Sol 2 False nagetive cases: 20%
False positive Cases: 10%

Sol 3. a) Specific hypothesis:

Pros: Specific hypothesis is always consistent with the training data.

Cons: It gives us false nagetive.

(b) General hypothesis:

Pros: Useful when one hypothesis is more strictly general than others, ~~so~~ More ~~tai~~ number of training examples can be used.

Cons: General hypothesis gives more false positive

Sol 4. Consistent hypothesis: If a hyphothesis evaluates "T" for all positive example and "F" for all nagative example, ie ~~our~~ hyphothesis is able to classify the example in the the training data, then it is said to be consistent.

Version space: with respect to hypothesis space (H) and training ~~data~~ examples (D) is the subset of hypothasis from H, consistent with the training example in D.

Sol 5 The most general hypothesis has "?" or don't care value for each attribute.

Sol 7.

<1, 1, 0, 1, 1>	1	D1
<0, 1, 0, 1, 1>	0	D2
<1, 1, 1, 1, 0>	1	D3
<0, 0, 0, 1, 1>	0	D4
<1, 1, 1, 1, 1>	1	D5

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In Find-S algorithm, we go from most specific hypothesis to general and consider only (+)ve example.

$S \Rightarrow < \phi, \phi, \phi, \phi, \phi >$

For D1

$S \Rightarrow < 1, 1, 0, 1, 1 >$

For D3

$S \Rightarrow < 1, 1, ?, 1, ? >$

For D5

$S \Rightarrow < 1, 1, ?, 1, ? >$

Ans $S \Rightarrow < 1, 1, ?, 1, ? >$

Sol (8) For this decision tree, we'll consider following attribute

X_{gPA}

$\cancel{X_{GPA}} \geq 3.5$, $X_{EXP} \geq 3$, $X_{EXP} \geq 1$

DNF for this decision tree will be.

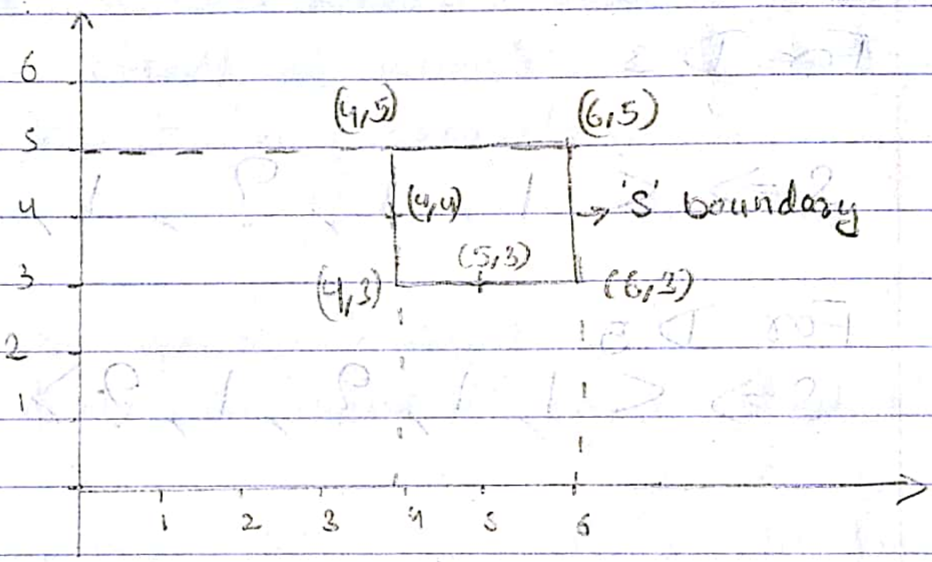
$\{ (\neg X_{GPA} \geq 3.5 \wedge X_{EXP} \geq 3) \vee (X_{GPA} \geq 3.5 \wedge X_{EXP} \geq 1) \}$

