

Lecture 2



One person decisions: Games with and
against yourself

Lecture Outline



- <http://www.youtube.com/watch?v=MoNs0mdKA08>

Lecture Outline



- Using Marginal Analysis to guide decisions.
- Decision Trees
- How to draw
- Why they are useful (good to organize data, simplify the decision process. Communicate decisions to others)
- Examples:
 - Sunk cost dilemma
 - Nebraska versus Miami (1984 Orange Bowl)
- Thinning Strategically games against yourself.

Simple Decisions

- For many simple decisions, the best choice is often a matter of simply weighing the benefits against the costs and choose the highest number.
- Go to university or not"

Benefit	Cost
Better paying job (+1M)	Tuition (-100K)
Better peers (+500K)	Rotten Profs (-750K)
1.5M	-850K

Decisions on the Margin



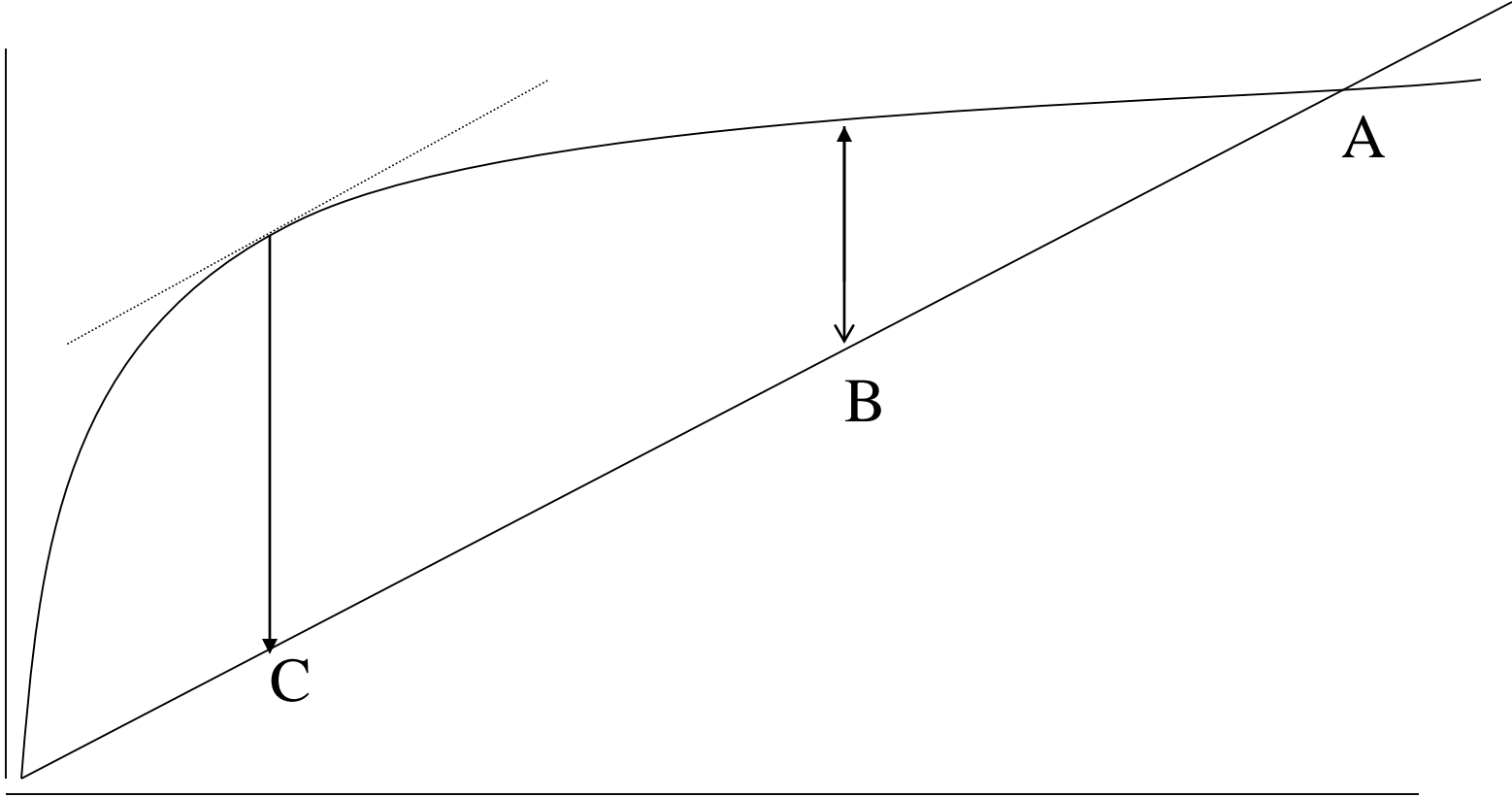
- For many choices, though, the question is not “whether” but “how much?”
- You could try the approach above but a faster trick is to use “thinking at the margin”
- Suppose you are training for a marathon. How many miles a week should you run?
- The next slide shows the costs and benefits.

