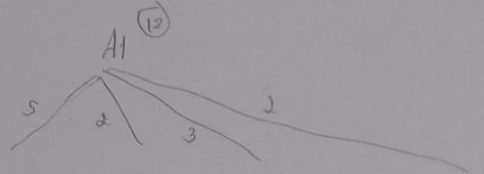
id	A1	A2	A3	target
1	4	1	3	-
2	1	1	1	-
3	3	1	1	-
4	2	4	3	+
5	1	1	3	-
6	3	4	1	+
7	4	1	3	-
8	2	3	1	-
9	1	2	2	+
10	1	2	3	+
11	1	3	1	+
12	3	2	3	+

Node1 $E(S) = -\frac{6}{12}\log\left(\frac{6}{12}\right) - \frac{6}{12}\log\left(\frac{6}{12}\right)$ (− 6, + 6)

$= 1$

A1 (12)



1: (− 2, + 3) $E = -\frac{2}{5}\log\left(\frac{2}{5}\right) - \frac{3}{5}\log\left(\frac{3}{5}\right) = 0.97$

2: (− 1, + 1) $E = 1$

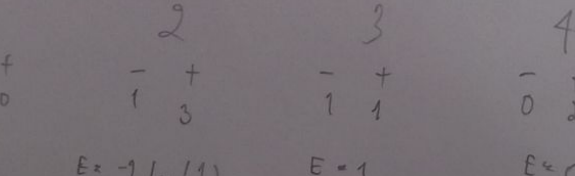
3: (− 1, + 2) $E = -\frac{1}{3}\log\left(\frac{1}{3}\right) - \frac{2}{3}\log\left(\frac{2}{3}\right) = 0.92$

4: (− 2, + 0) $E = 0$

$Gain(S, A1) = 1 - \frac{5}{12}(0.97) - \frac{2}{12}(1) - \frac{3}{12}(0.92)$

$= 0.2$

A2 (12)



1: (− 4, + 0) $E = 0$

2: (− 1, + 3) $E = -\frac{1}{4}\log\left(\frac{1}{4}\right) - \frac{3}{4}\log\left(\frac{3}{4}\right) = 0.81$

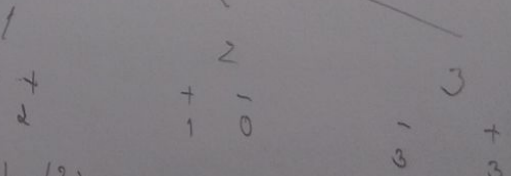
3: (− 1, + 1) $E = 1$

4: (− 0, + 2) $E = 0$

$Gain(S, A2) = 1 - \frac{4}{12}(0.81) - \frac{2}{12}(1)$

$= 0.52$

A3 (12)



1: (− 3, + 2) $E = -\frac{2}{5}\log\left(\frac{2}{5}\right) - \frac{3}{5}\log\left(\frac{3}{5}\right) = 0.97$

2: (+ 1, − 0) $E = 0$

3: (− 3, + 3) $E = 1$

$Gain(S, A3) = 1 - \frac{5}{12}(0.97) - \frac{6}{12}(1)$

$= 0.095$

Node1 เลือก A2

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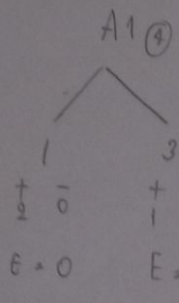
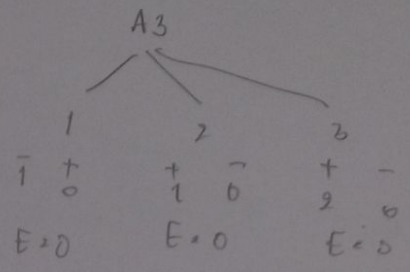
Node Deep 1 (2)

id	A1	A2	A3	T
3	3	2	1	−
9	1	2	2	+
10	1	2	3	+
12	3	2	3	+

$E(S) = -\frac{1}{4}\log(\frac{1}{4}) - \frac{3}{4}\lg(\frac{3}{4}) = 0.81$





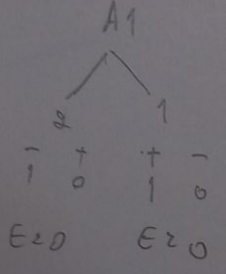
Gain(S, A1) = 0.81 − 2/4
= 0.31

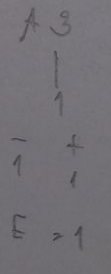
Gain (S, A3) = 0.81

Node Deep 1 (2) เลือก A3

Node Deep 1 (3)

id	A1	A2	A3	T
3	2	3	1	−
11	1	3	1	+



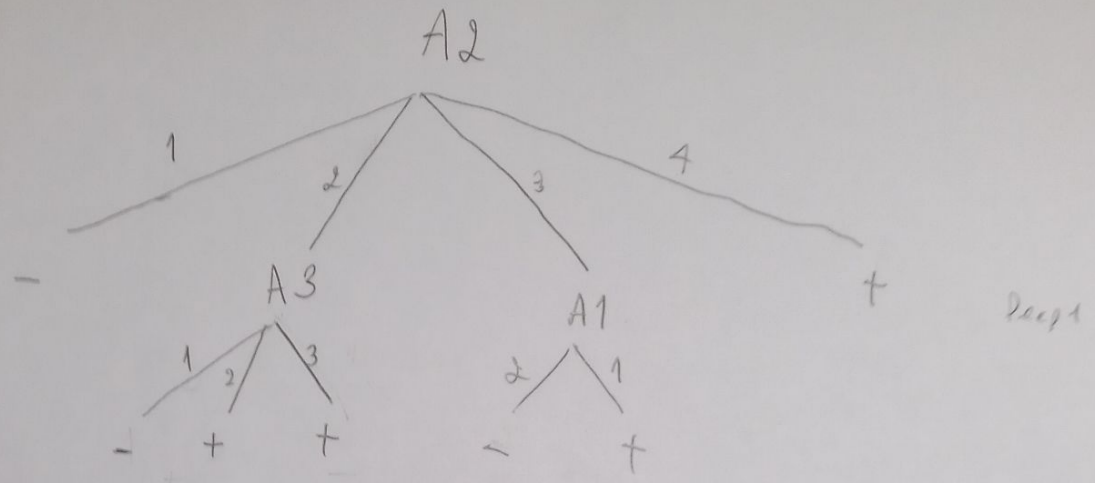


E(S) = 1

Gain(S, A1) = 1

Gain(S, A3) = 0

Node Deep 1 (3) เลือก A1



Ans .

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