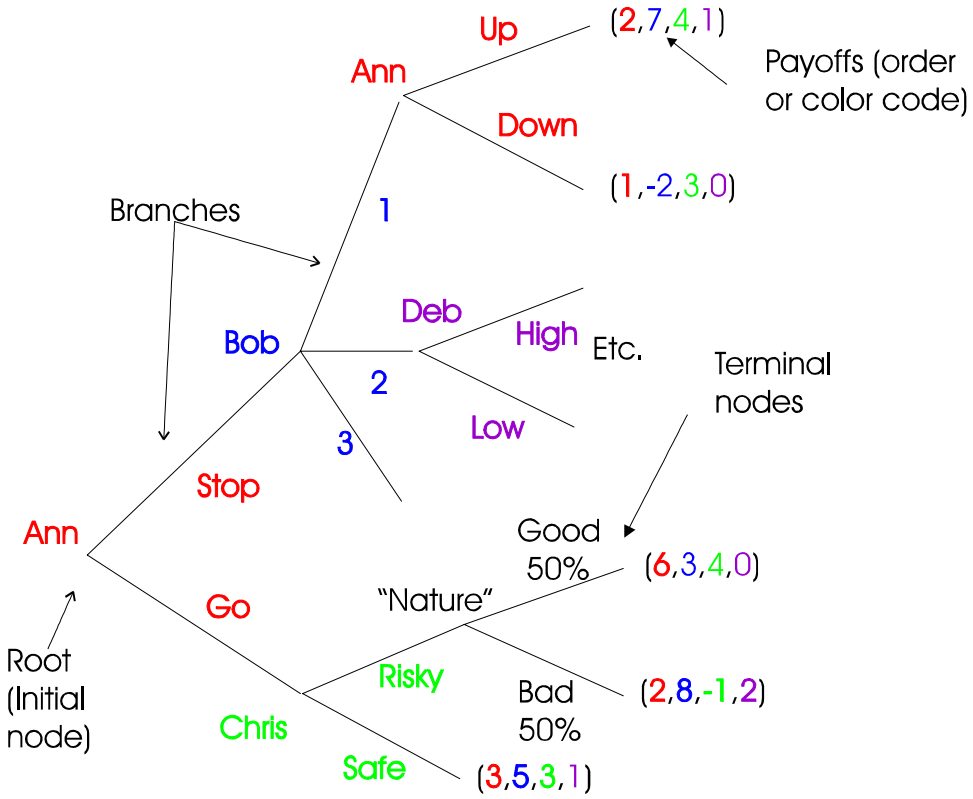
ECO 199 – GAMES OF STRATEGY
Spring Term 2004 – February 10
SEQUENTIAL-MOVE GAMES