Running a Marathon



- Suppose for each mile you run, you have to give up \$10 in wages.
- Initially, running a small number of miles per week has a big payoff.
- As you run more miles, the incremental (that is, marginal) payoff in terms of finish time (evaluated in dollars) declines.
- See the next slide.

Costs and Benefits of Running



Running a Marathon



- Where do you want to end up?
- A A? B? or C?
- What is the property of the best choice?
- Marginal benefit = marginal cost.

Example: Maximizing Profits.

- Suppose you are a monopoly providing tutorial services.
- Each hour costs you \$5 worth of tennis practice.
- As you provide more services, your revenue rises as follows:

Hours	1	2	3	4	5	6
Earnings	30	50	60	65	67	68

Thinking at the Margin

	1	2	3	4	5	6
Earnings	30	50	60	65	67	68
Costs	5	10	15	20	25	30
Profits	25	40	45	45	42	38

Optimal Choice



- When the choice is a quantity, the rule for the optimal amount is where the marginal benefit equals the marginal cost.
- (Marginal Benefit = increase in benefit from increasing q by one unit.)
- (Marginal Cost = increase in cost from increasing q by one unit.)

Thinking at the Margin

	1	2	3	4	5	6
Earnings	30	50	60	65	67	68
Costs	5	10	15	20	25	30
Profits	25	40	45	45	42	38

