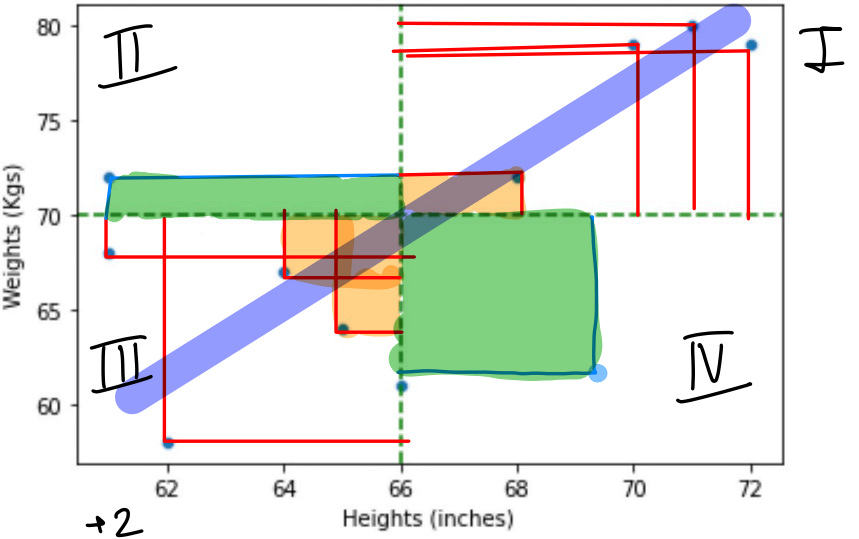
CORRELATION TEST

Height (inches)	Weight (kg)	
68	72	
62	58	
64	67	
61	72	
70	79	
66	61	
61	68	
65	64	
71	80	
72	79	
$\bar{h} = 66$	$\bar{w} = 70$	



I $(68-66) \times (72-70) = +4$ (+2, +2)

II $(61-66) \times (72-70) = -10$ (−5, +2)

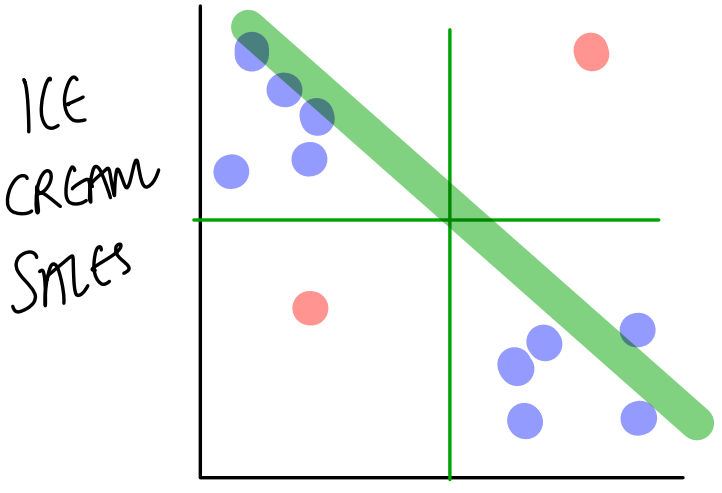
III $(64-66) \times (67-70) = +6$ (−2, −3)

IV $(69-66) \times (63-70) = -21$ (+3, −7)

