Rayhaan Shaikh 014340259
Mark Tan 012707693
Andrew Soth 014248453
Brian Pham 013534805
Preston Wong 014460145
5/5/18

Project 5

Code:

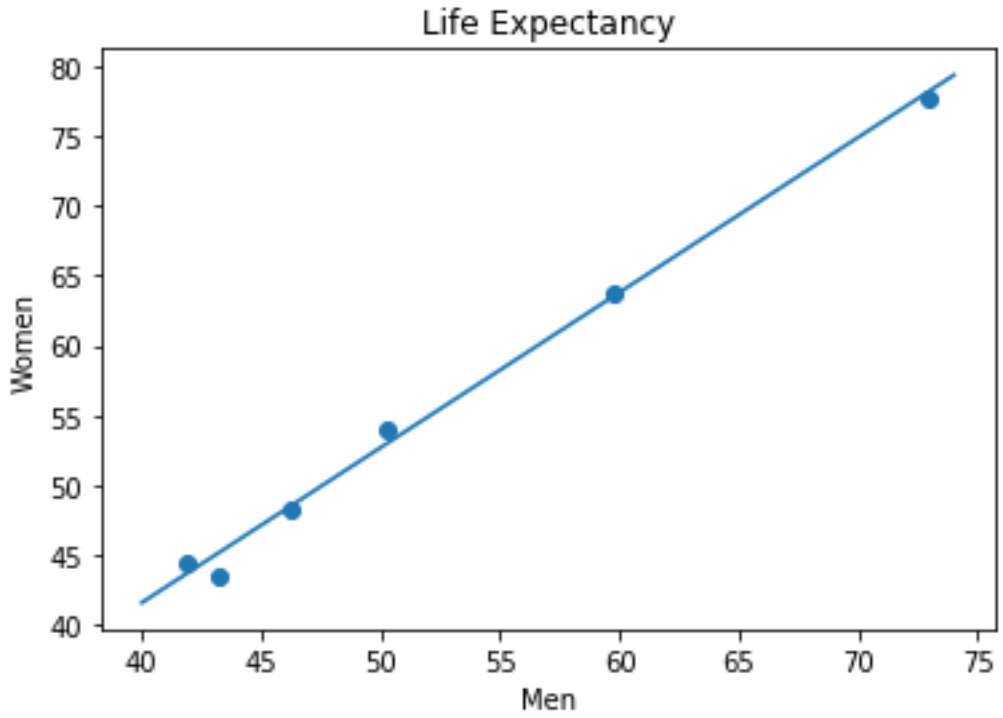
```
# EE 381 Project 5

# Linear Relationship Between Two Random Variables


import math

import numpy as np

import matplotlib.pyplot as plt


n = 6 # 6 data pairs total

men = [59.7,72.9,41.9,46.2,50.3,43.2]

women=[63.8,77.8,44.5,48.3,54.0,43.5]


summationX = sum(men)

summationY = sum(women)


exy = [0,0,0,0,0,0]

i=0

while i < len(men):

    #getting indices for exy

    exy[i] = men[i]*women[i]

    i=i + 1


menSquared=[0]*n
```

```
womenSquared = [0]*n
i=0
while i < 6:
    #making list for ex^2 and ey^2
    menSquared[i] = men[i]*men[i]              # ex^2
    womenSquared[i]=women[i]*women[i]    # ey^2
    i=i+1

summationWomenSquared =sum(womenSquared)
summationMenSquared = sum(menSquared)
summationMen = sum(men)
summationWomen = sum(women)

i = 0

topOfFraction = 6 * (sum(exy)) - (summationMen)*(summationWomen)
bottomOfFraction = math.sqrt((6 * (summationMenSquared) - ((summationX)**2)) * ( ( (6 * summationWomenSquared))-(summationY**2)))
r = topOfFraction/bottomOfFraction #answer is .997 so positive correlation

#df time to find the c.v
#d,f = n -2 on beachboard project 5 post so go to 10 and then .05 from there
cv = 1.812
tv = r * (math.sqrt((6-2)/(1-r**2))) #solving for tv with the formula on beach board
print ("The tv is",tv)

#reject null hypothesis since cv has been crossed
#solving for a and b with the formulas posted on beachboard
```

```
a= ((summationWomen*summationMenSquared) -(summationMen)*(sum(exy))) /(( 6*(summationMenSquared) - (summationMen)**2))

b=((6 * sum(exy) - ((summationMen) * (summationWomen)) ))  / ((6 * summationMenSquared) - summationMen**2)


# make scattered plot

plt.scatter(men, women)


#make regression line

f = np.array(range(40,75))

g = a + b * f

plt.plot(f,g)


#display graph with points and regression line

plt.title('Life Expectancy')

plt.xlabel('Men')

plt.ylabel('Women')

plt.show()


#predict new values of dependent variable (women)

print("Now predicting new values of dependent variable for women")

test_vals = [75,80,85,90]

i = 0

while i < len(test_vals):

    g = a + b * test_vals[i]

    print(test_vals[i]," ",g)

    i += 1
```

Output:

The tv is 27.883877746623874



Now predicting new values of dependent variable for women

75 80.49948777310203

80 86.06270303961938

85 91.62591830613673

90 97.18913357265409