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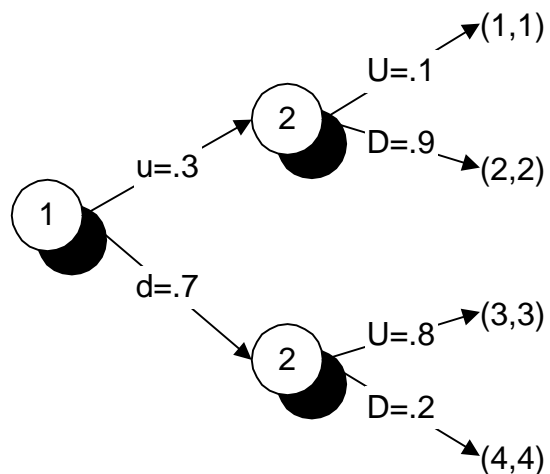
Risk and Extensive Form Games

Mixed vs. Behavior Strategies

A mixed strategy is a probability distribution over strategies in the normal form

A behavior strategy gives conditional probabilities of acting at information sets

Behavior vs. Mixed Strategy Example



	UU(.08)	UD(.02)	DU(.72)	DD(.18)
u(.3)	1,1	1,1	2,2	2,2
d(.7)	3,3	4,4	3,3	4,4
	(.06)	(.04)	(.74)	(.16)

$$\Pr(U|u) = \Pr(UU) + \Pr(UD) = 0.1$$

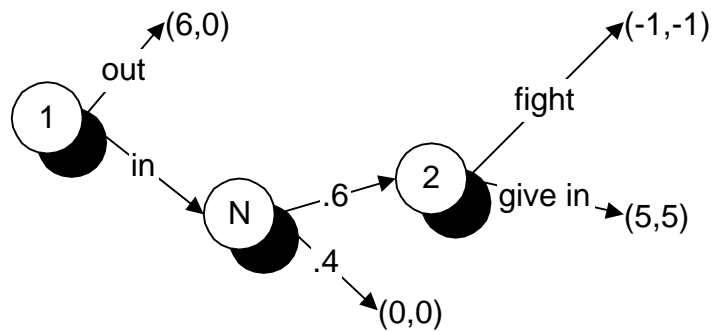
$$\Pr(U|d) = \Pr(UU) + \Pr(DU) = 0.8$$

For practical purposes mixed and behavior strategies are the same

Nature's Moves

Add an additional player "Nature" with random moves

Example: Chain Store in declining industry



Decision Analysis

To drill for oil or not to drill for oil? Cost \$100,000.

How much will you pay for a geological survey before drilling?

Value of Oil:

\$0 (dry) with probability 50%

\$300,000 with probability 50%

The survey has a 10% error rate

No risk aversion

Expected Revenue After the Test

$$pr(dry|+) = \frac{pr(+|dry)pr(dry)}{pr(+)} = \frac{.1 \times .5}{.5} = .1$$

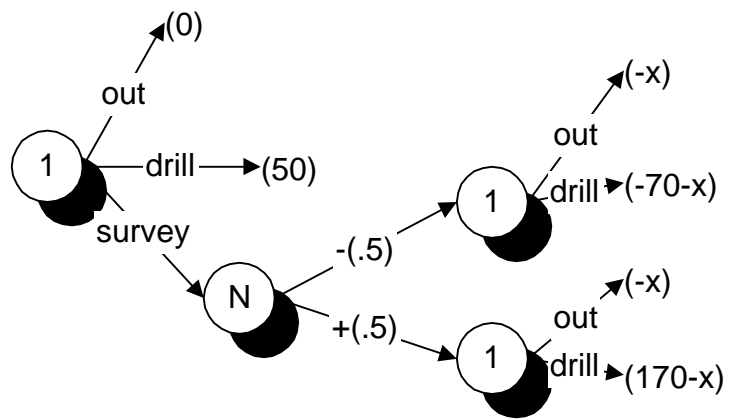
expected revenue given +

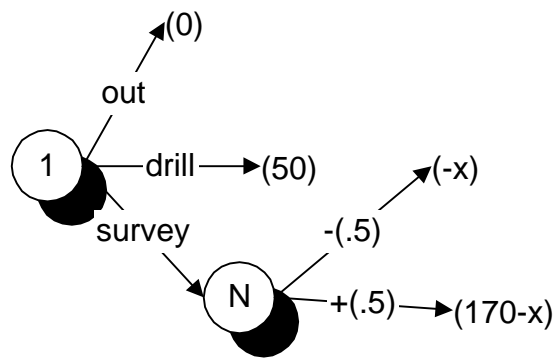
$$.1 \times 0 + .9 \times 300 = 270$$

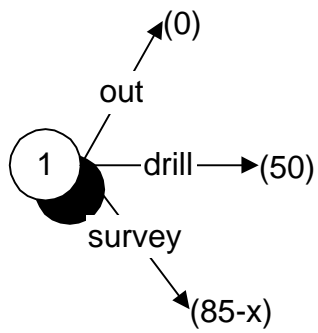
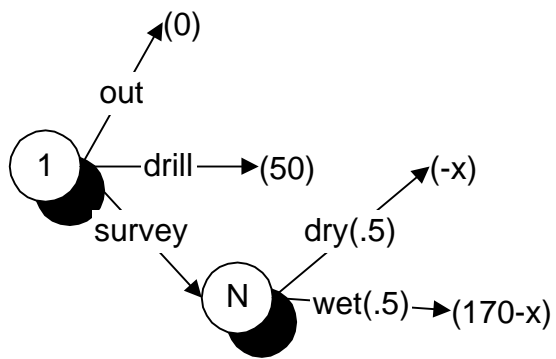
expected revenue given –

$$.1 \times 300 + .9 \times 0 = 30$$

Dynamic Programming Analysis







drill or survey; survey if $85 - x > 50$ or $x < 35$