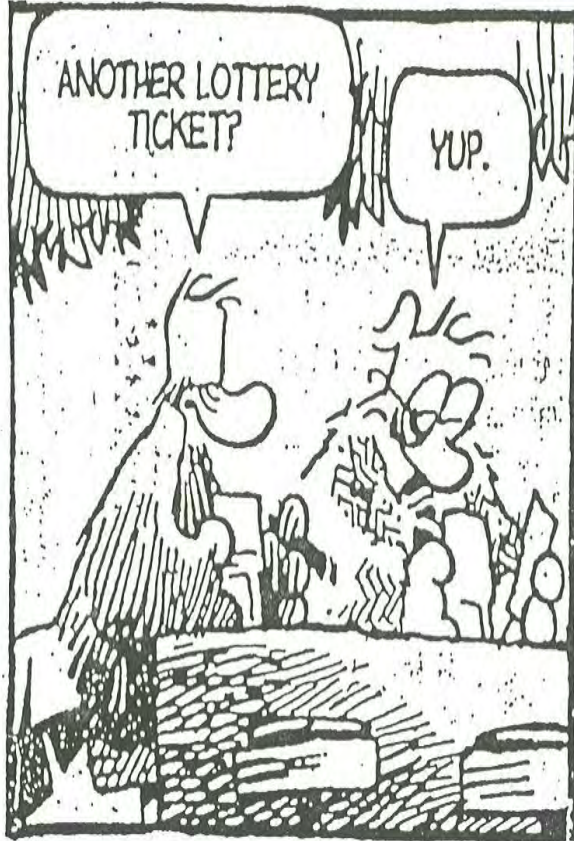


How To's of Decision Tree Analysis for Lawyers, Mediators, and Their Clients

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THE SUPREME COURT *of* OHIO **2020**
Dispute Resolution
Conference

SHOE by Jeff MacNelly



Tackling Fear

Pre-lawyers with math phobias large & small,

Neither calculus, nor algebra nor geometry need
you recall.

Computer dyslexia is not so bad,

With paper, pen and calculator you can subtract and
add.

If you a clear-thinking, logical person be, you can
use a decision tree.

Tackling skepticism

Solomon, Portia and scions of our legal tradition,
Managed to muddle through on judgment and intuition.

Decision analysis is a rubric for structure and rigor,

In cases requiring intellectual vigor.

Exposure may be great and winning and losing
issues hard to rate.

Parties and motions may be in odd array, or many

Damages theories set in the way.

Tackling Dread

Math in law school is too much to take.

There's not enough coffee to keep me awake.

Decision analysis isn't about dry calculation.

It's about structuring from speculation.

Thinking through uncertainty,

As you build a decision tree.

Order out of chaos

Often a case is a legal mess,

Settlement value's an uneasy guess.

Working through a decision tree can check or confirm intuition,

Providing logic and structure for settlement decision.

Decision analysis helps create a sense of separation.

It can achieve greater clarity in communication,

Sometimes maximizing the force of persuasion.

EXPLAIN AND SHOW

HOW DOES DECISION ANALYSIS WORK?

JUST HOW NATURAL AND EASY CAN
THIS REALLY BE????

COMMON SENSE, SIMPLE LOGIC AND SOUND INTUITION

1. Define the decision: What's the problem?
What are the choices?
2. Identify the possibilities: What might happen if I decide on one course of action or another?
3. Judge the likelihood: What are the chances the possibilities will come to pass?
4. Figure the net gains or costs: What will the net effect be if it works out this way or that way?

Define the Decision at Hand

Home mortgage decision – variable or fixed rate?

Vacation decision: Cape Cod or the Berkshires

Client decision – Continue to litigate or settle for \$?

Identify the possibilities

- Home mortgage decision – if variable, rates could go up or down or remain the same.

How far up or down?

- Vacation decision: It might rain. It might be cool. It might be sunny and warm.
- Client decision: I might win or lose on summary judgment. There might be a finding of significant negligence, contributory negligence, or no negligence. The defendant might pay the award or file Chapter 11.

Judge the Likelihood

- Home mortgage decision: I think it's unlikely that the rates will go down by more than a point or two; they could go up a great deal.
- Vacation decision: I have never picked a week of good weather. I am convinced it is likely to be cool and/or rainy some or much of the time.
- Client decision: Summary judgment is unlikely due to a factual issue. Liability is very likely, significant contributory negligence is not. There's an even chance of bankruptcy by then.

Figure Net Gains and Costs

- Home mortgage decision: if the rate goes up by 2 points, the net additional cost over 30 years will be \$30,000 (can discount to present value).
- Vacation decision: Dollar costs of the 2 vacations are the same. But if it rains on Cape Cod, there is nothing to do but eat and go to outlet stores. I will be miserable. If it rains and I am in the Berkshires, I can go to concerts, plays, museums. I will be happy.

Figure Net Gains and Costs

- Client Decision: If I win on summary judgment, I will collect \$250,000 in damages but I will pay \$20,000 in attorneys' fees between now and then. If I lose on summary judgment but prevail on liability, I will pay \$40,000 in attorneys' fees through trial but will collect \$250,000 if there is no contributory negligence and \$200,000 with 20% contributory negligence. But if the defendant is bankrupt it will be a long time before I see a dime.

