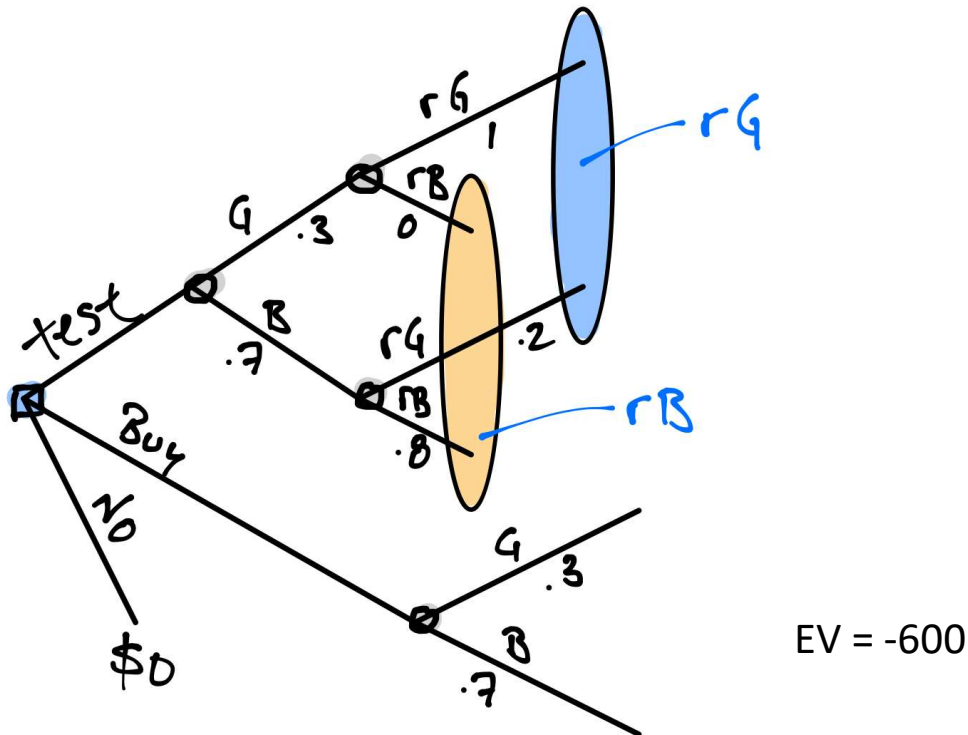


E: Imperfect information, part 2

a136

Continuing the analysis:

Tree constructed so far:

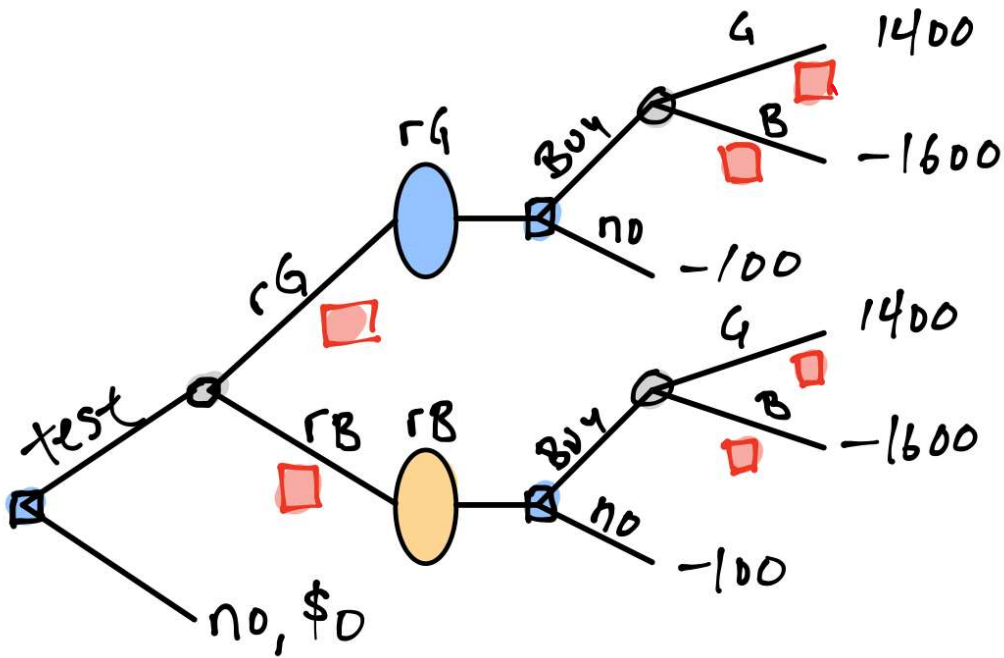


Can help to redraw tree from buyer's perspective:

Connect test directly to information sets

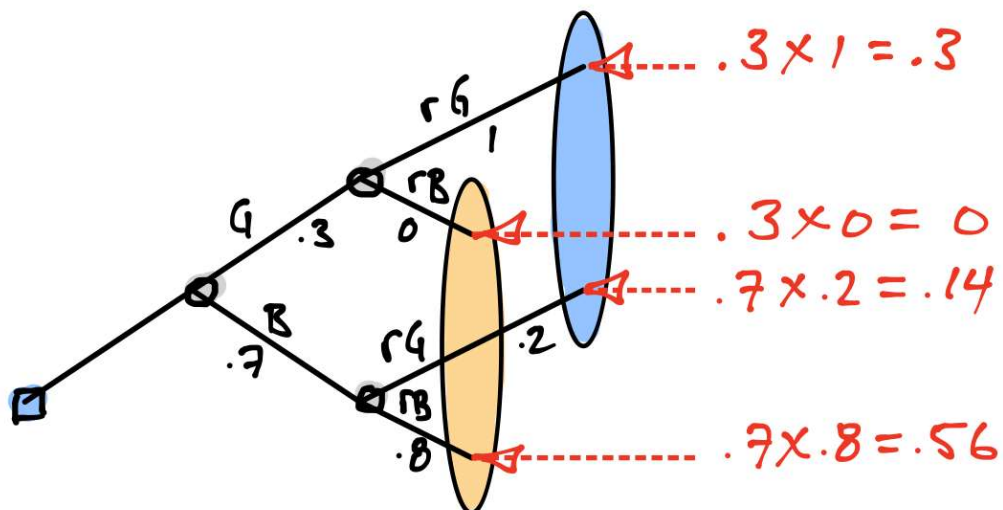
Also, only three key payoffs down test branch:

Test, buy car, car is G:	-100	- 2500	+ 4000	= 1400
Test, buy car, car is B:	-100	- 2500	+ 1000	= -1600
Test, don't buy car	-100			= -100



Red boxes: probabilities to be determined

Step 1: **unconditional** probabilities of individual information set endpoints:



Checking the sum: $0.3 + 0 + 0.14 + 0.56 = 1$

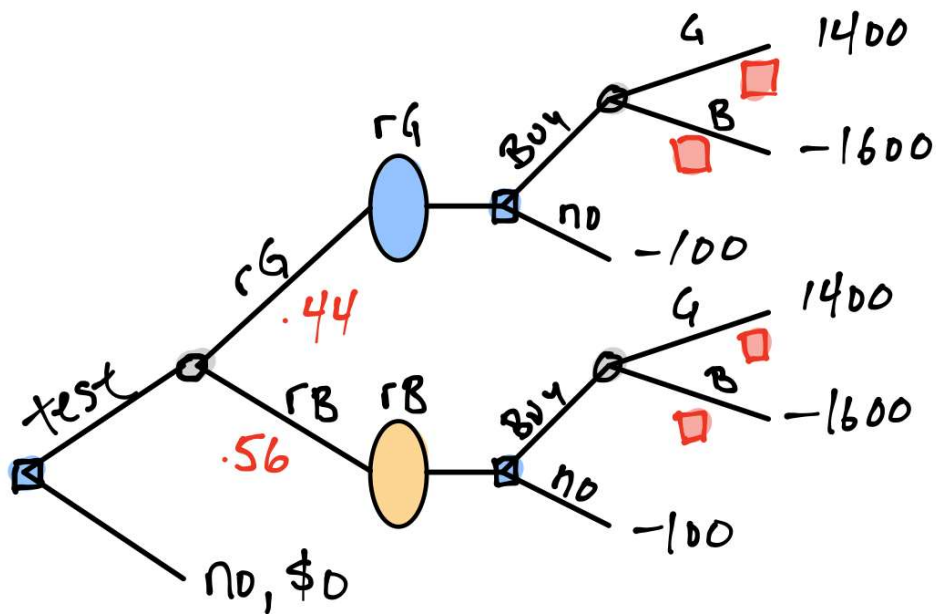
Step 2: probabilities of information sets rG, rB:

probability of rG: $0.3 + 0.14 = 0.44$

probability of rB: $0 + 0.56 = 0.56$

Checking the sum: $0.44 + 0.56 = 1$

Adding to the tree:



Step 3: calculate **conditional** probabilities after rG and rB:

Conditional probability:

Probability of **true state** given **reported state**

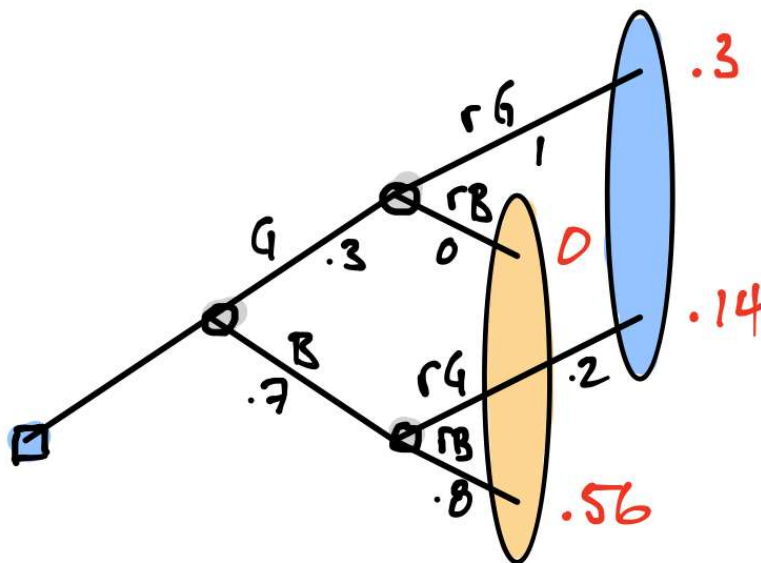
Example:

Probability car is actually **good** (G) when **reported good** (rG)

Formally, an application of Bayes' Rule

Equal to the **share of G cars** in **those with rG reports**

Find from original tree:



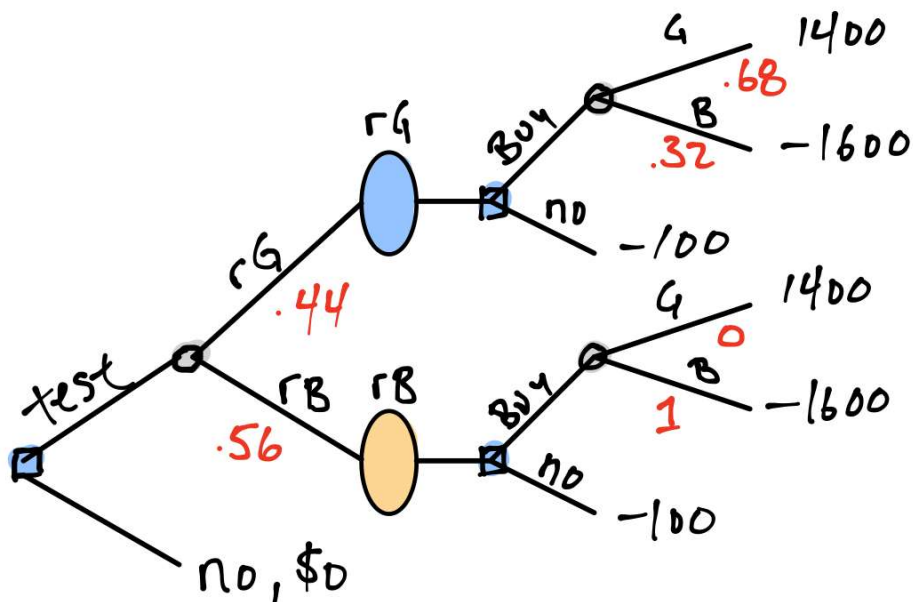
Prob G if rG :
 $0.3/0.44 = 0.68$

Prob B if rG :
 $0.14/0.44 = 0.32$

Prob G if rB :
 $0/0.56 = 0$

Prob B if rB :
 $0.56/0.56 = 1$

Adding to the buyer's view:



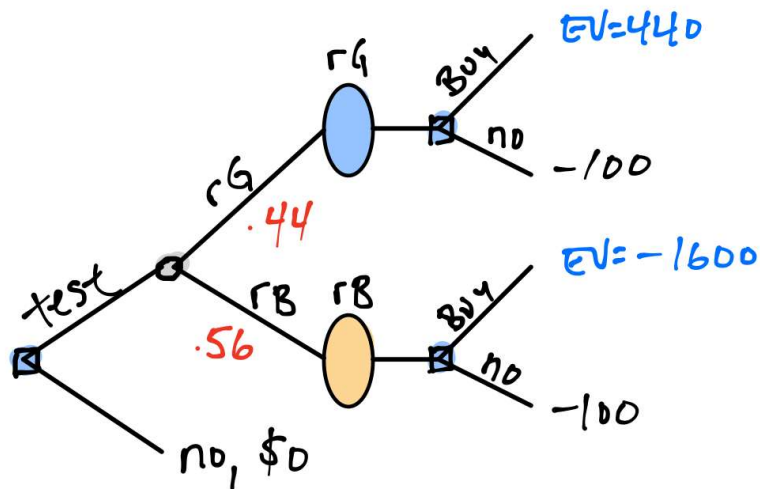
Step 4: evaluate finished tree:

Computing EVs at right:

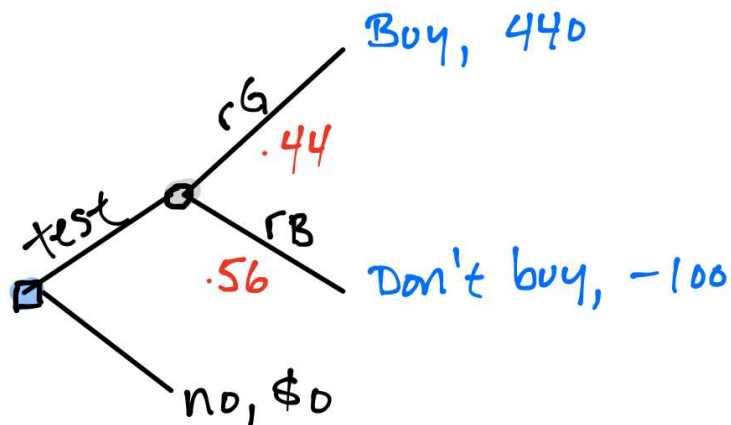
Buy if rG : $0.68 \cdot 1400 + 0.32 \cdot (-1600) = 440$

Buy if **rB**: $0 \cdot 1400 + 1 \cdot (-1600) = -1600$

Updating the tree:

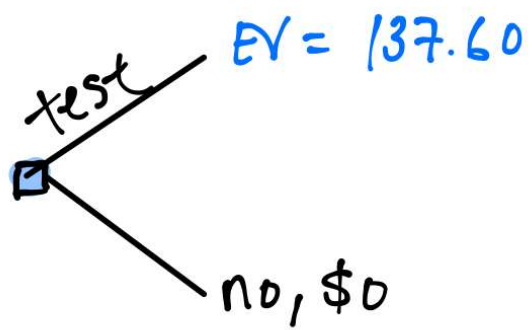


Evaluating right-most choice nodes:



Evaluating again gives the EV of the test:

$$EV = 0.44 \cdot 440 + 0.56 \cdot (-100) = 137.6$$



Conclusion:

Buy the test