Using chi-squared to make a decision tree Step 1) Compute chi-squared of each altribute, highest being root nade. Since there is a SO/SO Headache No = 6 split in Diasnostics, 3 Yes = 4 P=2, N=4 expected is 0.5x total P=3, N=1 Negative Total Positive Headache \*) 1(0.5×4=2) 4 3(0.5×4苯=2) Yes 4(0.5×6=3) 6 ) 2 (0.5 x6 = 3) No 5 10 1 Total 2)  $\frac{(3-2)^2+(1-2)^2+(2-3)^2+(4*3)^2}{2}$ 2) = 5/3 = 1.666...3 7 Spot s No = 4 yes = 6P=1, N=3 P=4,N=2 Total Positive Negative Spots 4(0.5×8=3) 2(0.5×6=3) 6 Yes 1(0.5×4=2) 3(0.5×4=2) 100 10 Total  $\frac{(4-3)^2}{3} + \frac{(2-3)^2}{3} + \frac{(1-2)^2}{2} + \frac{(3-2)^2}{2}$ - 5/2 = 1.666....

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		У	(1) -	nec	K	<b>A.</b> 1 - 5
	$\longrightarrow$	10	2=4,	N=	: \	$N_0 = S$ $P=1, N=4$
		7+	78 -	ne	ck	Positive Negative Total
			Yes	S		Positive Negative Total 4(0.5×5=2.5) 1(0.5×S=0.25) 5
			No			1(0.5 x 5=0.5) 4(0.5 x S=0,25) 5
			Total	(		5 5
		(	1 - 3	2.5)	2	$(1-25)^2$ (4) 25/2 1. 25/2
		1	2.5		-+	$\frac{(1-2.5)^{2}+(9-2.5)^{2}+(4-2.5)^{2}}{2.5}$
						2.3
		=	1	8/5	5 =	= 3.6
	-					
	-	Hea	da	the	- J	.667 (3.s.J)
	-	200	1		= /	(a,b)
	-	Stiff	- No	zck	= 3	3.600 (35.5) < root node.
	-					
	-					Still-neck
7				Yes	_/	No
					/_	
	Cid	<u>H</u>	Sp	S	D	Cid HSPS D
	1	γ_	Y	Y	P	2NNNP
	3	Y	N	Y	P	TNYNN
	4	N	Y	Y	P	8 NYNN
	5	Υ	Y	Y	F	MNNYP
	6	N	N	Y	PN	10 N N N N
of contracts special extension and the second			<u> </u>			

Still neck = Yes
P4, N=1: 4:1
4 7
Headache 5= True, = Jalx.
$\sqrt{e} = 3$ $N = 2$
P= 3,N=0 P=1,N=1
Headache Positive Negative Total Yes 3(415x37=12/5) 0(1/5x3=3/6) 3
Yes 3(4/5x3=12/5) O(1/5x3=3/6) 3
No $(4/5 \times 2 = 8/5)$ $(1/5 \times 2 = 2/5)$ 2
No $1(\frac{4}{5}x^2 = \frac{8}{5})$ $1(\frac{1}{5}x^2 = \frac{2}{5})$ 2
$\frac{\left(3-\frac{12}{5}\right)^{2}+\left(0-\frac{3}{5}\right)^{2}+\left(1-\frac{8}{5}\right)^{2}+\left(1-\frac{2}{5}\right)^{2}}{\left(\frac{12}{5}\right)}+\frac{\left(1-\frac{2}{5}\right)^{2}}{\frac{3}{5}}$
$(\frac{12}{5})$ $\frac{3}{5}$ $\frac{8}{5}$ $\frac{2}{5}$
= 15/8 = 1.875
Spot 7
$Yes = 3 \qquad No = 2$
P=3,N=0 P=1,N=1
Spot Positive Negative Total
2(1) 2(1) 2(1) 2 3(1)
$\frac{1}{1} \frac{3(9/5 \times 3 = 195)}{1} \frac{3(9/5 \times 3 = 195)}{1} \frac{3}{1} \frac{3(9/5 \times 3 = 195)}{1} \frac{3}{1} \frac{3}{1}$
70tal 4 1 5
$(0.121-12)^2$ $(0.31-12)^2$ $(1.91-)^2$ $(121-)^2$
$\frac{\left(3 - \frac{12}{5}\right)^{2} + \left(0 - \frac{3}{5}\right)^{2} + \left(1 - \frac{8}{5}\right)^{2} + \left(1 - \frac{2}{5}\right)^{2}}{\frac{3}{5}} + \frac{3}{5} + \frac{3}{5} + \frac{2}{5}$
12/5 3/5 2/5
= 15/8 = 1.875
Both matter emalls.
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Still-neck = No P=1, N=4 : 1:4 1/5 = True, 4/5 = July. Headache Yes=1 No = 4 P=+, N=1 P=1, N=3 Headache Positive Wegative Total
Yes 0(1/5×1=1/5) 1(4/5×1=4/5) 1
NO 1(1/5×4=4/5) 3(4/5×4=16/5) 4 NO Total  $\frac{(0-1/s)^2}{1/s} + \frac{(1-41s)^2}{4/s} + \frac{(3-16/s)^2}{4/s}$  $= \frac{291}{10} = \frac{291}{10} = \frac{291}{10} = 0.3125$ Spots y = 3 N = 2P=1,N=2 P=0,N=2 Wesalire Total spots Poshitire 2(4/5 x 3=12/5) 1(1/5/3=3/5) Yos 2 (415 x2= 815) 2 0 (1/5 x2= 2/5) No Total  $\frac{1-3/5)^2+(2*12/5)^2+(0*2/5)^2+(2-8/5)^2}{3/5}$ = 6ps 5/6 = 0.333 .... se split on Headache. So splir on spots. 0 Chi-Square Decision free Still-neck Yes OCH Headache Spots 0 Yes OU No Yes 2/3 change Positive Spots Negative Negative Yes de Positive Negative 0