Anatomy of a Decision Tree

Decision Node

Branch

Chance Node

Terminal Node

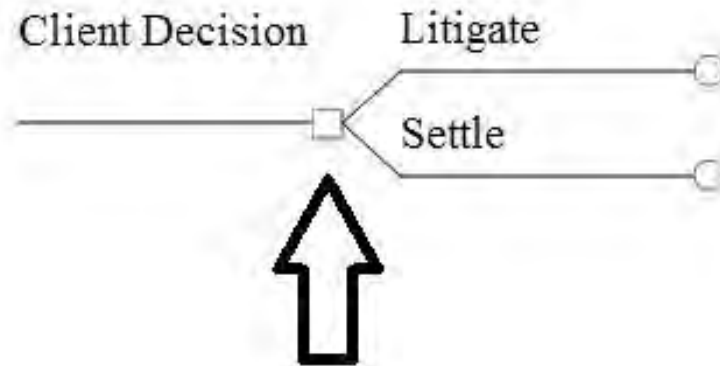
Pay-off

Roll-back

Expected Monetary Value (EMV)

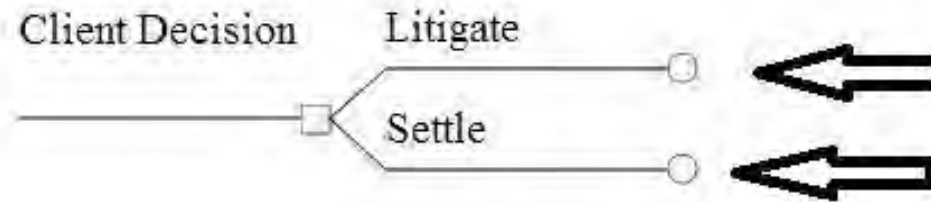
Anatomy of a Decision Tree

Decision Node



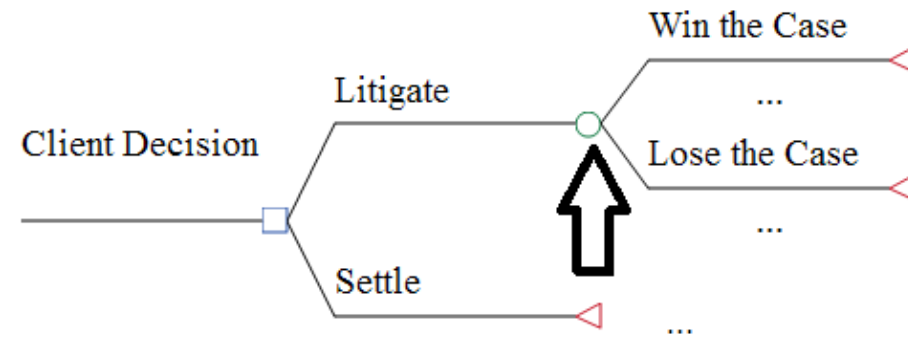
Anatomy of a Decision Tree

Branch