<u>Sol 9.</u>

From TOM MITCHELL

<u>Q2.4</u>

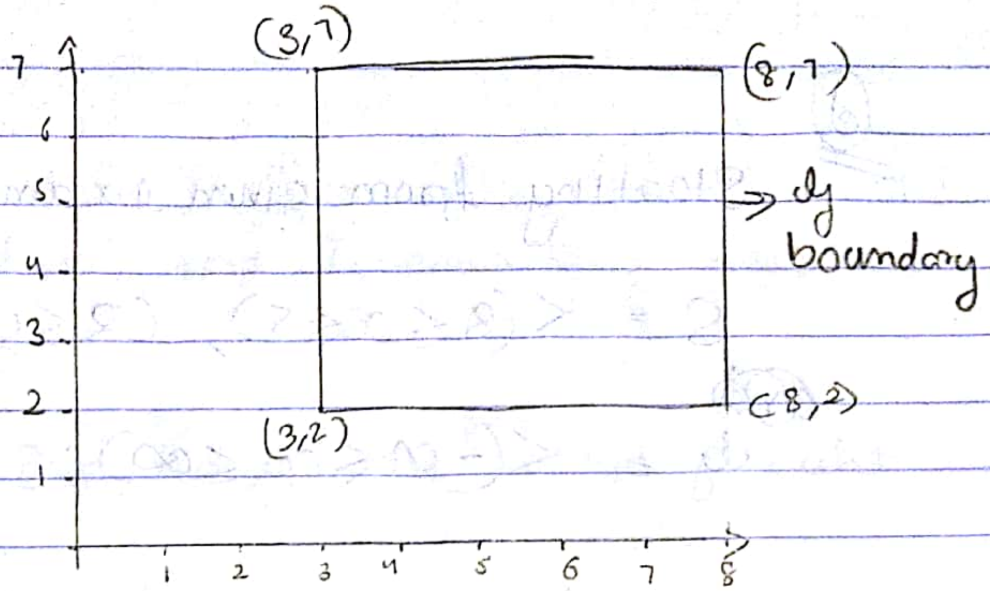
(a)



~~C.G,4~~

$S = \langle (4 \leq x \leq 6), (3 \leq y \leq 5) \rangle$

(b)



$G \Rightarrow <(3 \leq x \leq 8), (2 \leq y \leq 7)$

(c) To reduce the size of version space, ~~there~~ we need to increase the boundaries of 'S' and reduce the boundary of "G".
Therefore ~~our~~ query will be
$(x, y) = (4, 6)$ either positive or negative.

Query that won't reduce version space will be within 'S' like (5,4) or beyond G like (1,4).

(d) For algorithm to learn the target concept S boundary and G boundary must coincide.

Therefore to ~~to~~ achieve target concept

$S \Rightarrow (3 \leq x \leq 5)\ (2 \leq y \leq 9)$

from

$G = (-\infty \leq x \leq \infty),\ (-\infty \leq y \leq \infty)$

we need minimum number of #4 example ie.

x	y	result
3	2	0 (-ve)
3	9	0
5	2	0
5	9	0

Scanned by CamScanner

Sol
(10)

Initially we have.

S= < (ϕ, ϕ, ϕ, ϕ), (ϕ, ϕ, ϕ, ϕ)>
G= < (?, ?, ?, ?), (?, ?, ?, ?)>

(A) D_1 < (UG, SE, l, hs), (gr, cs, h, hs)> (+)

S=> < ($\cancel{UG}$ ug, se, l, hs), (gr, cs, h, hs)>

G= < (?, ?, ?, ?), (?, ?, ?, ?)>

(A) D_2 <(ug, se, h, fr), (gr, cs, h, hs)> (+)

S=> < (ug, se, ?, ?), (gr, cs, h, hs)>

G= < (?, ?, ?, ?), (?, ?, ?, ?)>

(A) D_3 < (gr, se, l, so), (gr, cs, h, se)> (−)

S=> < (ug, se, ?, ?), (gr, cs, h, hs)>

g ⇒ {<(ug, ?, ?, ?), (?, ?, ?, ?)>,
<(?, ?, ?, ?), (?, ?, ?, hs)>}

D1 = <(ug, se, l, ju), (gr, se, h, ju)> +

~~S4~~ S ⇒ <(ug, se, ?, ?), (gr, ?, h, ?)>

lg ⇒ <(ug, ?, ?, ?), (?, ?, ?, ?)>

(b) <(ug, se, ?, ?), (gr, ?, h, ?)>
<(ug, se, ?, ?), (gr, ?, ?, ?)>
<(ug, se, ?, ?), (?, ?, h, ?)>
<(ug, se, ?, ?), (?, ?, ?, ?)>

<(ug, ?, ?, ?), (gr, ?, h, ?)>
<(ug, ?, ?, ?), (gr, ?, ?, ?)> — 1
<(ug, ?, ?, ?), (?, ?, h, ?)>
<(ug, ?, ?, ?), (?, ?, ?, ?)> — 2

Tatal hypothesis: 8

And only 2 satisfies given data point

Sol 6) If all attribute are included with value
(a) 0 or 1 ∴ No. of possible ~~vate~~ values = 2

No. of instances possible for |x|

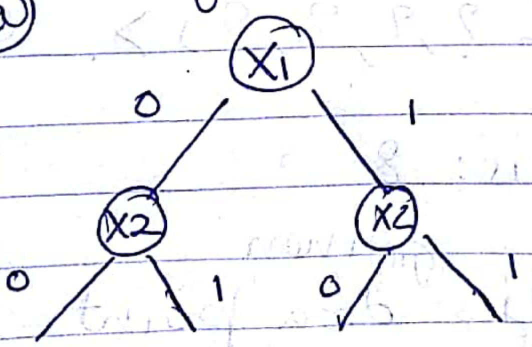
$= 2\times2\times2\times2$
$= \boxed{16}$