GAME TREES – GENERAL CONCEPTS

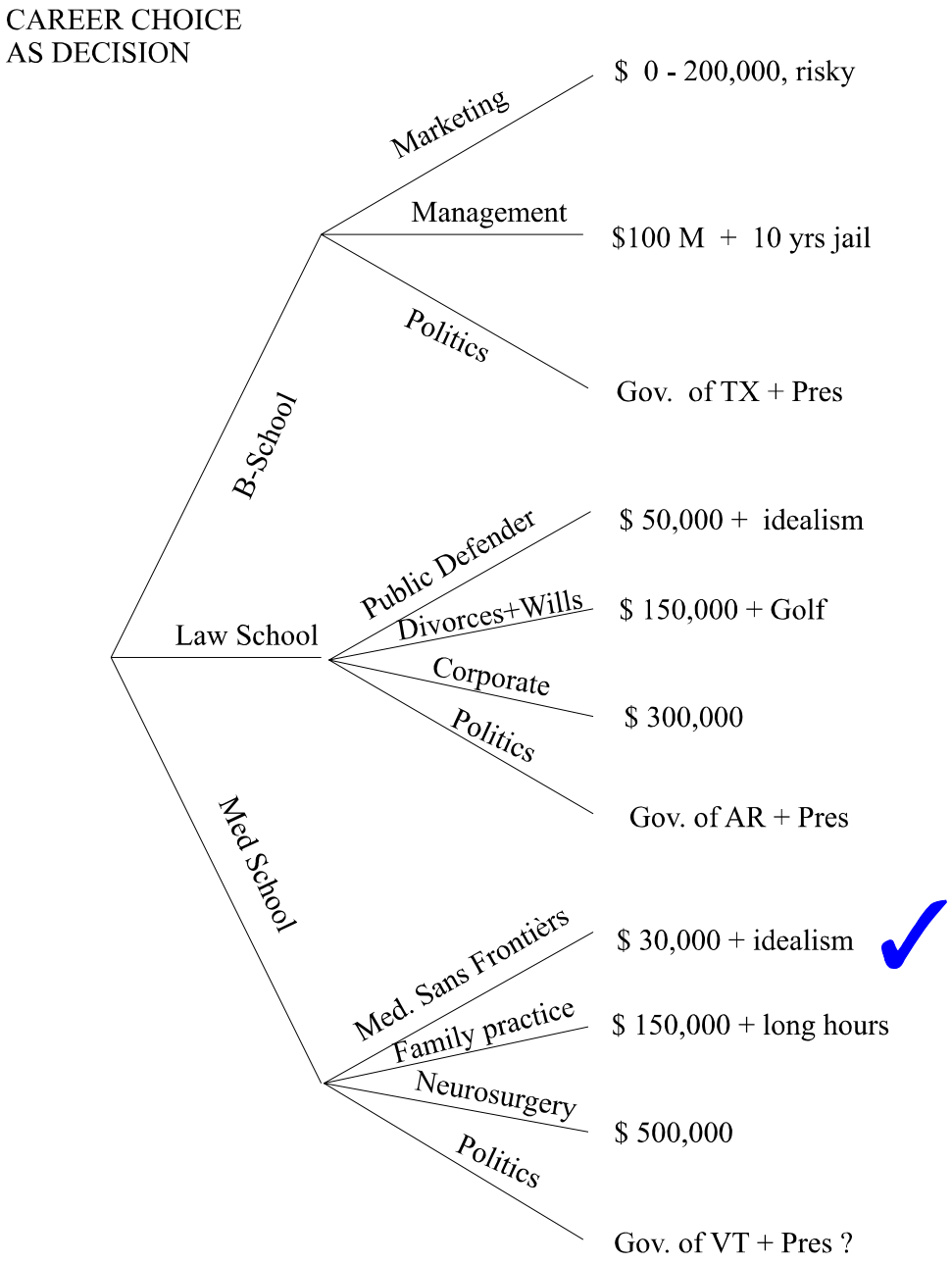


Labels:
On "action" nodes - name of player taking action there
On branches - description of action taken, probabilities
On terminal nodes - payoffs of all players except "Nature"

Strategy is complete plan of action – specifying the action which the player would take at all nodes where the rules say it is his/her move
Must specify actions even at nodes that will not be reached in actual play and even if the player's own earlier action makes that so
e.g. for Ann at second opportunity even if her action at first is "Go"
Because what you *would* do later affects what you *choose* to do now