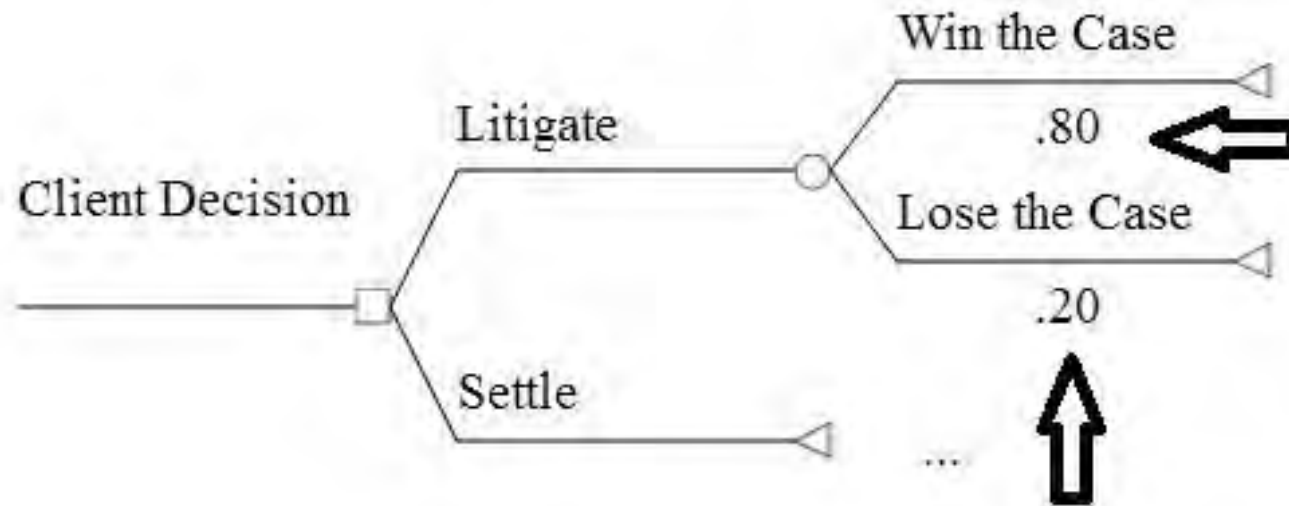
Anatomy of a Decision Tree

Chance Node



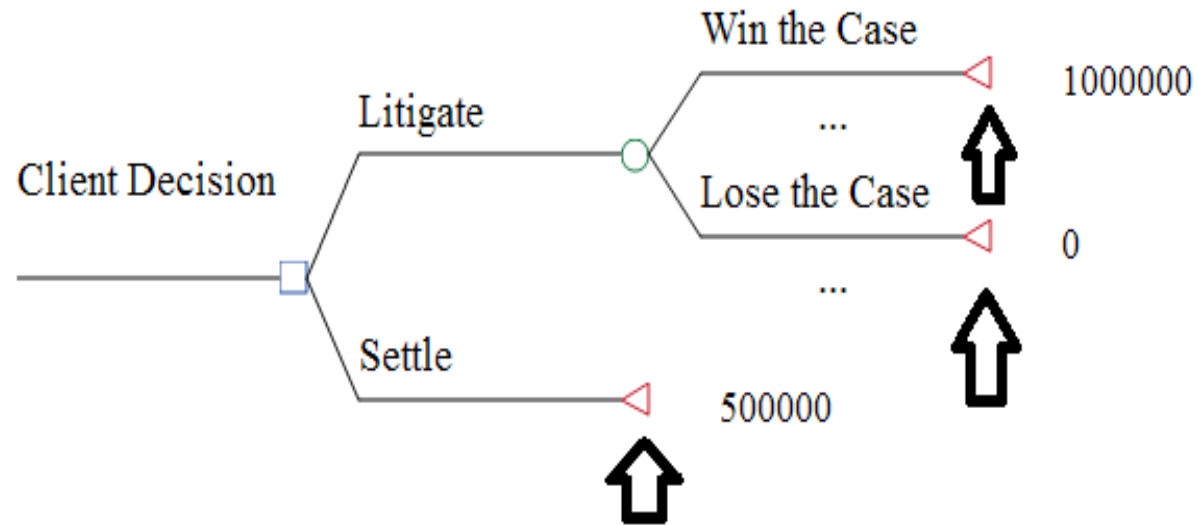
Anatomy of a Decision Tree

Probability



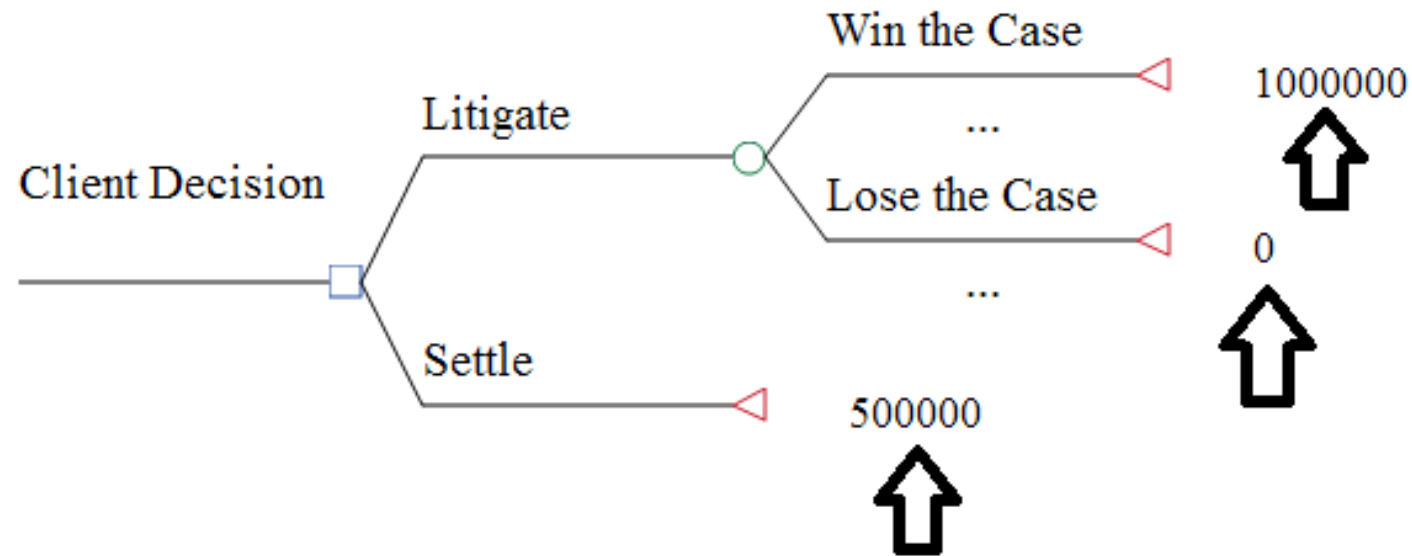
Anatomy of a Decision Tree

Terminal Node



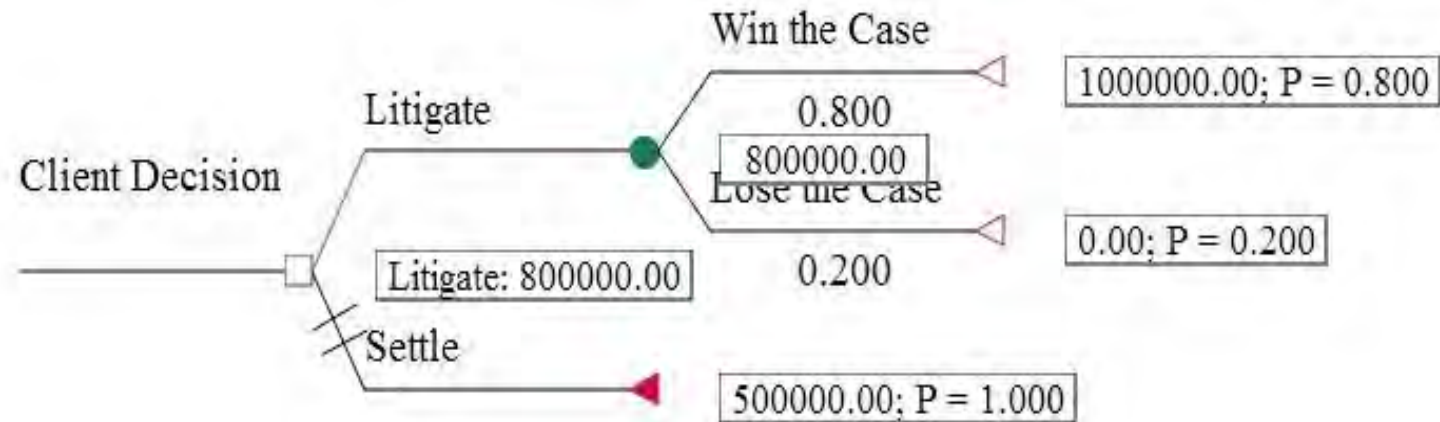
Anatomy of a Decision Tree (Plaintiff's Side Perspective)