MB	20	10	5	2	1
MC	5	5	5	5	5



Dynamic Decision-making

Decision Trees



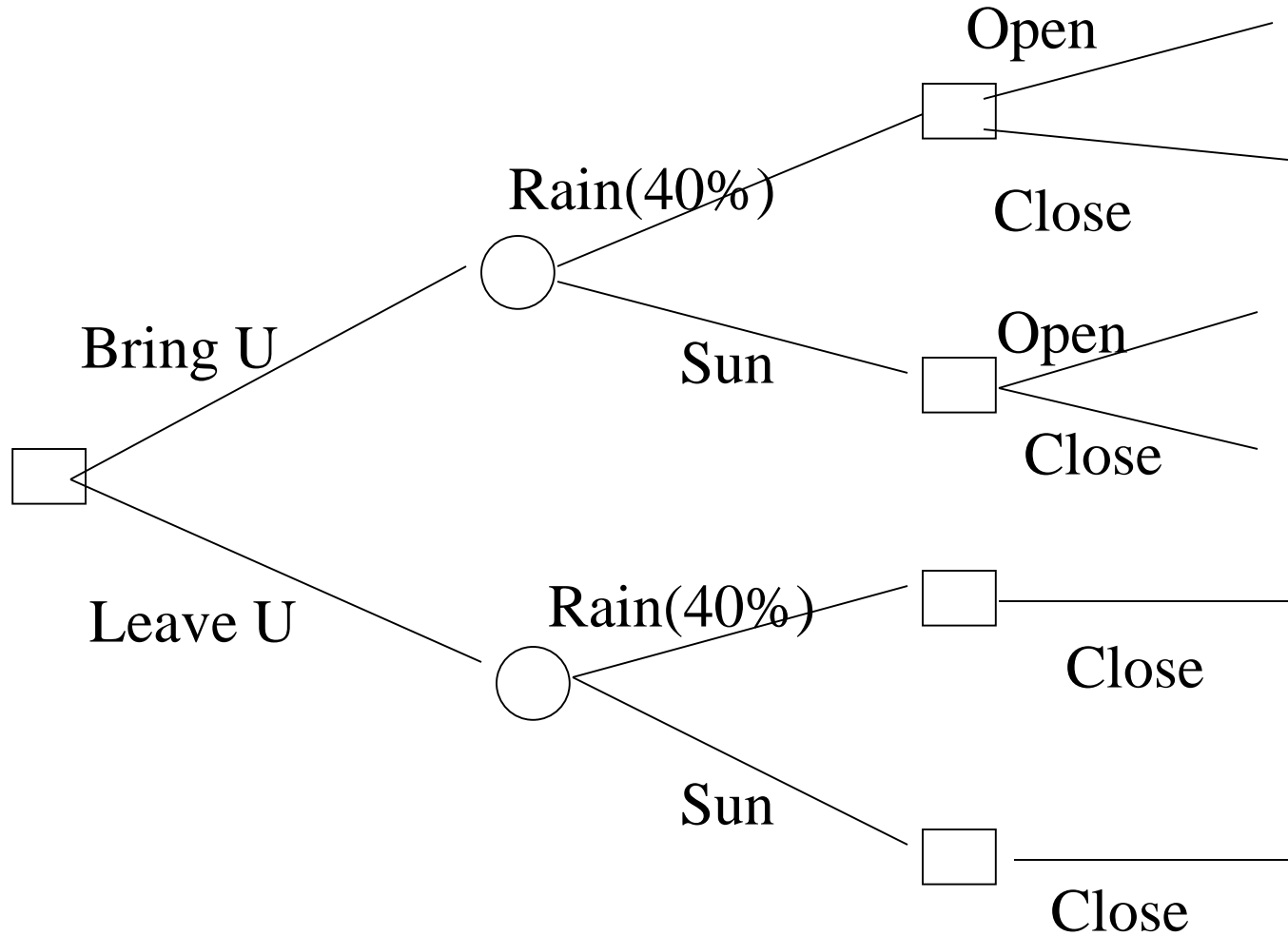
- Many decisions must be made sequentially, often because some decisions must wait until other events occur.
- Decision trees are (sometimes) useful devices for organizing thoughts about these decisions.
- A decision tree is an ordered graph. It is a sequence of boxes and circles joined by lines.
- The boxes represent points where you make a decision. The circles are random outcomes.
- The lines are the choices you make or made by chance.

Decision Trees: Example



- You hear that there is a 40% chance of rain.
- Should you bring your umbrella to campus?
- Here is a decision tree to help you out.