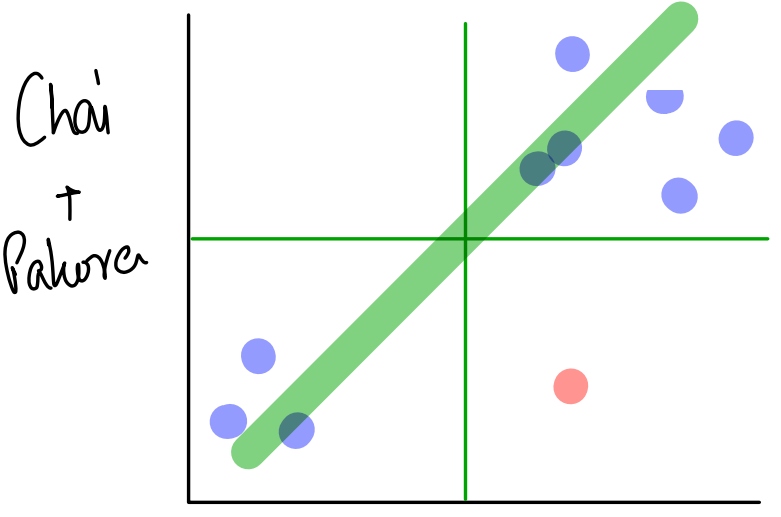
I & III +ve

II & IV -ve

$$\text{Covariance} = \frac{1}{n}\sum (x_i - \bar{x})(y_i - \bar{y})$$



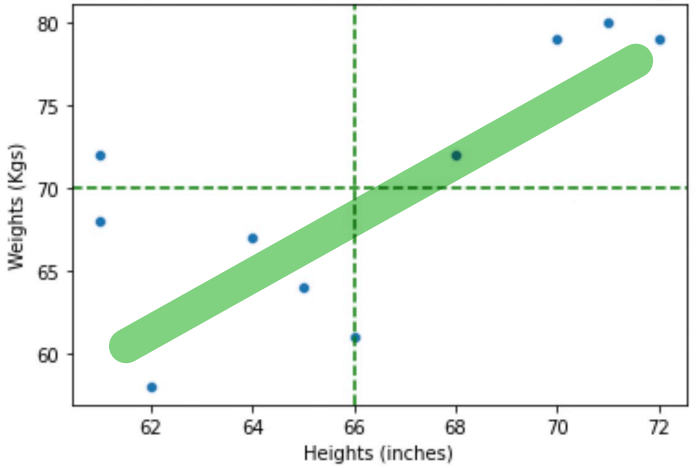
-ve correlated Rains



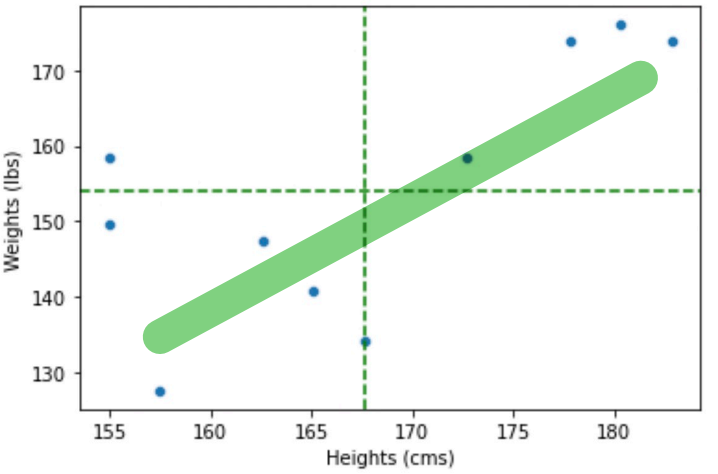
+ve correlated Rains

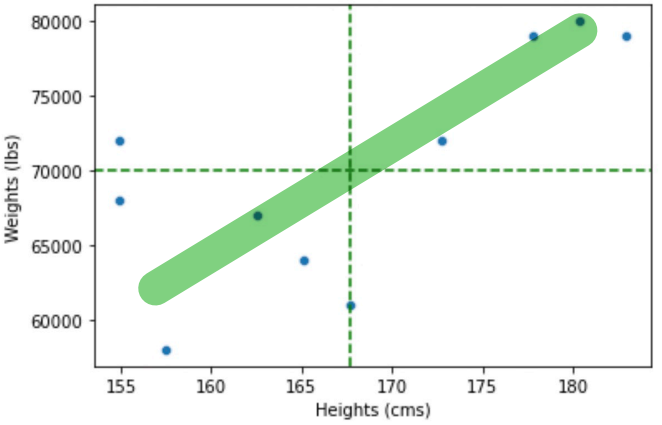