Payoff



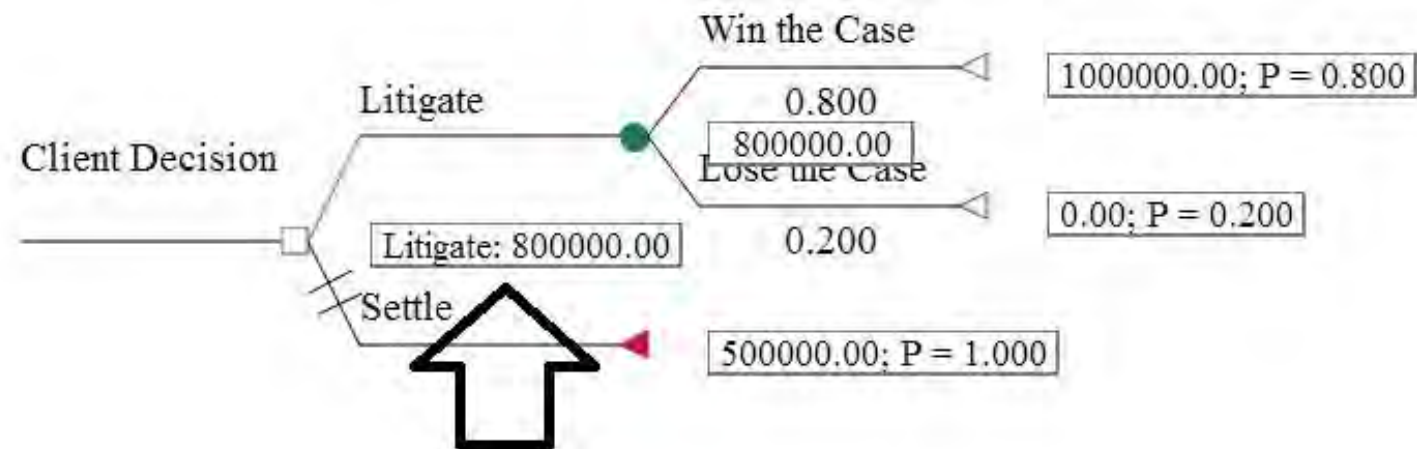
Anatomy of a Decision Tree

Rollback

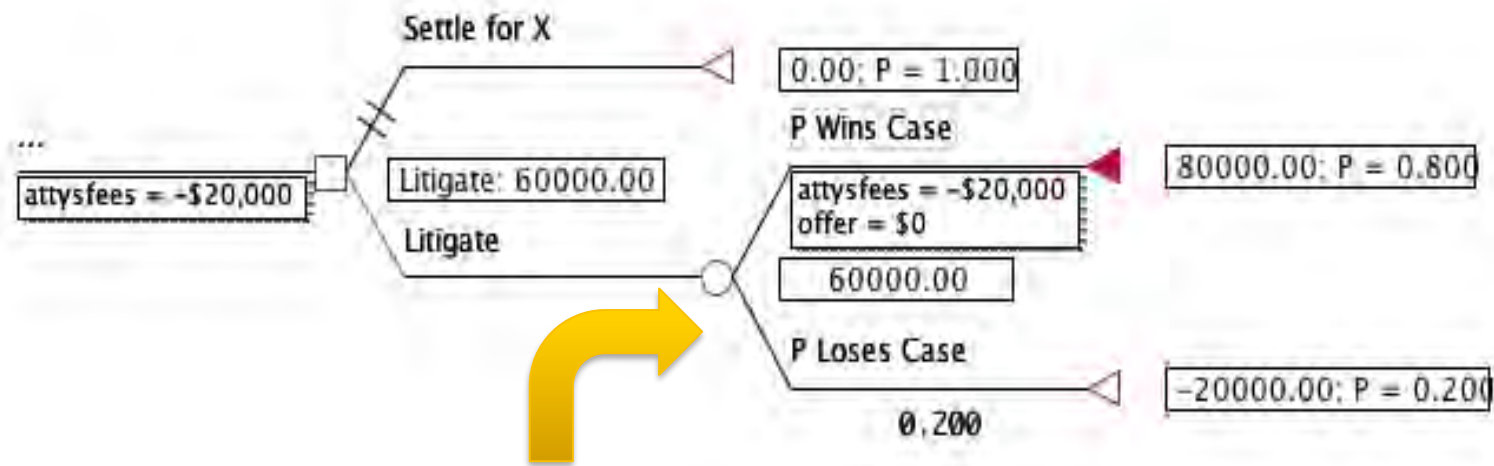


Anatomy of a Decision Tree

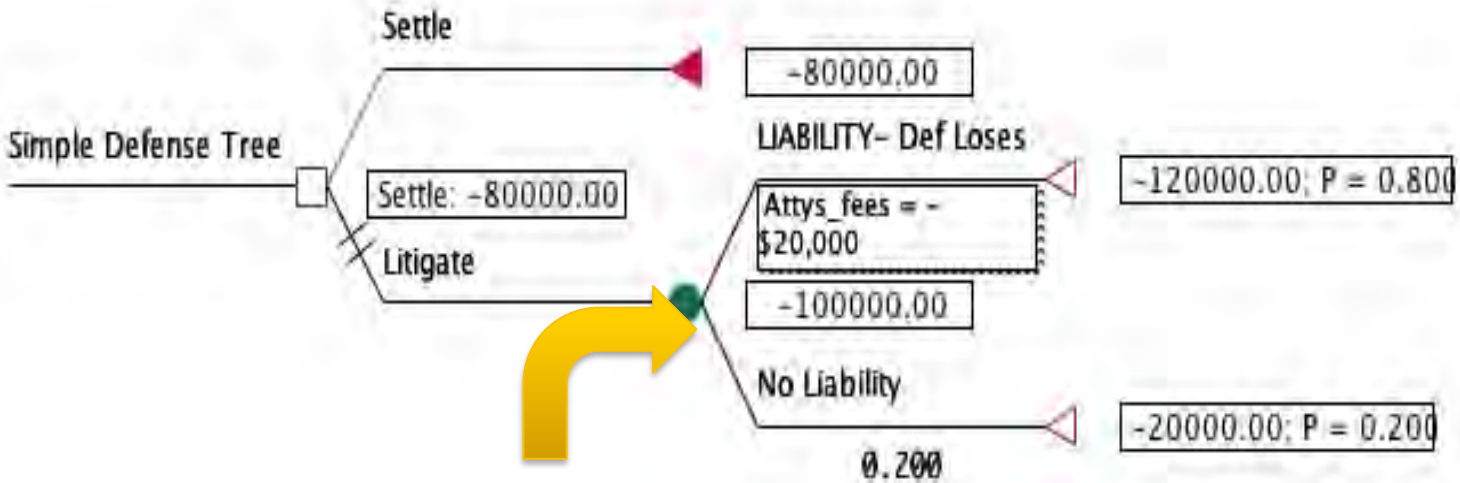
Expected Money Value- EMV



Only NET PAYOFFS MATTER ACCOUNT FOR Attorney's Fees!



Defense NET Loss includes Fees



A Check on the Math is a Check on Reality

- The sum of outcomes at each “chance node” or “branch cluster” must equal 100%
- Or the Expected Value outcome will be “skewed” and misleading.
- In real terms, we will have failed to consider and account for a possible outcome

A Fair Decision Game

At the county fair, you see a large jar of marbles displayed at a booth. The gamesman says that it contains 1000 marbles: 500 are blue and 500 are red.

Your friend purchased a ticket to play the game, but had to leave the fair, and has given it to you.

To play the game, you must give the gamesman your ticket, put on a blindfold, then reach into the jar and select a marble. If it is blue, you win \$20. If it is red, you win nothing.

What is your ticket “worth”? How much could the gamesman pay you NOT to play the game?

Calculating the Decision

Decision: Play or not? Price for the ticket?

