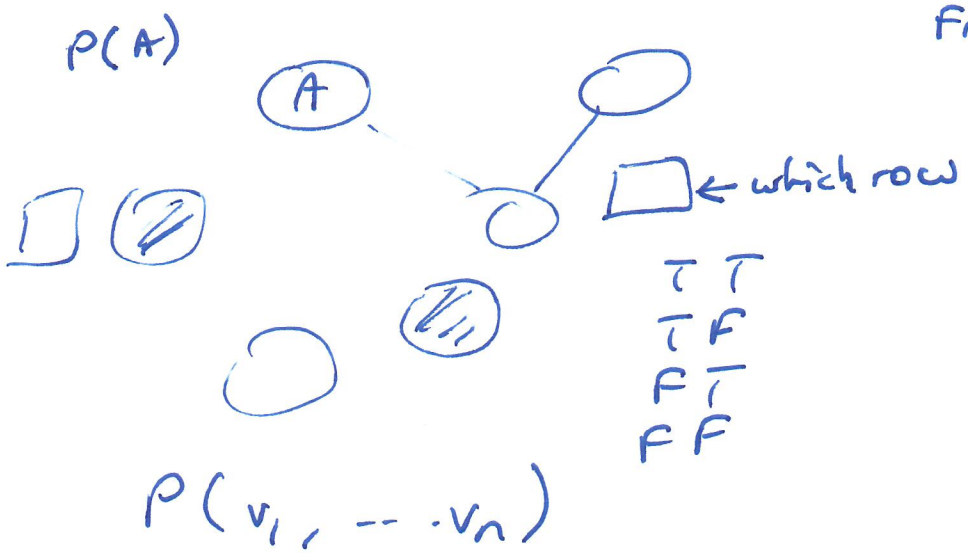
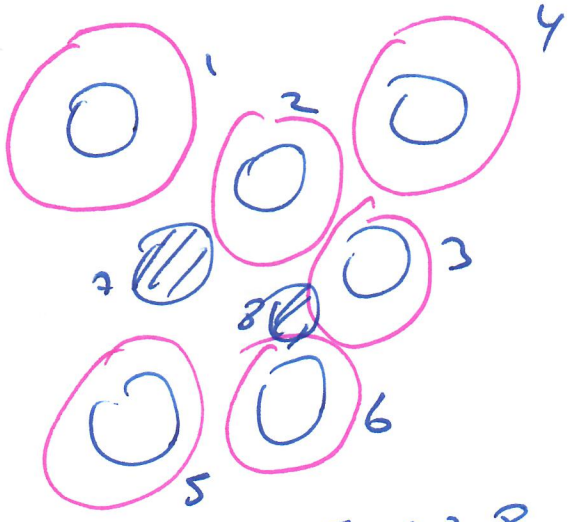
CS5811
November 6, 2020
Friday (1)

<0.67, 0.33>



[V_1] w

N [ ] w



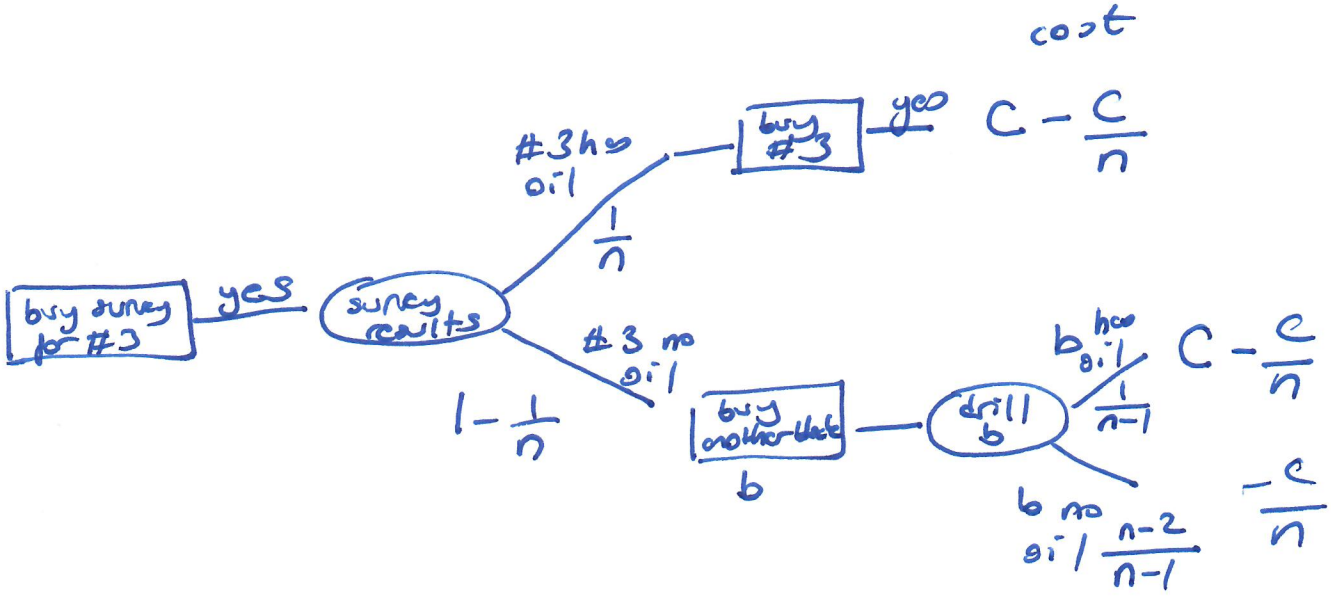
step 1: [1 t f 2 t f 3 t f 4 t f 5 t f 6 t f 7 t f 8]