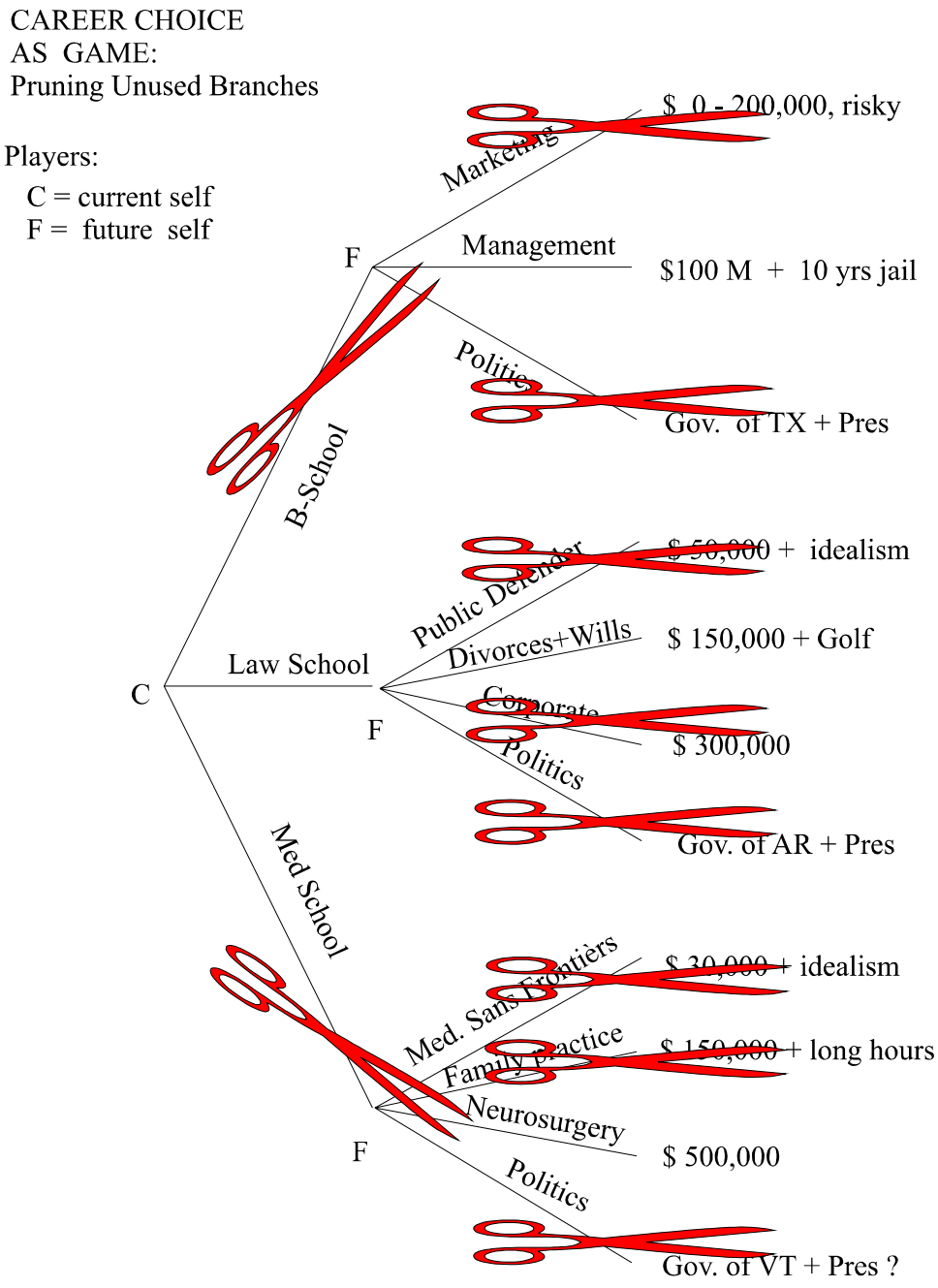
DECISION TREE

Can choose among all terminal nodes at once

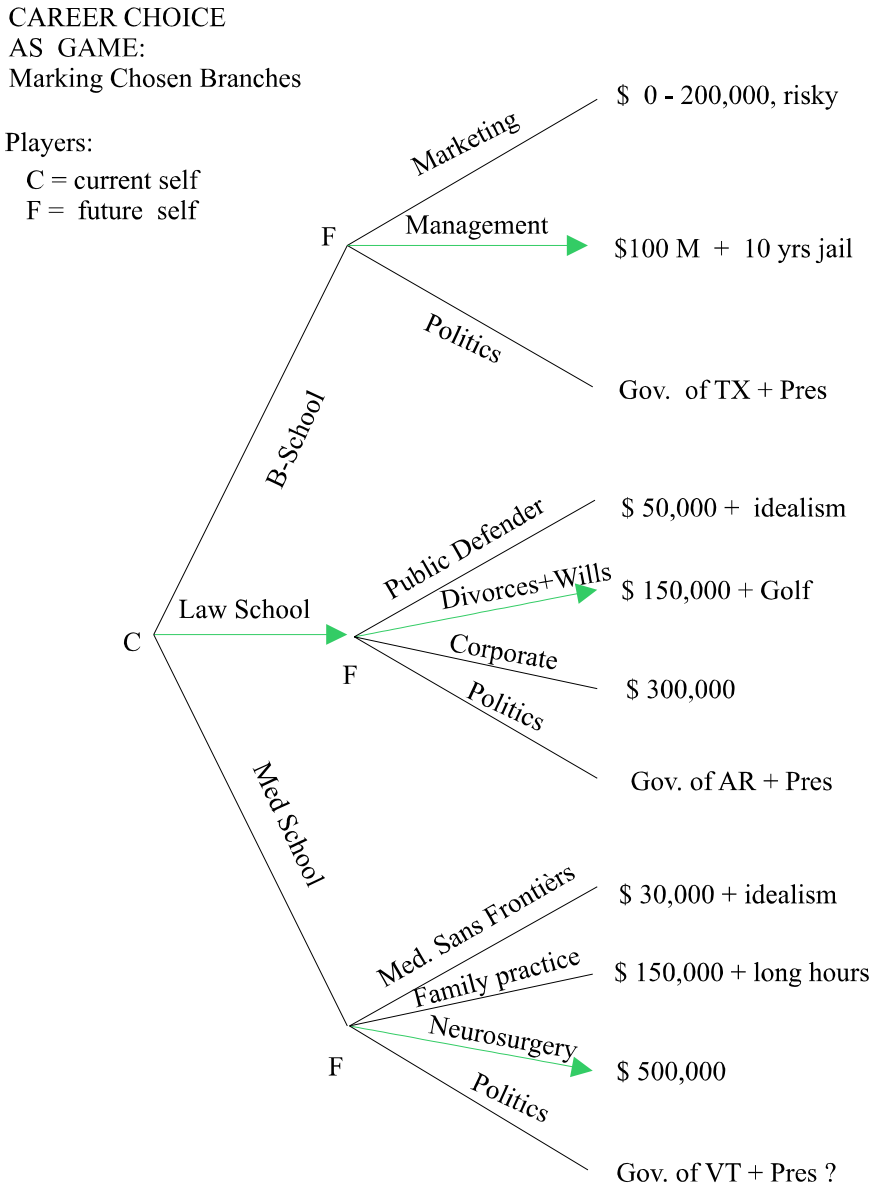


GAME TREE - ROLLBACK ANALYSIS