Possibilities: Blue Marble or Red Marble

Probabilities: 50% Blue; 50% Red

Pay-offs: If Blue, + \$20

If Red, \$0

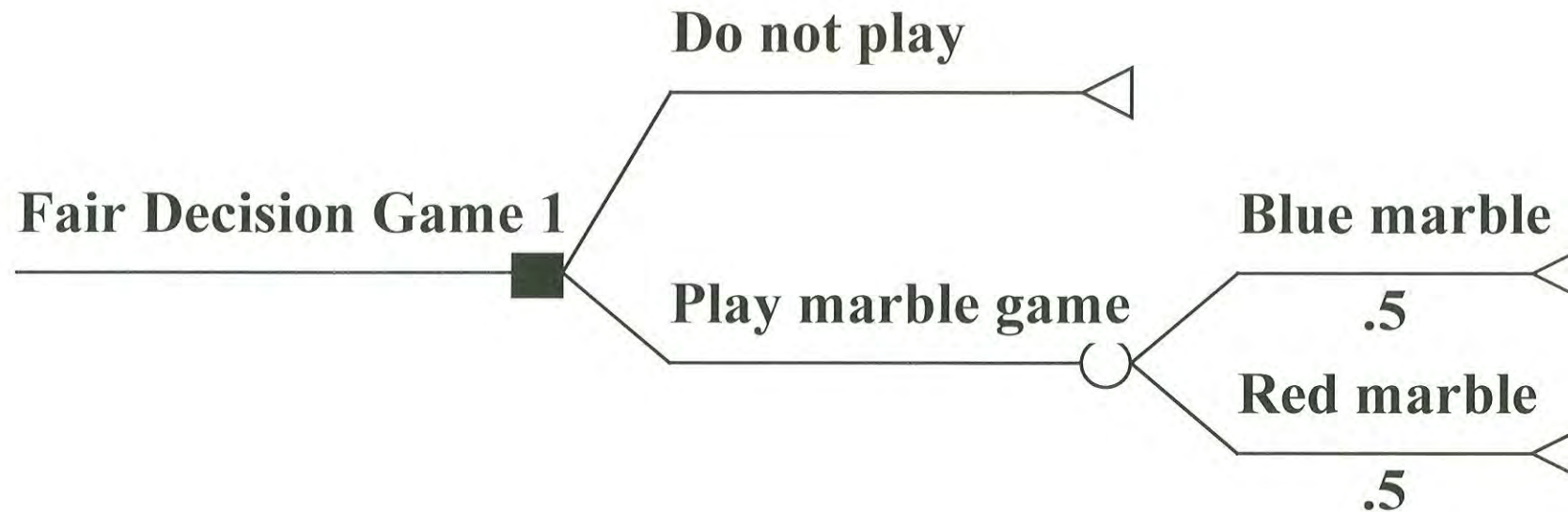
$$\$20 \times .5 = \$10$$

$$+\$0 \times .5 = \$0$$

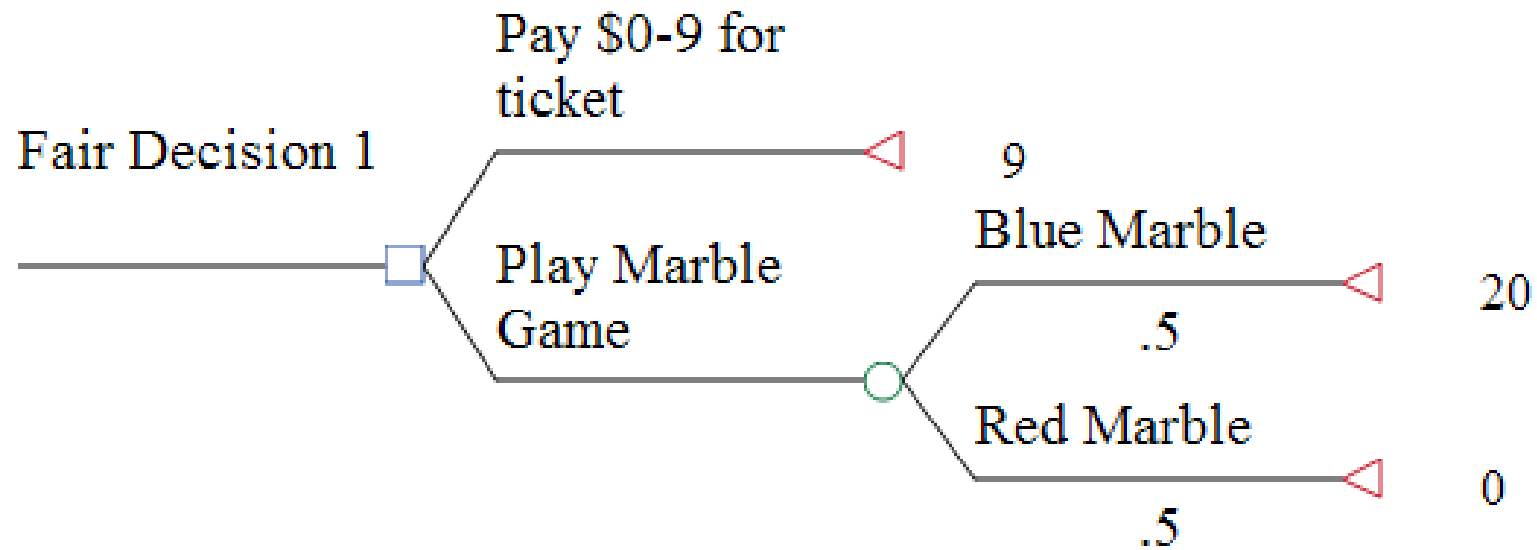
\$10

Sell the ticket if he offers you \$10 or more?