step 2: sample for a variable : V_1
[f f t f t f t f]

step x: sample for another variable : V_2
[f f t f t f t f]

CS5811 Worksheet - Value of information

- n blocks, C worth of oil in exactly one block, each block C/n dollars
- A seismologist offers the company the results of a survey of block number 3, which indicates definitely whether the block contains oil.
- How much should the company be willing to pay for the information?



b has oil: the probability is
- → block has oil
- 1/n-1 → number of remaining blocks after buying at cost #3

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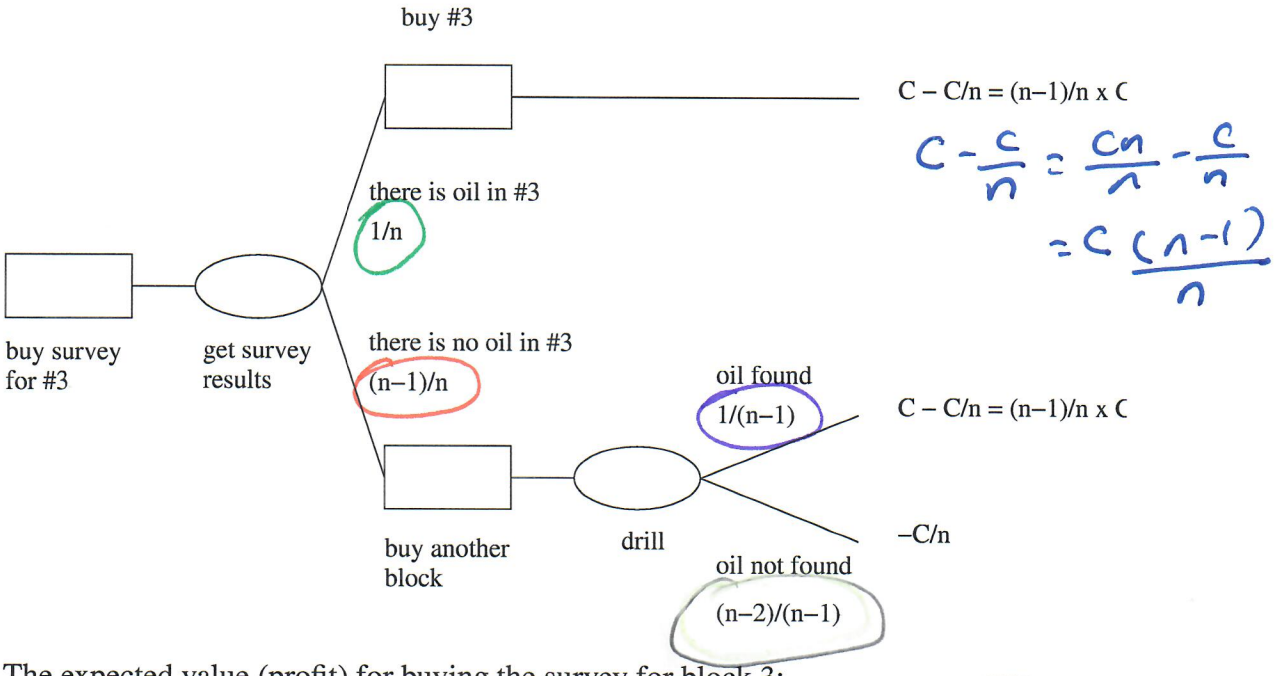

$C - \frac{C}{n} = \frac{Cn}{n} - \frac{C}{n}$

$= C\frac{(n-1)}{n}$

The expected value (profit) for buying the survey for block 3:

$$\frac{1}{n} \times \frac{(n-1)C}{n} + \frac{(n-1)}{n} \times \frac{1}{(n-1)} \times \frac{(n-1)C}{n} + \frac{(n-1)}{n} \times \frac{(n-2)}{(n-1)} \times \frac{-C}{n}$$

$$= \frac{(n-1)C}{n^2} + \frac{(n-1)C}{n^2} + \frac{(n-2) \times (-C)}{n^2}$$

$$= \frac{C(n-1+n-1-n+2)}{n^2} = \frac{Cn}{n^2} = \frac{C}{n}$$