Method 1 – Prune branches not chosen



Method 2 – Mark chosen branches



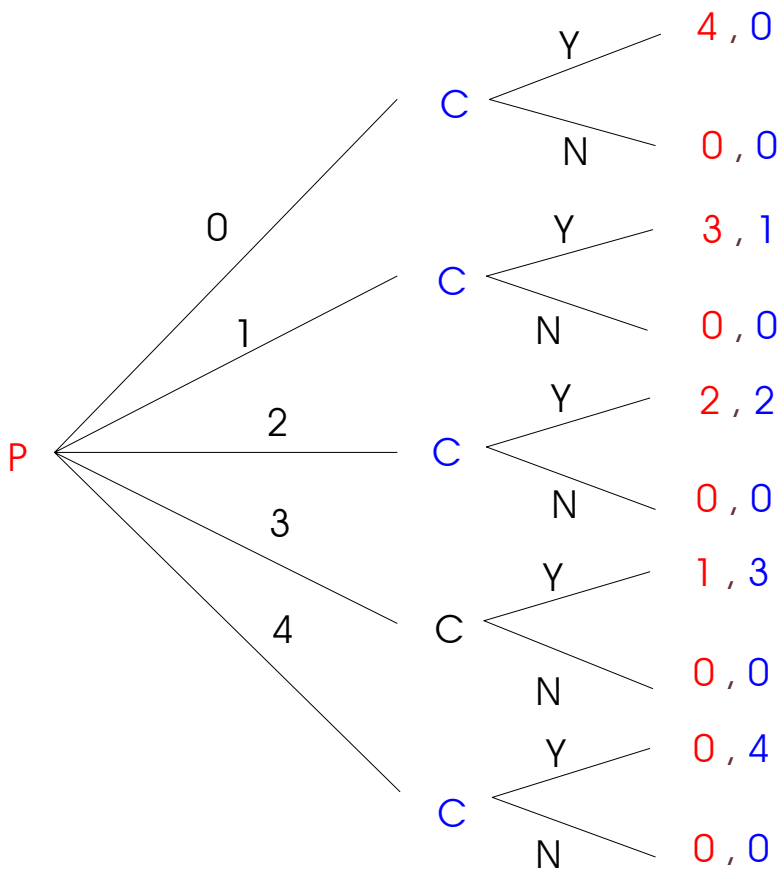
IMPORTANT – [1] Use the one or the other, not both