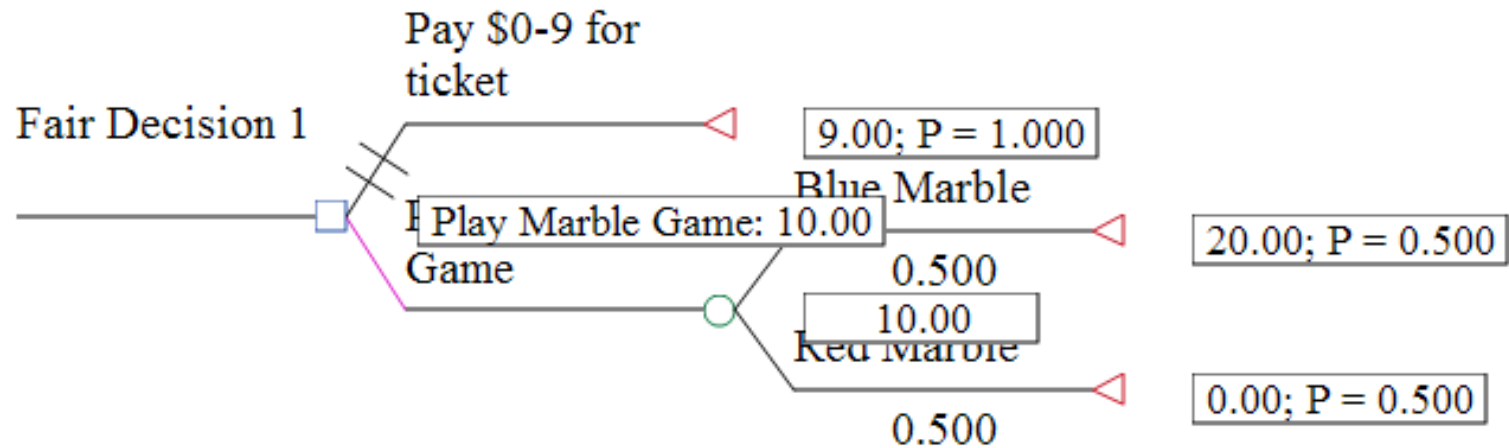
Fair Decision Tree 1



Fair Decision Tree 1



Fair Decision Tree 1 Rollback



Fair Decision Game Take Two

You move onto the next booth, which displays an identical jar of marbles. However, at this booth, you will receive \$30 if you select a blue marble and you will have to pay \$10 if you select a red marble (both while blind folded). Your wallet is flush with winnings from other games, so losing \$10 wouldn't be a problem. Still, you'd like to make an intelligent decision.

What's a reasonable price for your ticket?

Calculating Fair Decision 2

Decision: Play? Price of the ticket?

Possibilities: Blue Marble or Red Marble

Probabilities: 50% Blue, 50% Red

Pay-offs: If Blue, +\$30

If Red, -\$10

$$\$30 \times .5 = \$15$$

$$\underline{-\$10 \times .5 = -\$5}$$

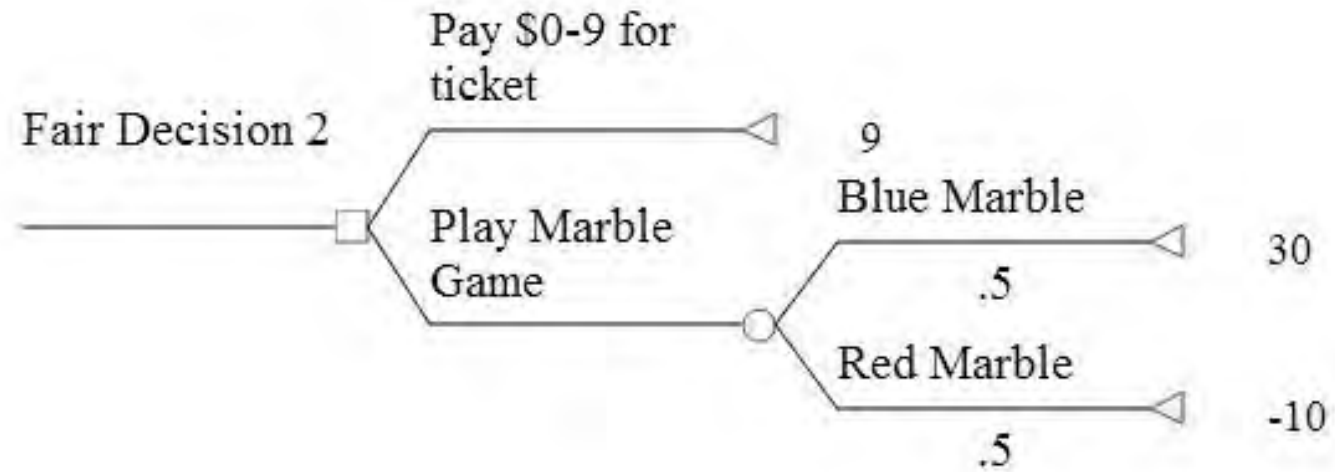
\$10

Sell the ticket for anything more than \$10? Would you take less?