```
plt.show()
```

LALIT'S



NAKUL'S





DARSH

$$\text{Covariance} = \frac{1}{n} \sum (x_i - \bar{x})(y_i - \bar{y})$$

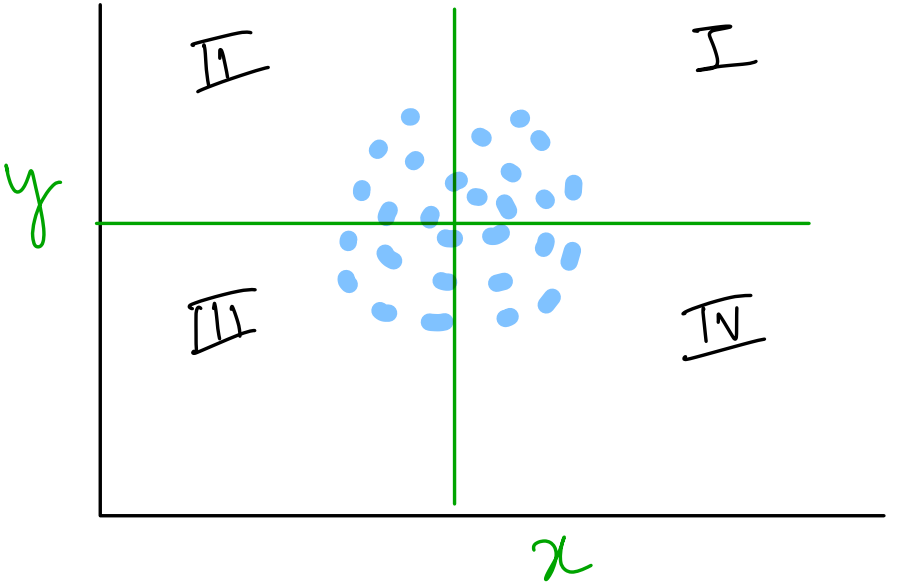
$$\text{Correlation} = \frac{1}{n} \sum \frac{(x_i - \bar{x})}{\sigma_x} \frac{(y_i - \bar{y})}{\sigma_y}$$

