

$$\begin{array}{ccccccc}
 & 1 & 4 & 9 & 16 & 25 & 36 \ 49 \ 64 \\
 & \swarrow 2.5 & \downarrow 1 & \downarrow & \downarrow 20.5 & \downarrow & \boxed{\downarrow 142.5} \\
 & 4.66 & & & & & 149.6 \\
 & & & & \boxed{10.99} & & 
 \end{array}$$

④ Given centroids are  $x_1, y_1, z$   
 we can assign each of  $x_1, y_1, z$  to A, B, C  
 in 27 possible ways.

chance of being in A is  $\frac{1000}{10000} = 0.1$

chance of being in B is  $\frac{8000}{10000} = 0.8$

chance of being in C is  $\frac{1000}{10000} = 0.1$

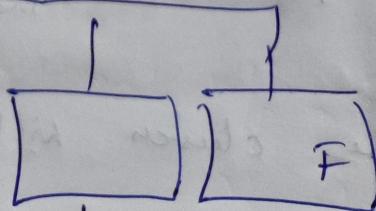
There are 6 different cases to interchange  $x_1, y_1, z$  in A, B, C which will be total 27.

The probability that A is correct is 24%.

The probability that C is correct is 24%.

The probability that A & C are correct is 4.8%.

⑤



## Assignment - 9

Q. Answer

given data points are  $1, 4, 9, 16, 25, 36, 49, 64, 81$  and  $100$ .

There can be 9 different clusters as follows:

1.  $\{1\}$ ,  $\{4, 9, 16, 25, 36, 49, 64, 81, 100\}$ ,
2.  $\{1, 4\}, \{9, 16, 25, 36, 49, 64, 81, 100\}$ ,
3.  $\{1, 49\}, \{16, 25, 36, 49, 64, 81, 100\}$ ,
4.  $\{1, 9, 16\}, \{25, 36, 49, 64, 81, 100\}$ ,
5.  $\{1, 4, 9, 16, 25\}, \{36, 49, 64, 81, 100\}$ ,
6.  $\{1, 4, 9, 16, 25, 36\}, \{49, 64, 81, 100\}$ ,
7.  $\{1, 4, 9, 16, 25, 36, 49\}, \{64, 81, 100\}$ ,
8.  $\{1, 4, 9, 16, 25, 36, 49, 64\}, \{81, 100\}$ ,
9.  $\{1, 4, 9, 16, 25, 36, 49, 64, 81\}, \{100\}$ .

→ if we change the centroid, only one point has to be shifted between the clusters.

Let the initial values be  $36$  and  $100$ . Their

$$\text{mean} = 68.$$

Hence, the clusters will be  $\{1, 4, 9, 25, 36, 49, 64\}$ ,  $\{81, 100\}$ .

Centroids of other cluster are  $25.5$  and  $90.5$ .

$$\text{mean} = \frac{25.5 + 90.5}{2} \Rightarrow 58.$$

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{64, 81, 100}

The clusters will be  $\{1, 4, 9, 16, 25, 36, 49\}$ ,

## Assignment - 9

Q. (55, 5) is the point which is clustered with centroid (0, 0) when  $L_1$  norm is used and with centroid (100, 40) when  $L_2$  norm is used.

	A	B	C	D	E	F
A	0	14.1	29.6	46.6	27.4	28.6
B	0	15.5	39.5	17.7	18.4	
C		0	16.9	17		16.5
D			0		28.5	27.4
E				0	0	31.5
F					0	0

A, C and B are low, clustering will be done as follows:

A and B will be clustered with

$$C \rightarrow AC \rightarrow 29.6$$

$$\text{and } BC \rightarrow 15.5$$

A and B will be clustered with D  $\rightarrow AD \rightarrow$

$$46.6 \text{ and } BD \rightarrow 32.5$$

A and B will be clustered with E  $\rightarrow AE \rightarrow 27.4$

$$\text{and } BE \rightarrow 17.7$$

A and B will be clustered with F  $\rightarrow AF \rightarrow 28.6$   
and BF  $\rightarrow 18.4$

C and

D and F will be clustered with CD  $\rightarrow 16.9$

D and E will be clustered  $\rightarrow DFE \rightarrow 27.4$

In CD, DE, DF as CD is low, clustering as follows:

C and D will be clustered with E  $\rightarrow CE \rightarrow 17$  and DE  $\rightarrow 28.6$   
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will be clustered with F  $\rightarrow CF \rightarrow 16.5$  and FE  $\rightarrow 27.4$