Decision Tree Example

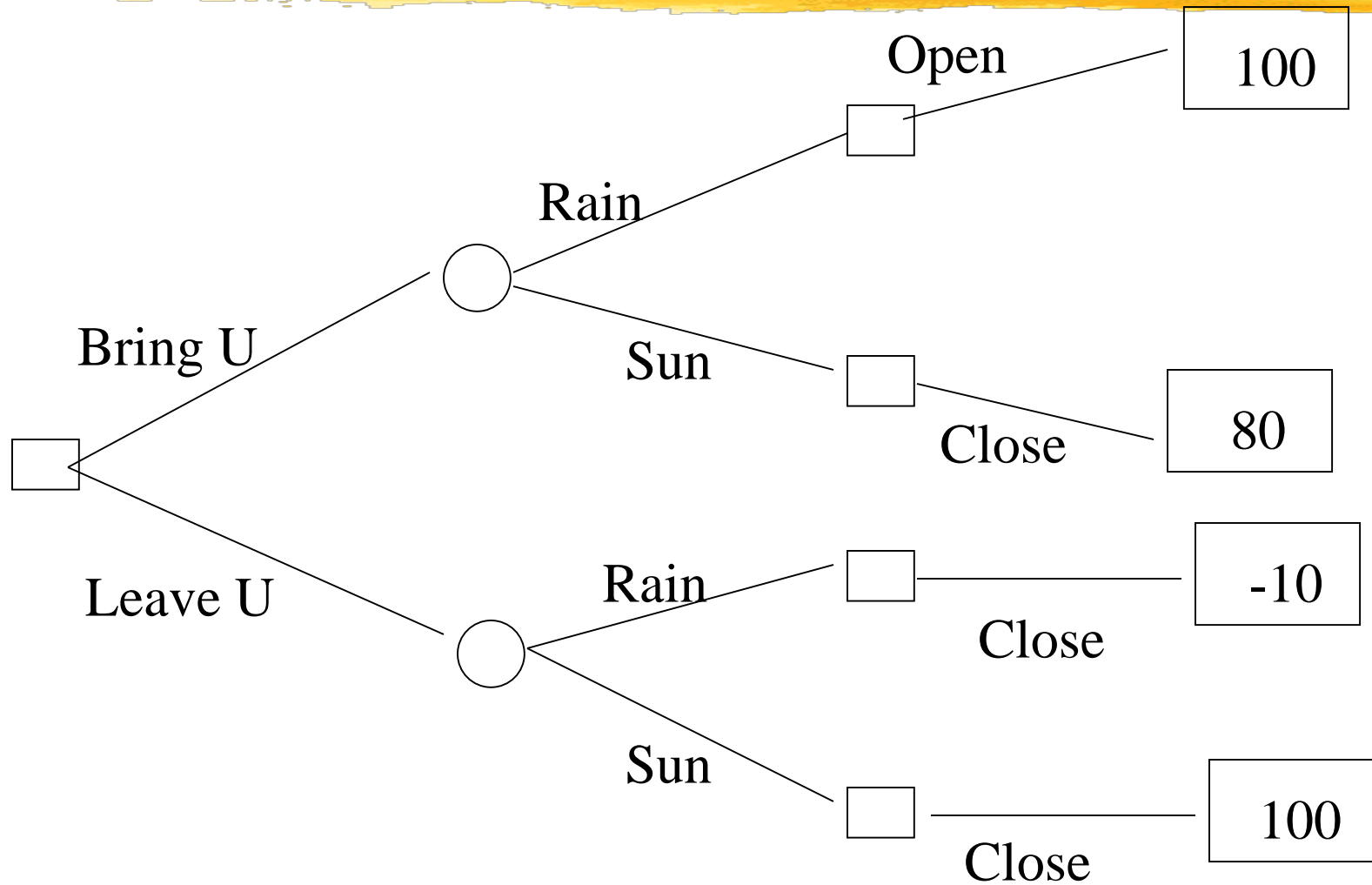


Back to Front Reasoning



- The typical way to “solve” this problem is to assign values to all the outcomes and find a path that maximizes (expected) value.
- However, we can save some of this by solving the game “back to front”
- For the collection of final decision nodes, find what you would choose to do.
- This process simplifies the game.
- Now assign values.