Pearson

$$\text{Correlation} = \frac{\text{Cov}(x, y)}{\sigma_x \sigma_y}$$

$$\rho_{xy} = \frac{\text{Cov}(x, y)}{\sigma_x \sigma_y}$$

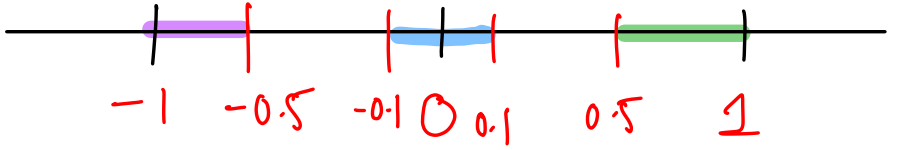
$$-1 \leq \rho_{xy} \leq 1$$



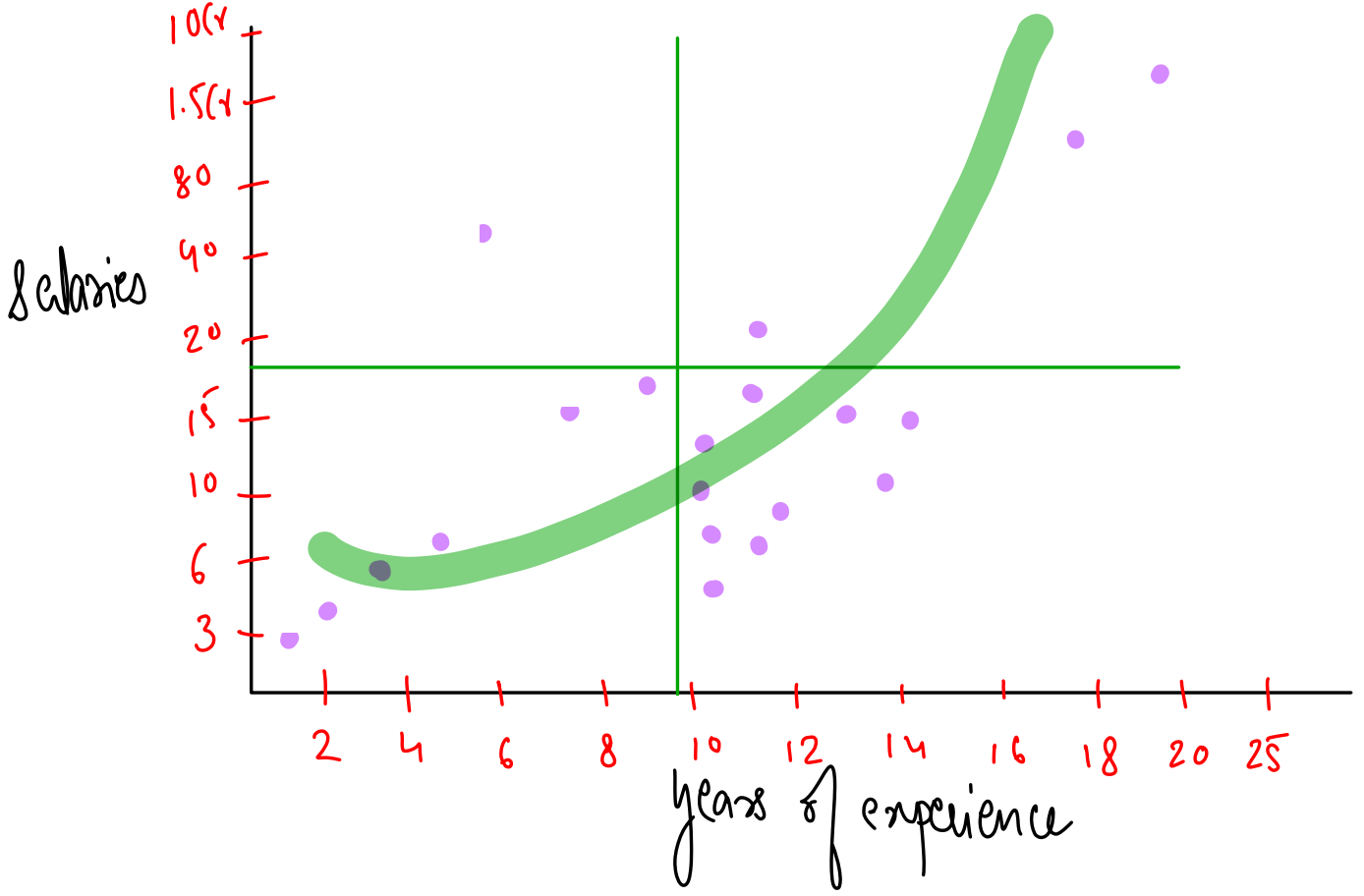
$Cov(x, y) = 0$

