")
     plt.title("Line_Bresenham_Algo")
     plt.show()
```



```
i  |  Pk   |  Pk+1  |  Xk+1  |  Yk+1  |  Plot
   |       |        |   10   |   15   |  (10,15)
1  |  30   |  -40   |   11   |   16   |  (11,16)
1  |  -40  |   90   |   12   |   16   |  (12,16)
1  |  90   |   20   |   13   |   17   |  (13,17)
1  |  20   |  -50   |   14   |   18   |  (14,18)
1  |  -50  |   80   |   15   |   18   |  (15,18)
1  |  80   |   10   |   16   |   19   |  (16,19)
1  |  10   |  -60   |   17   |   20   |  (17,20)
1  |  -60  |   70   |   18   |   20   |  (18,20)
1  |  70   |   0    |   19   |   21   |  (19,21)
1  |  0    |  -70   |   20   |   22   |  (20,22)
1  |  -70  |   60   |   21   |   22   |  (21,22)
1  |  60   |  -10   |   22   |   23   |  (22,23)
1  |  -10  |   120  |   23   |   23   |  (23,23)
1  |  120  |   50   |   24   |   24   |  (24,24)
1  |  50   |  -20   |   25   |   25   |  (25,25)
1  |  -20  |   110  |   26   |   25   |  (26,25)
1  |  110  |   40   |   27   |   26   |  (27,26)
1  |  40   |  -30   |   28   |   27   |  (28,27)
1  |  -30  |   100  |   29   |   27   |  (29,27)
1  |  100  |   30   |   30   |   28   |  (30,28)
1  |  30   |  -40   |   31   |   29   |  (31,29)
1  |  -40  |   90   |   32   |   29   |  (32,29)
1  |  90   |   20   |   33   |   30   |  (33,30)
1  |  20   |  -50   |   34   |   31   |  (34,31)
1  |  -50  |   80   |   35   |   31   |  (35,31)
1  |  80   |   10   |   36   |   32   |  (36,32)
1  |  10   |  -60   |   37   |   33   |  (37,33)
1  |  -60  |   70   |   38   |   33   |  (38,33)
```


Line_Bresenham_Algo
110,80
10, 15
80
70
60
50
40
30
20
Y axis
20
40
60
80
100
X axis