(b) We can choose (+)ve litoral (-)ve litoral or no litoral at all i.e '?'
∴ No. of hypothesis $= 3^4$
$= 81$

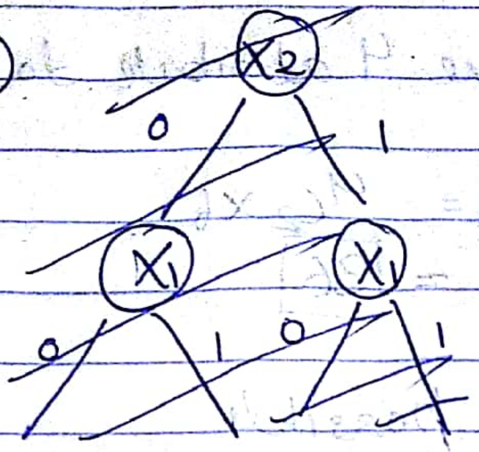
(c) No. of hypothesis $= 3^4$
$= 81$

(d) from 2 attribute, we can make 6 decision tree of depth 2.
as follows

(a)

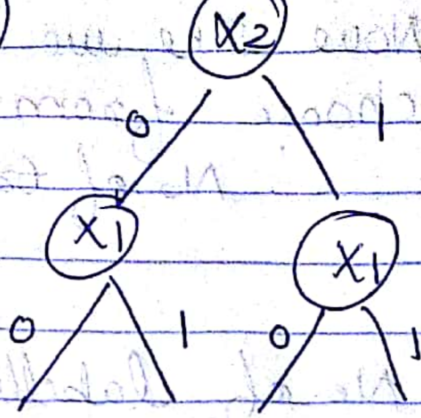


(b)



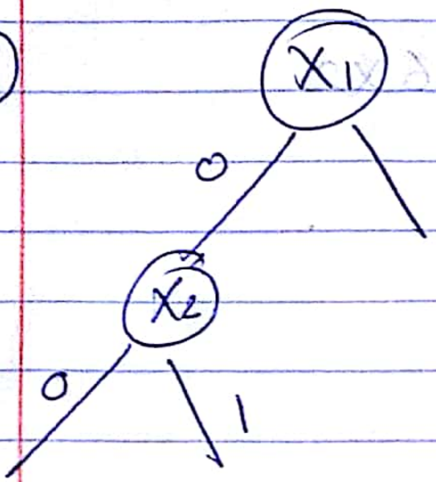
X_2
0
1
X_1
X_1
0
1
0
1

(b)



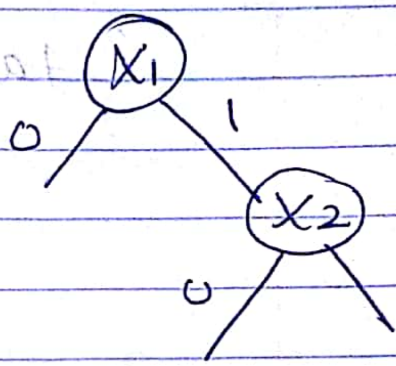
X_2
0
1
X_1
X_1
0
1
0
1

(c)



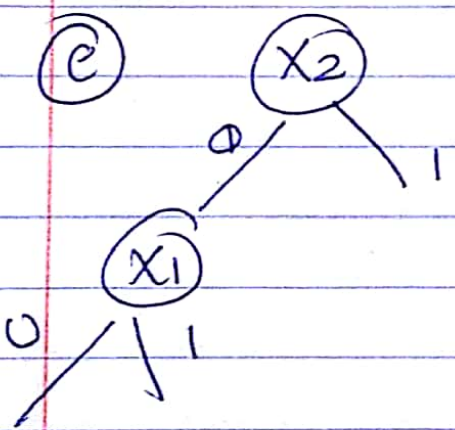
X_1
0
1
X_2
0
1

(d)



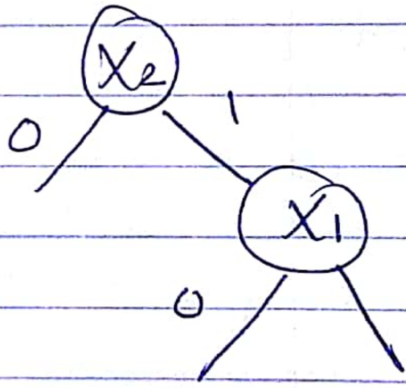
X_1
0
1
X_2
0
1

(e)



X_2
0
1
X_1
0
1

(f)



X_2
0
1
X_1
0
1

Now sine we have 4 attribute to choose from

∴ No. of trees = $^4C_2 \times 6$

$= \boxed{36}$

(e) No. of labelling possible (+ve, -ve) or (-ve, +ve)

∴ total = $^4C_2 \times 6 \times 2$

$= \boxed{72}$