[2] Checkmarks somewhat better because
order of pruning can be unclear, and
full sequence of checkmarks immediately shows path of play

[3] Must show what would happen even at nodes not on the
actual path followed from choices made, because actual path
is determined by consideration of what would happen otherwise

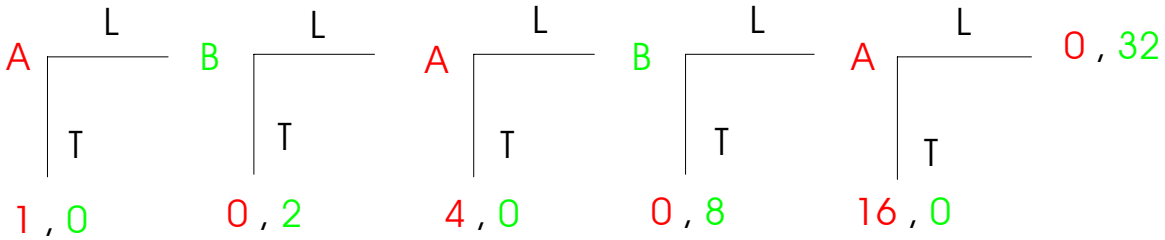
ULTIMATUM GAME

P = proposer; his actions are the number of quarters
out of a dollar that he proposes to leave to
C = the chooser, who decides to accept (Y) or reject (N)



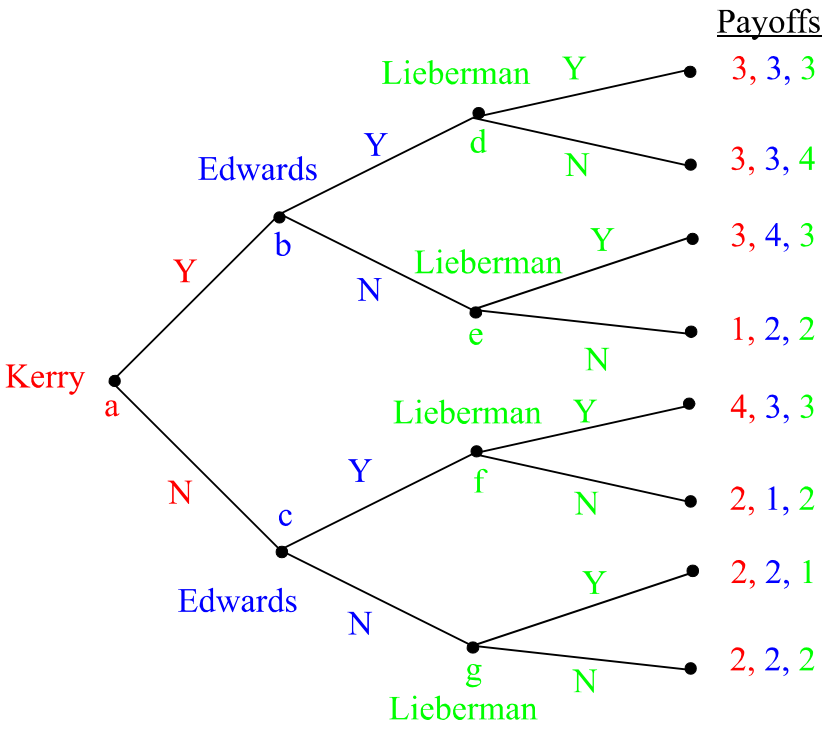
CENTIPEDE GAME

Each of A and B decides whether to Take or Leave at each turn



PAY RAISE VOTING GAME

Each of three legislators (or groups) votes Y or N
Payoffs: 4 if raise passes, but own vote N
3 if raise passes, and own vote Y
2 if raise fails, and own vote N
1 if raise fails, but own vote Y



All feasible (logically available) strategies (complete plans of action):

Kerry : 1. Y 2. N

Edwards : 1. Y at b (if Kerry played Y), N at c (if Kerry played N)
2. Other way round, 3. Y regardless, 4. N regardless

Lieberman : 1. Y at d, N at e, Y at f, N at g, ...
Total 16 strategies because following each of 4 possible "histories",
Lieberman can choose one of two actions : $2 \times 2 \times 2 \times 2 = 16$