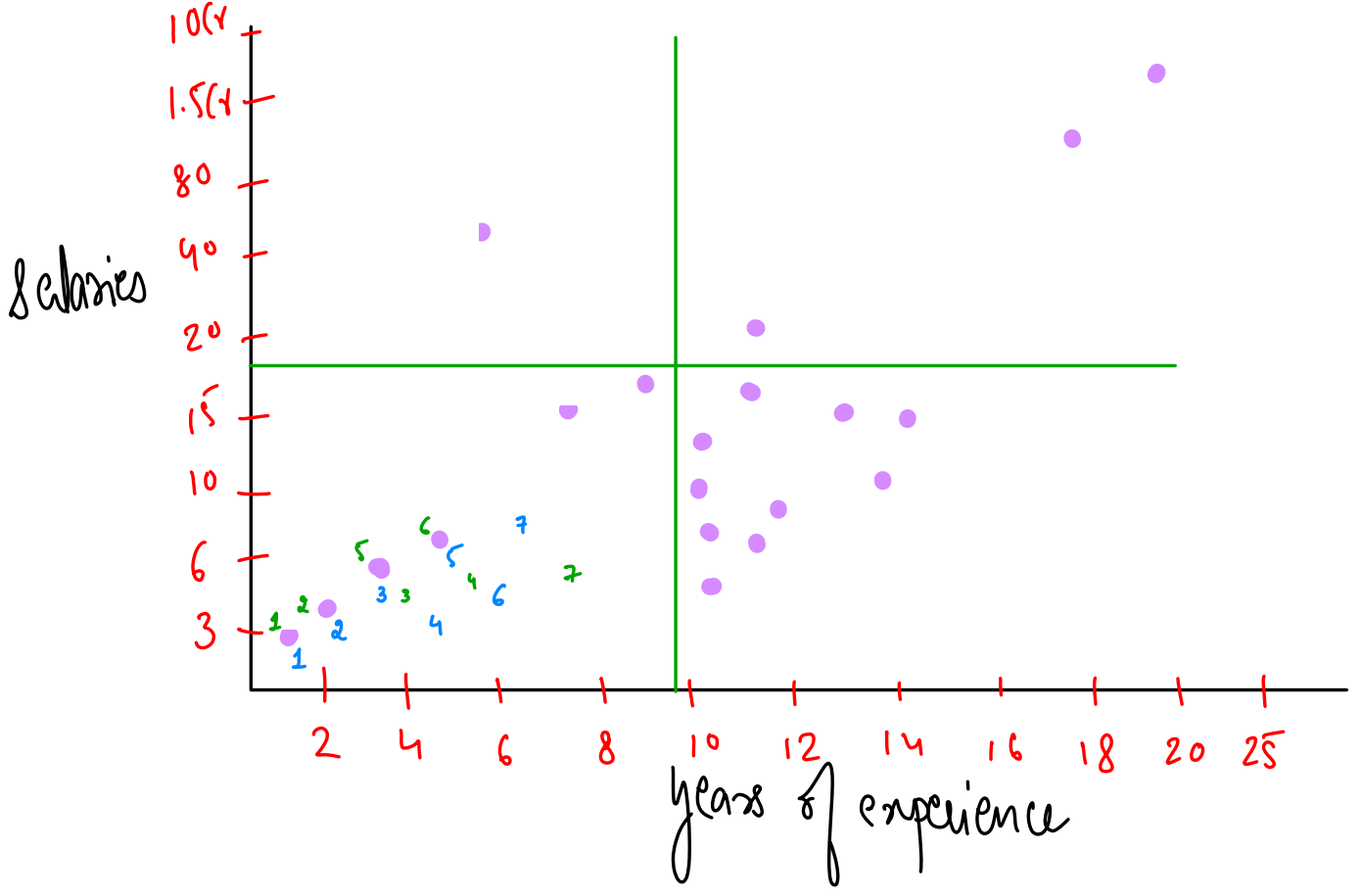
$\underline{\underline{Cor}} = 0$

Uncorrelated

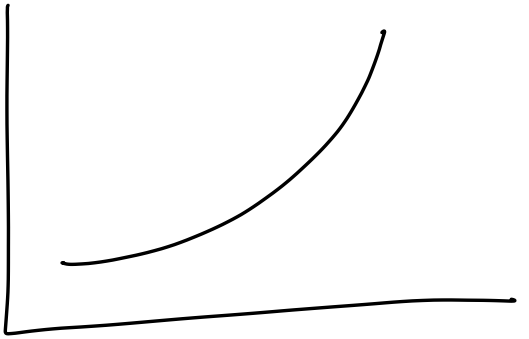


ρ_{xy}

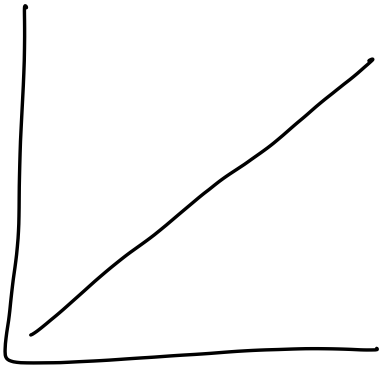

100Cr
1.5Cr
80
40
20
15
10
6
3
$ salaries
2
4
6
8
10
12
14
16
18
20
25
years of experience

