30/1/24 KNN

KNN	maths	CS	Result
1	4	3	F
(2)	6	7	P
(3)	7	8	P
4	5	5	F
(5)	8	8	P

$X = (maths = 6, CS = 8)$ and $K = 3$

The classification of pass or fail.

Soln:

Distance Formula:

$x_2 = 6$

$y_2 = 8$

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(6-4)^2 + (8-3)^2} = \sqrt{4+25} = \sqrt{29} = 5.38$$

$$= \sqrt{(6-6)^2 + (8-7)^2} = \sqrt{0+1} = \sqrt{1} = 1$$

$$= \sqrt{(6-7)^2 + (8-8)^2} = \sqrt{1+0} = 1$$

$$= \sqrt{(6-5)^2 + (8-5)^2} = \sqrt{1+9} = 3.162$$

$$= \sqrt{(6-8)^2 + (8-8)^2} = \sqrt{4+0} = 2$$

1) 5.38

1 (2) 1

2 (3) 1

4) 3.162

3 (5) 2

Find Shortest-

Here ___ So 3 newest value

For those value Find P or F.

take majority.

Hence for $m = 0$, $c = 8$ The classification is pass.

2)	Sepal length	Sepal width	Species.
1	5.3	3.7	Setosa
2	5.1	3.8	Setosa
3	7.2	3.0	Virginica
4	5.4	3.4	Setosa
5	5.1	3.3	"
6	5.4	3.9	"
7	7.4	2.8	Verginica
8	6.1	2.8	"
9	7.3	2.9	"
10	6.0	2.7	"
11	5.8	2.8	"
12	6.3	2.3	"
13	5.1	2.5	"
14	6.3	2.5	"
15	5.5	2.4	"

SL = 5.2, S.W = 3.1 S = ?

x_2 y_2

1. $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = \sqrt{(5.2-5.3)^2+(3.1-3.7)^2}$

$= \sqrt{0.01+0.36}$

① = 0.608

2. $\sqrt{(5.2-5.1)^2+(3.1-3.8)^2}$

$= \sqrt{0.1^2+0.7^2} = \sqrt{0.01+0.49} = \sqrt{0.5}$

② ⇒ 0.707

3. $\sqrt{(5.2-7.2)^2+(3.1-3.0)^2}$

$= \sqrt{(-2)^2+0.1^2} = \sqrt{4+0.01} = \sqrt{4.01}$

③ ⇒ 2.00

4. $\sqrt{(5.2-5.4)^2+(3.1-3.4)^2}$

$= \sqrt{(-0.2)^2+(-0.3)^2} = \sqrt{0.04+0.09} = \sqrt{0.13}$

④ ⇒ 0.36

5. $\sqrt{(5.2-5.1)^2+(3.1-3.3)^2}$

$= \sqrt{(0.1)^2+-0.2^2} = \sqrt{0.01+0.04} = \sqrt{0.05}$

⑤ ⇒ 0.22

6. $\sqrt{(5.2-5.4)^2+(3.1-3.9)^2}$

$= \sqrt{-0.2^2+-0.8^2} = \sqrt{0.04+0.64} = \sqrt{0.68}$

⑥ ⇒ 0.824

7. $\sqrt{(5.2-7.4)^2+(3.1-2.8)^2}$

$= \sqrt{-2.2^2+0.3^2} = \sqrt{4.84+0.09} = 2.22.$

⑦ ⇒ 2.22

8. $\sqrt{(5.2-6.1)^2+(3.1-2.8)^2}$

$= \sqrt{-0.9^2+0.3^2} = \sqrt{0.81+0.09} = \sqrt{0.9}$

⑧ ⇒ 0.948

9. $\sqrt{(5.2-7.3)^2+(3.1-2.9)^2}$

$= \sqrt{-2.1^2+0.2^2} = \sqrt{4.41+0.04} = \sqrt{4.45}$

⑨ ⇒ 2.109

10. $\sqrt{(5.2-6.0)^2+(3.1-2.7)^2}$

10 ⇒ 0.8944

11. $\sqrt{(5.2-5.8)^2+(3.1-2.8)^2}$

(11) → 0.6708

12. $\sqrt{(5.2-6.3)^2+(3.1-2.3)^2}$ (12) ⇒ 1.3607

13. $\sqrt{(5.2-5.1)^2+(3.1-2.5)^2}$ (13) ⇒ 0.608

14. $\sqrt{(5.2-6.3)^2+(3.1-2.5)^2}$ (14) ⇒ 1.2529

15. $\sqrt{(5.2-5.5)^2+(3.1-2.4)^2}$ (15) ⇒ 0.761

From Results

	Distance	Rank.	
(1)	0.608	(3)	→ Setosa.
2.	0.707		
3.	2.002		
(4)	0.3605		→ Setosa
(5)	0.2236		→ Setosa
6.	0.8246		→ Setosa
7.	2.2203		→ Setosa.
8.	0.948		
9.	2.1095		
10.	0.8944		
11.	0.6708		
12.	1.3601		
(13)	0.608	(5)	Verginica.
14.	1.2529		
15.	0.761		

K=3 So first 3 ascending. So classification is Setosa.

3. HW

Height	Weight	Class
167	51	Underweight.
182	62	normal
176	69	"
173	64	"
174	65	"
169	56	underweight
173	58	normal
170	57	"
	55	

To Find.

Ht = 170, Wt = 57 Class ?

1. $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$x_2 = 170$, $y_2 = 57$.

(167, 51) ⇒ $\sqrt{(170-167)^2+(57-51)^2}$

$= 6.708$. ——— (5)

(182, 62) ⇒ $\sqrt{(170-182)^2+(57-62)^2}$

$= 13$

(176, 69) = $\sqrt{(170-176)^2+(57-69)^2}$

$= 13.476$.

(173, 64) = $\sqrt{(170-173)^2+(57-64)^2}$

$= 7.615$

$$(172,65) = \sqrt{(170-172)^2 + (57-65)^2}$$

$$= 8.246.$$

$$(174,56) = \sqrt{(170-174)^2 + (57-56)^2}$$

$$= 4.123 \quad \text{——} (4)$$

$$(169,58) = \sqrt{(170-169)^2 + (57-58)^2}$$

$$= 1.414 \quad \text{——} (1)$$

$$(173,57) = \sqrt{(170-173)^2 + (57-57)^2}$$

$$= 3 \quad \text{——} (3)$$

$$(170,55) = \sqrt{(170-170)^2 + (57-55)^2}$$

$$= 2 \quad \text{——} (2)$$

The classification result is normal.