Decision Tree Example





The 1984 Orange Bowl

More on Two Point Conversion vs. PAT

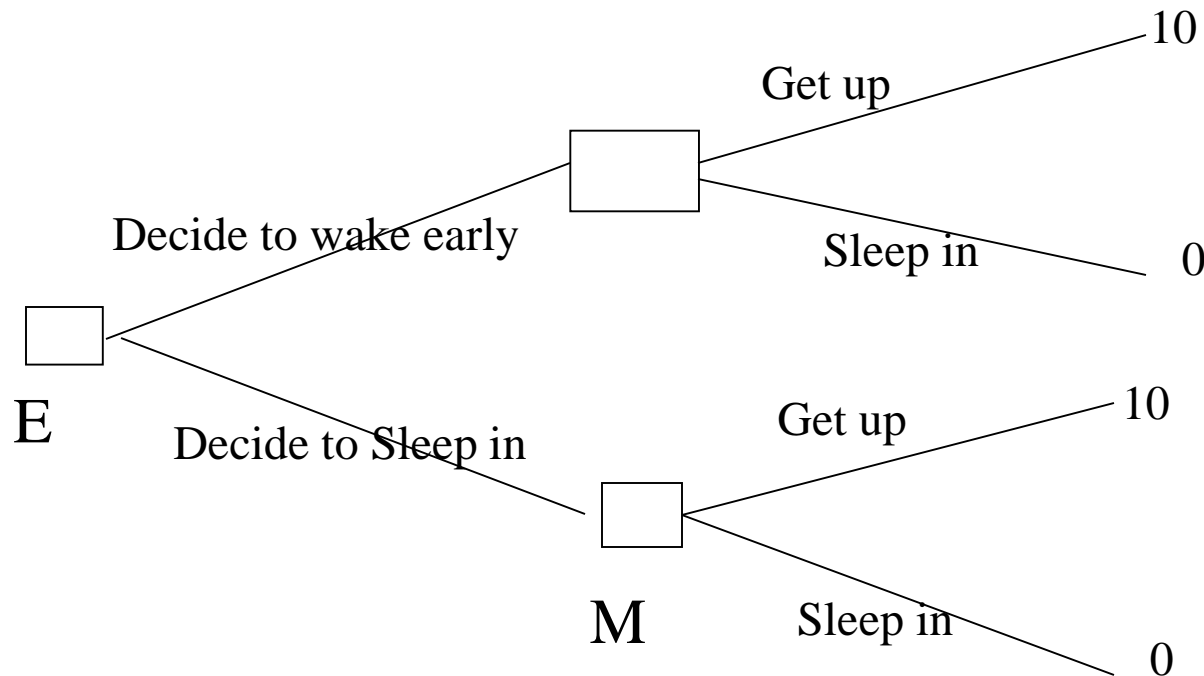


- <http://www.stat.duke.edu/~dalene/chance/chanceweb/133.sackrowitz.pdf>

