Decision Analysis

Company GFB owns a plot of land.

Alternatives	Payoffs: Oil	Dry
Drill	700k	-100k
Sell Land	90k	90k
Probability	.25	.75

Decision Strategies:

(i) Choose alternative that maximises minimum payoff

$\max\{-100k, 90k\}$ i.e. Sell

(ii) Choose alternative that maximises payoff under most likely alternative. Again Sell

(iii) Choose alternative that maximises expected profit.

Drill : $.25 \times 700 - .75 \times 100 = 100^{*}$ Drill

Sell : $.25 \times 90 + .75 \times 90 = 90$

Now introduce third alternative:

Do a Seismic Study (SS) and then make decision. Cost of survey is 30k.

Outcome: FSS ≡ Favorable

USS ≡ Unfavorable

Data:

$P[FSS|Oil] = .6$ $\quad P[USS|Oil] = .4$

$P[FSS|Dry] = .2$ $\quad P[USS|Dry] = .8$

Bayes Computation:

We need

$$P[Oil \mid FSS] = \frac{P[Oil \wedge FSS]}{P[FSS]}$$

$$= \frac{P[FSS \mid Oil]\, P[Oil]}{P[FSS \mid Oil]\, P[Oil] + P[FSS \mid Dry]\, P[Dry]}$$

$$= \frac{.6 \times .25}{.6 \times .25 + .2 \times .75}$$

$$= \frac{1}{2}$$

Similar calculations give:

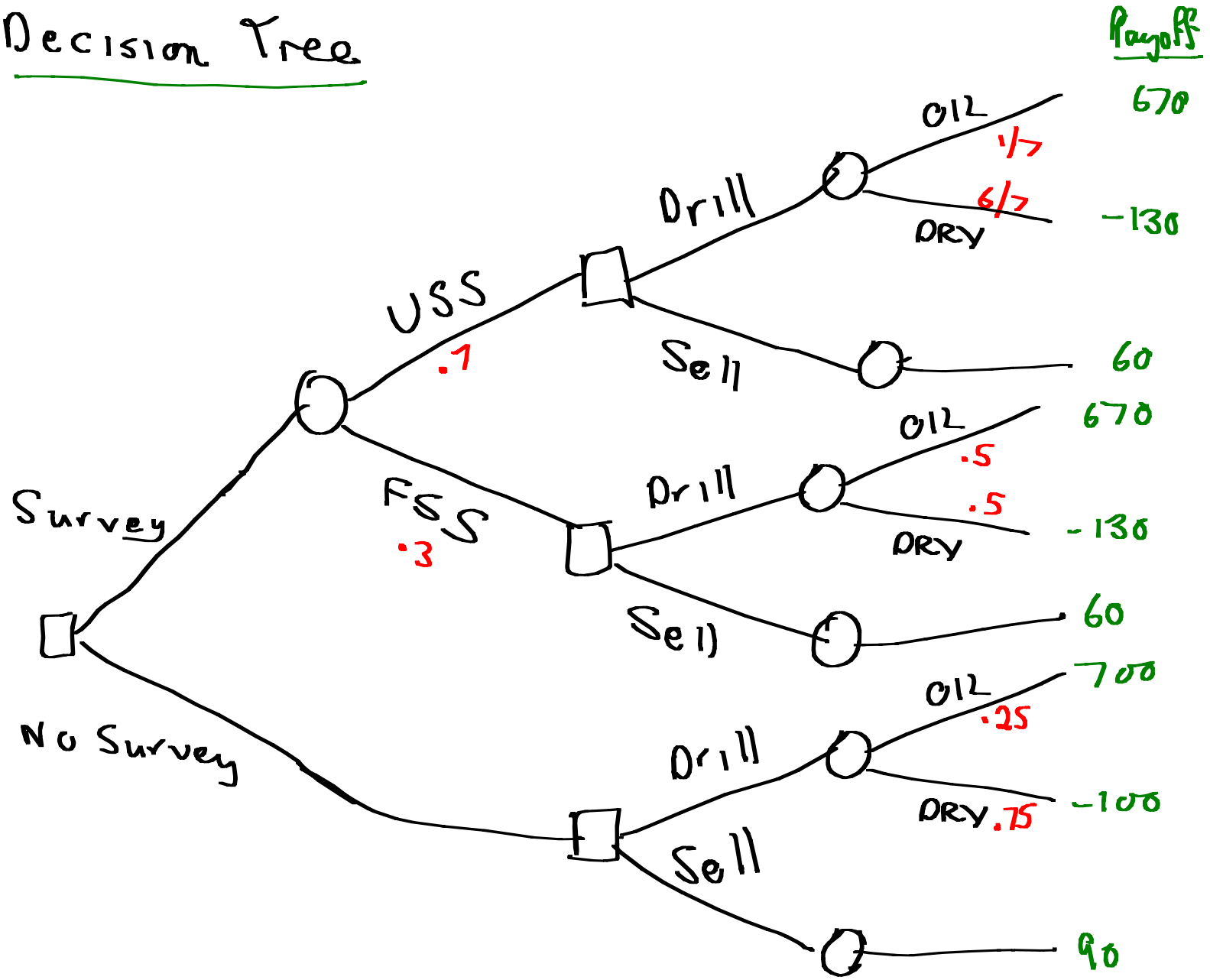
$$P[Oil \mid FSS] = \frac{1}{2}$$

$$P[Dry \mid FSS] = \frac{1}{2}$$

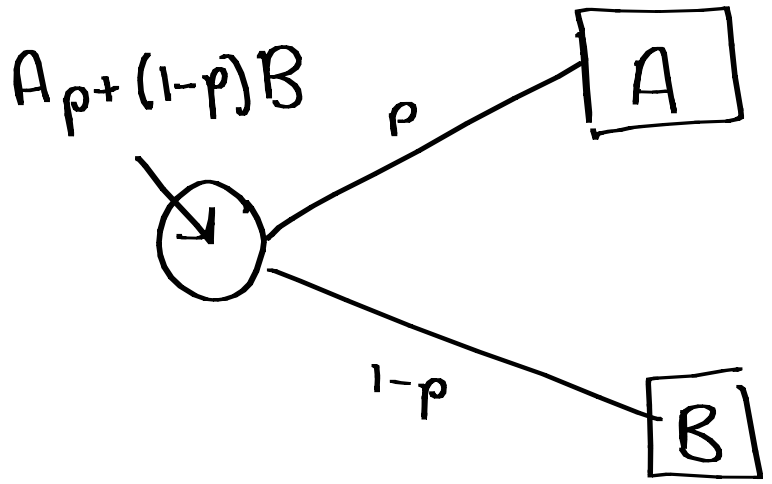
$$P[Oil \mid VSS] = \frac{1}{7}$$

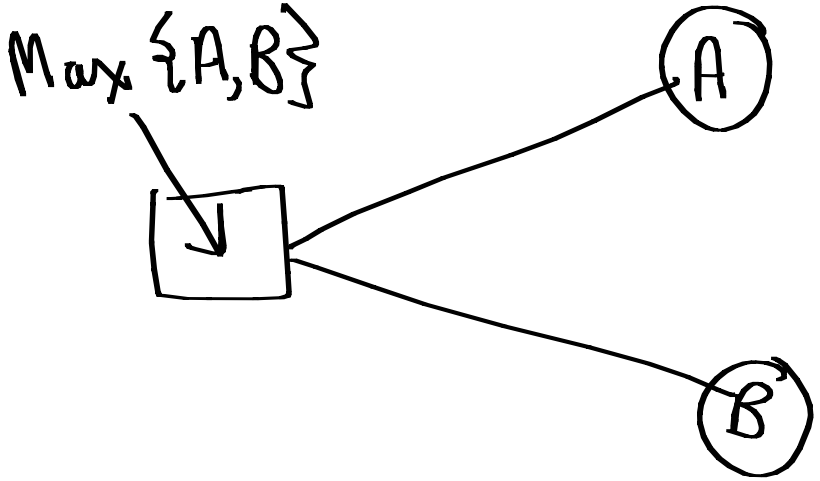
$$P[Dry \mid VSS] = \frac{6}{7}$$

Decision Tree



Evaluating Nodes of Tree





Decision Tree