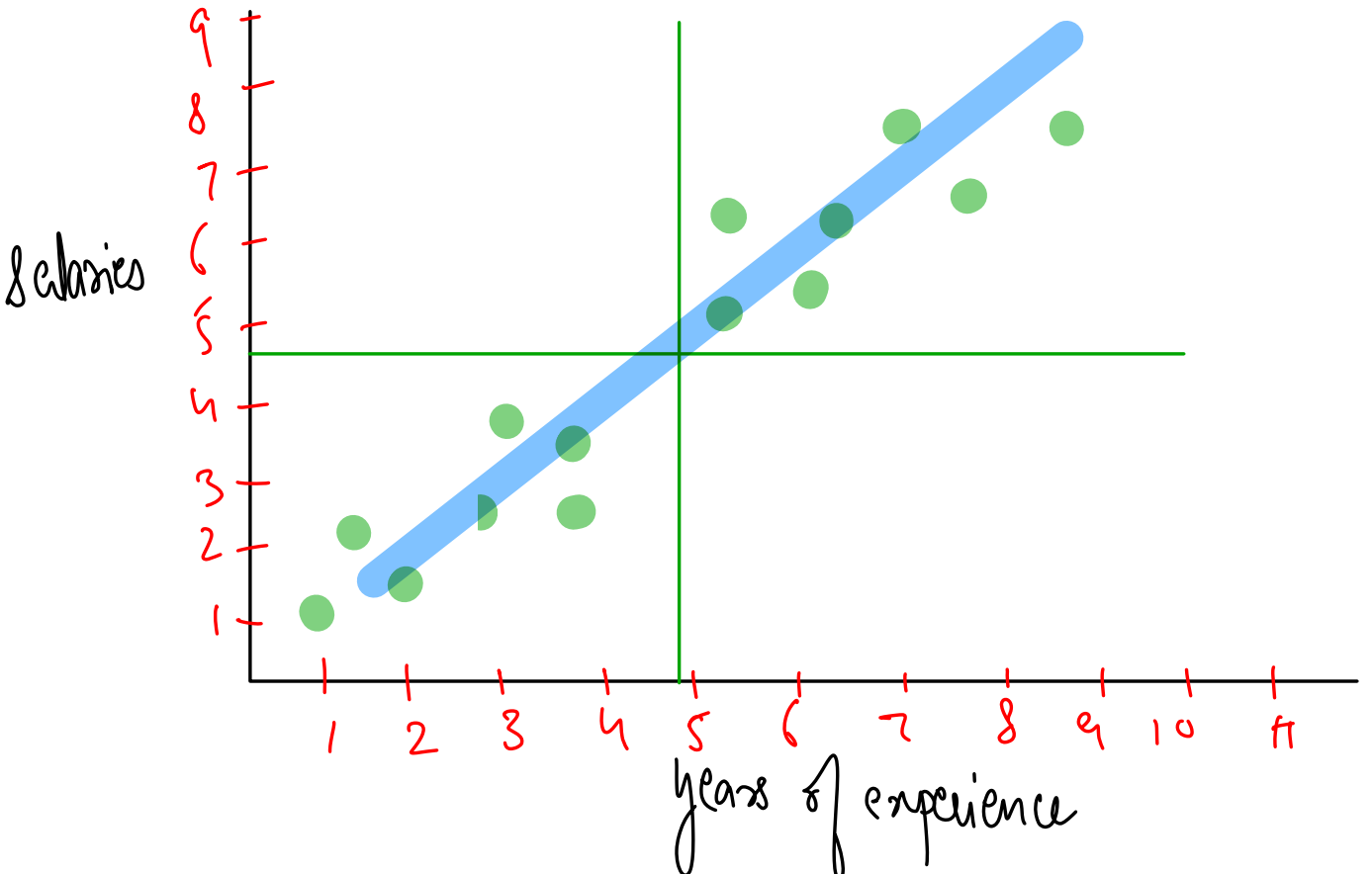

100
150
80
40
20
15
10
6
3
Salaries
2
4
6
8
10
12
14
16
18
20
25
years of experience

yrs. of experience	Salary
3 (1)	7 (1)
10 (2)	20 (2)
15 (3)	45 (3)
25 (4)	100 (4)



yrs. of exp. (Rank)	Salary (Ranks)
1	1
2	2
3	3
4	4



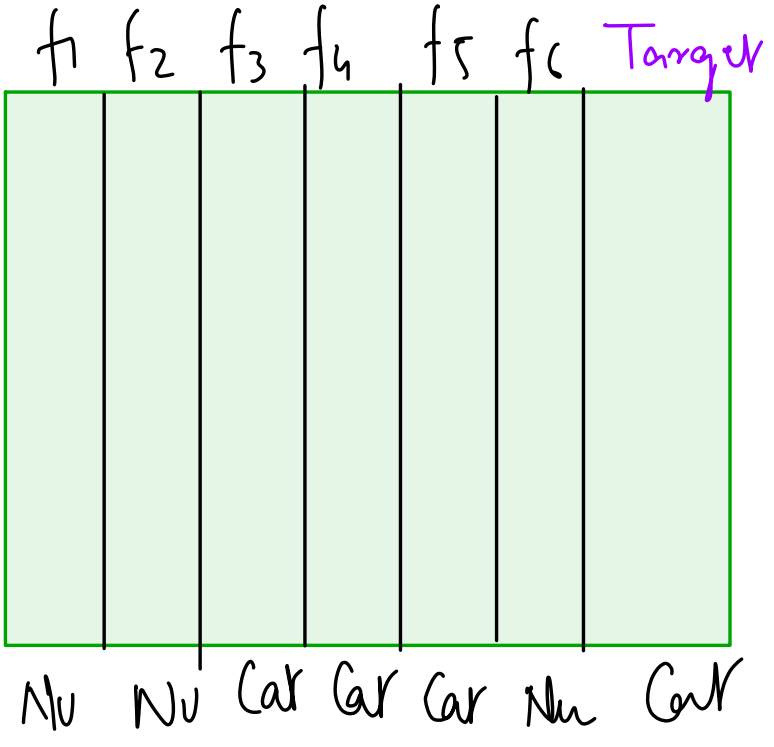

Salaries
9
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8
9
10
11
years of experience

Spearman Rank Correlation Coefficient

$$S_{x_{Rank}\, y_{Rank}} = \frac{Cov(x_{Rank}, y_{Rank})}{\sigma_{x_{Rank}}\, \sigma_{y_{Rank}}}$$

	Heights	Weights
0	68	72
1	62	58
2	64	67
3	61	72
4	70	79
5	66	61
6	61	68
7	65	64
8	71	80
9	72	79

	Heights	Weights
0	7.0	6.5
1	3.0	1.0
2	4.0	4.0
3	1.5	6.5
4	8.0	8.5
5	6.0	2.0
6	1.5	5.0
7	5.0	3.0
8	9.0	10.0
9	10.0	8.5


f1 f2 f3 f4 f5 f6 Target
Nu Nu Car Car Car Nu Car

$$\rho_{xy} = \frac{\mathrm{Cov}(x, y)}{\sigma_x \sigma_y}$$