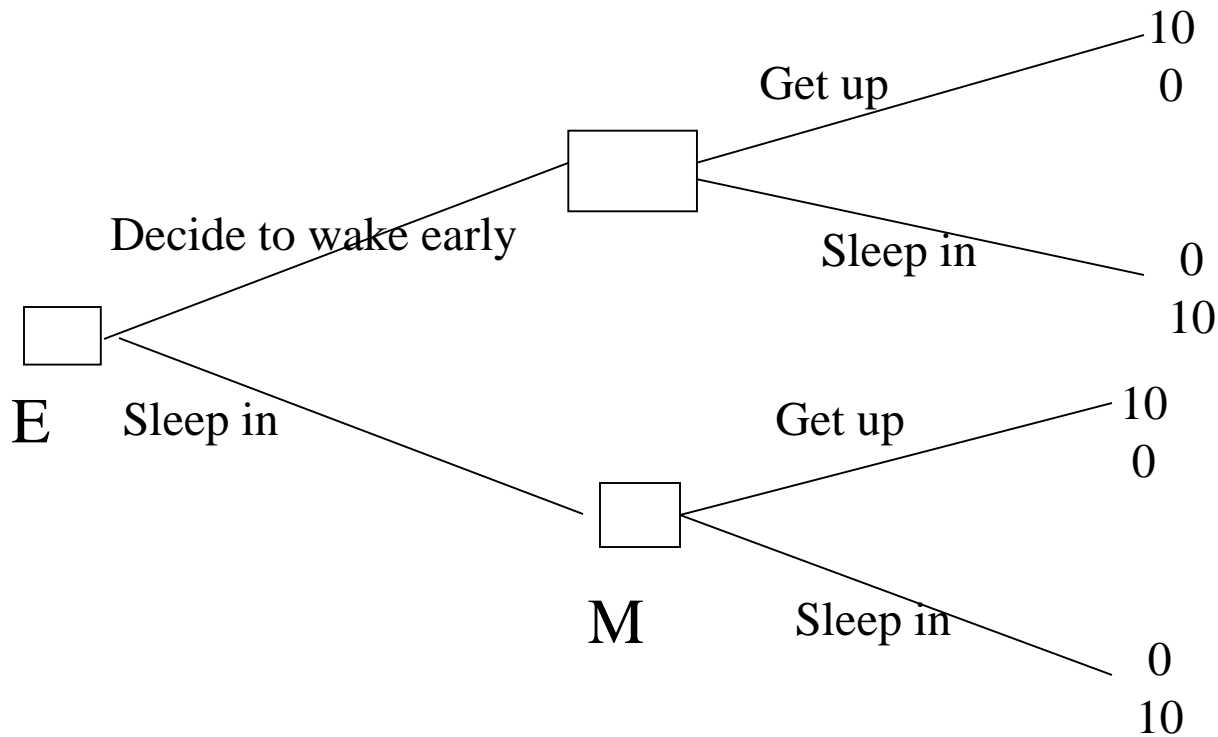


Games against yourself

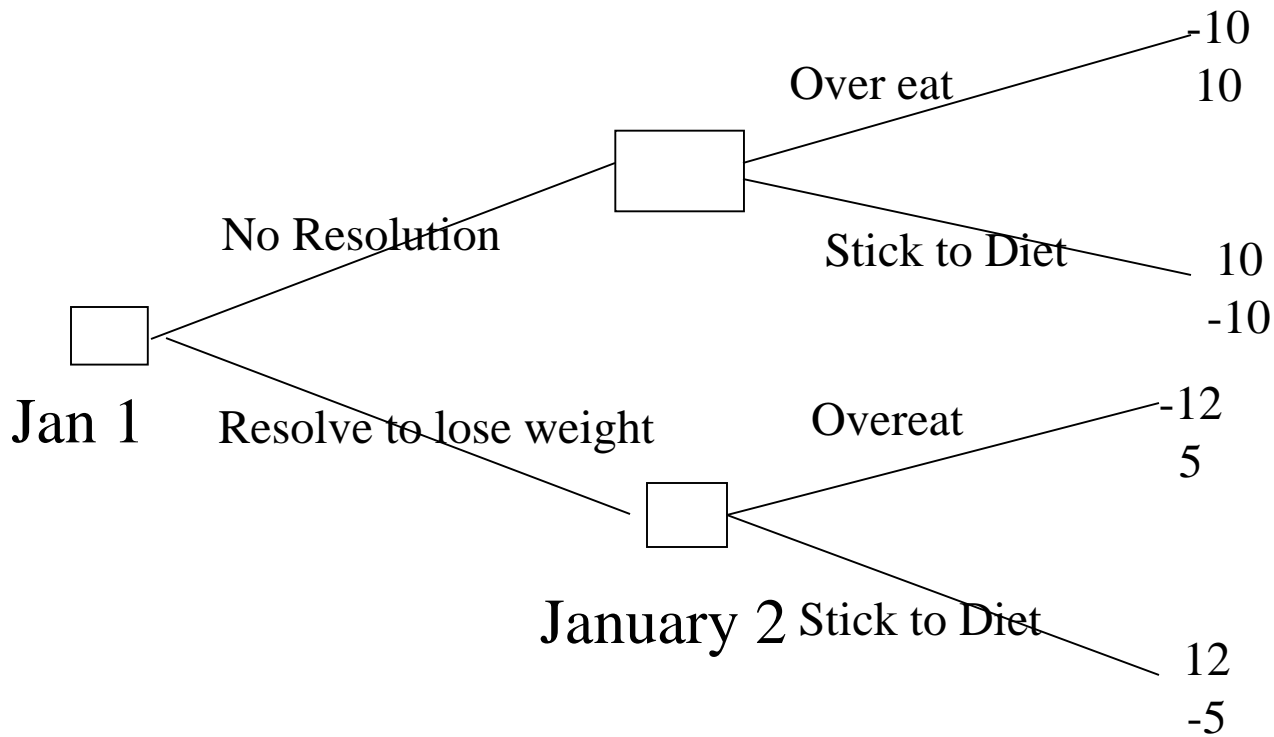
Morning people and not morning people: What is the problem?



