	Name: Deep Pawar CWID: A20545137									
	Sub: CSP 571 DPA Assignment 3									
	(Written part)									
Q.										
->	Here									
	1									
	5.1 3.5 1.4 0.2 Iris-setosa									
	4.9 3.0 1.4 0.2 Iris-setosa									
	4.7 3.2 1.3 0.2 Isis - setosa									
	6.3 3.3 6.0 2.5 Iris - virginica									
	5.8 2.7 5.1 1.9 Iris - virginica									
	7.1 3.0 5.9 2.1 Iris - virginica									
	2 + 2 + 2 + 2 + (12 + 1 2)									
	Gini Impurity Index!									
	$\alpha = 1 - \sum_{i=1}^{n} (p_i)^2$									
	Not to the state of the state o									
	Information Crain:									
1	IG = Hb - 2. Pj. Hj									
	Here									
	Ho is entropy before splitting									
	Entropy : 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1									
	H = - & P: · log 2 (P:)									
	Setora = 3 Virginica = 3									
( )	Total = 6									
	Probability:									
	P (setora) = 3/6 = 0.5									
1 2	P(Virginica) = 3/6 = 0.5									
	Pre-split entropy:									
	12 × 3 1 = 3 The sell of a grant of the form									
	Hb = - (0.5. log2 (0.5) + 0.5. log2 (0.5.))									
	= 1									

Osie Page

Pre-split Gini:

 $(\tau_b = 1 - (0.5)^2 + (0.5)^2$  = 0.5

First split on first column:

Midpoints: (4.9 + 4.7)/2 = 4.8 (4.1 + 5.1)/2 = 5 (5.1 + 5.8)/2 = 5.45 (5.8 + 6.3)/2 = 6.05(6.3 + 7.1)/2 = 6.7

[1] Split 1 : (first column) < 4.8

Left -> 4.7

Right -> 4.9 5.1 5.8 6.3 7.1

Gini Impurity:

Left side = 0

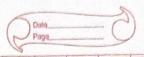
right side = 1 - (2/5)^2 - (3.5)^2

= 0.48

weighted (in: = (1/6 × 0) + (5.6 × 0.48) = 0.4

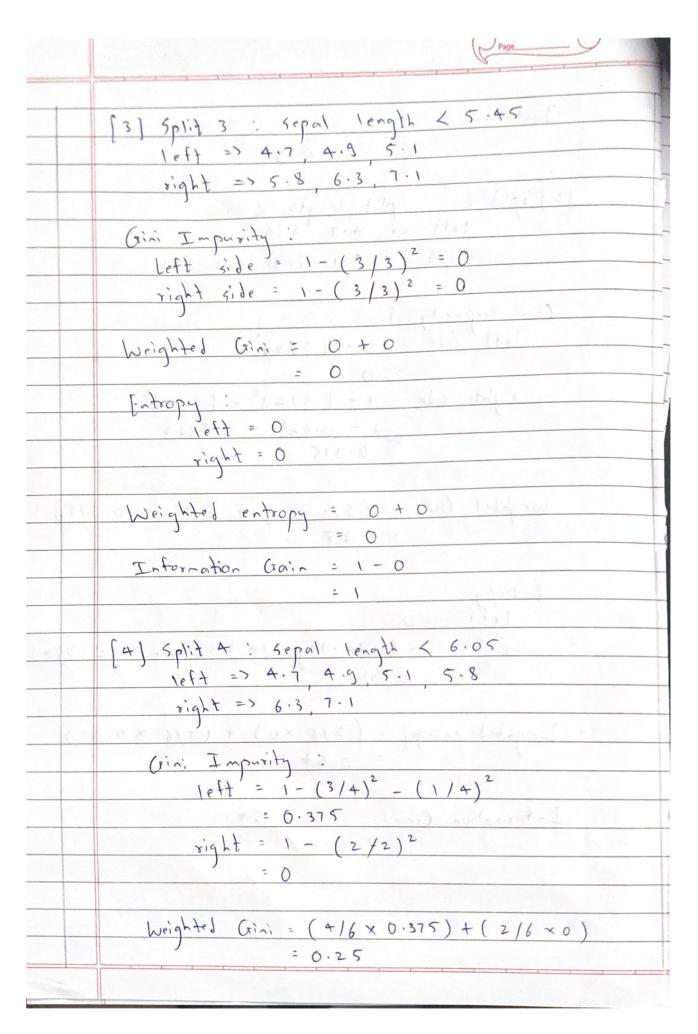
[-tropy = (2/5/092 2/5) - (3/5/092 3/5) \$\times 0.97\$

brighted entropy = (1/6.0) + (5/6 × 0.97) = 0.81



Information Crain = 11 - 0.81 0.19 [2] Split 2: Split length < 5 right => 5.1, 5.8, 6.3, 7.1 (timi impurity:

left side = 11 - (2/2)2  $\frac{5}{5} = \frac{1}{5} = \frac{1}$ = 0.375 Wrighted Gin = (2/6 × 0) + (4/6 × 0.375) = 0.25 Entropy = Left = 0 right = - (1/4.log21/4)-(3/4log23/4) = 0.81 heighted entropy = (2/6 ×0) + (4/6 × 0.81) = 0.54 Information Gain: 1-0.54 = 0.46 ( \* 1 px = 1 x 5) + ( = 1)

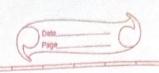


Entropy: left = (3/4/0923/4) - (1/4/0921/4) = 0.811 right = 0 (pure group) Weighted entropy: = 4/6 × 0.811 + 2/6 × 0 = 0.541 + 0 Information Gain : 1-0.541 [5] Split 5: sepal length < 6.7

left => 4.7, 4.9, 5.1, 5.8, 6.3 right => 7.1 Gini Impurity:

left => 1-(3/5)^2-(2/5)^2 = 0.48

right => 1-(1/1)^2 = 0 Weighted (in = (5/6 × 0.48) + (1/6 × 0) 1eft = (3/5. log2 3/5) - (2/5 log2 2/5) right = 0 Weighted entropy = (5/6 × 0.97) + (1/6 × 0)



Information	Grain	2	1	-	0.808
			0.		

Summary of split:

M .						The second secon	-
		Split	Gini	Information	Left	Right	
		1	Impurity	Crain	(ount	count	
		4.8	0.4	0.19	1	5	
		5-0	0.25	0.46	2	4	
		5-45	0	1	3	3	
		6.05	0.25	0.459	4	2	
		6.7	0.4	0.192	5	1	
-	-		-				

Decision tree !

5.45 sepal length >

Yes No Iris -

Isis -

virginica setosa