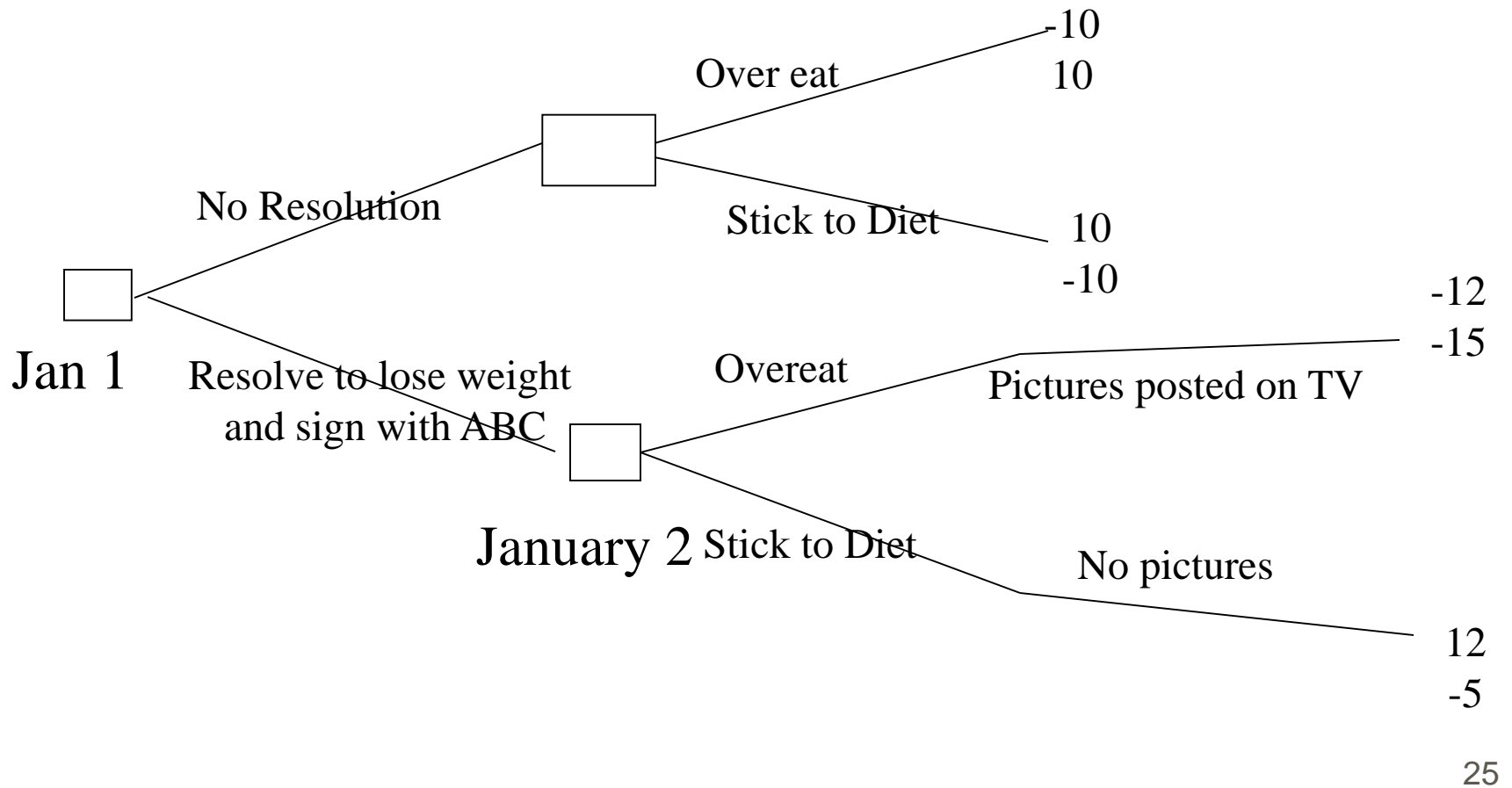
Morning people and not morning people: "I am just not myself in the morning."




Thinning Strategically



Thinning Strategically



Health Clubs and Decision Trees



- "Saturday, 31, December, New Year's Resolution. I WILL ... go to the gym three times a week, not merely to buy sandwich." *Bridget Jones Diary*.
- "Monday, 28 April, ... , Gym visits, 0, no. of gym visits, so far this year, 1, cost of gym membership per year 370, cost of single gym visit, 123 (v. bad economy)". *Bridget Jones, The Edge of Reason*.

Briget Jones and the Economics Profession



- <http://eml.berkeley.edu/~sdellavi/wp/gymempAER.pdf>

Buying A Commitment: or Am I a Masochist?



- www.stickK.com
- <http://econpapers.repec.org/paper/hbswpaaper/07-099.htm>
- http://www.imdb.com/video/imdb/vi3042902041/?ref_=tt_ov_vi
- <http://www.youtube.com/watch?v=UGqtupg4dqY>