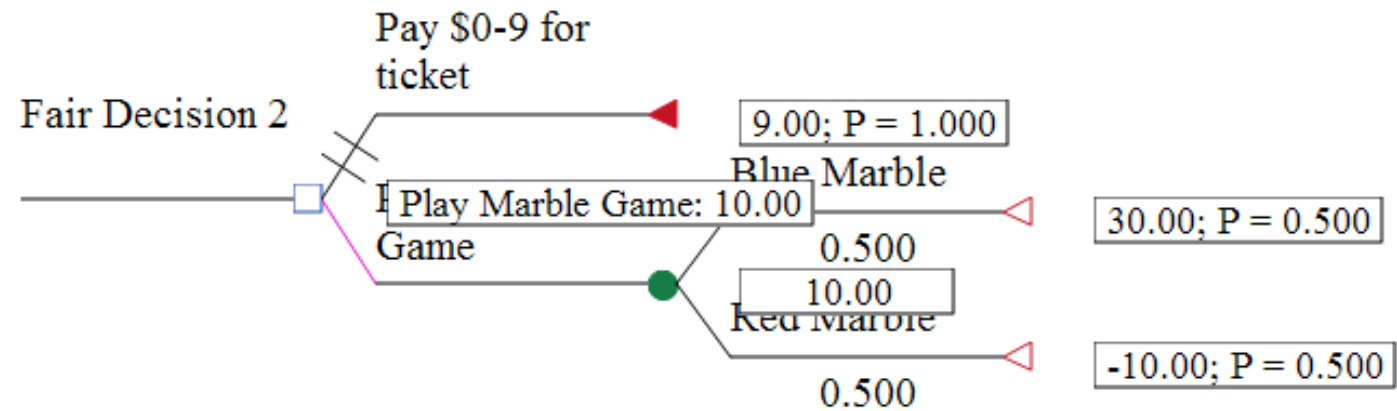
Fair Decision Tree 2



Fair Decision Tree 2



Fair Decision Tree 2 Rollback



Fair Decision – Take Three

You move to a third booth, which displays a jar of 2000 marbles, of which 500 are blue, 500 red, 500 green and 500 yellow.

This time, the gamesman hands you a ticket. He explains that with this ticket, you will win \$60,000 for selecting a blue, red, or green marble, but you will lose \$100,000 if it's a yellow marble. Or, you can cash in the ticket for a price.

How much is the ticket worth?

Would you play the game?

Would you play if you were given 100 tries before a final tally?

Calculating the Fair Decision Take Three

Decision: Play? – Price for the ticket?

Possibilities: Blue, Red, Green, or Yellow Marble

Probabilities: 75% Blue, Red, or Green

25% Yellow

Pay-Offs Blue, Green, Red +\$60,000

Yellow -\$100,000

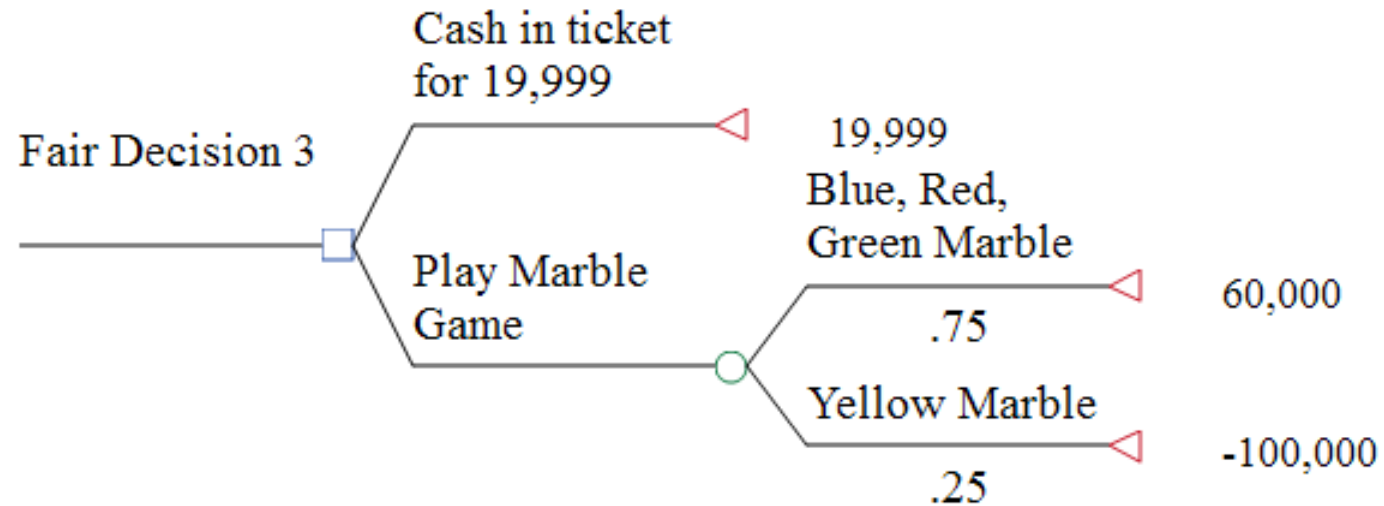
$$\$60,000 \times .75 = \$45,000$$

$$-\$100,000 \times .25 = \underline{-\$25,000}$$

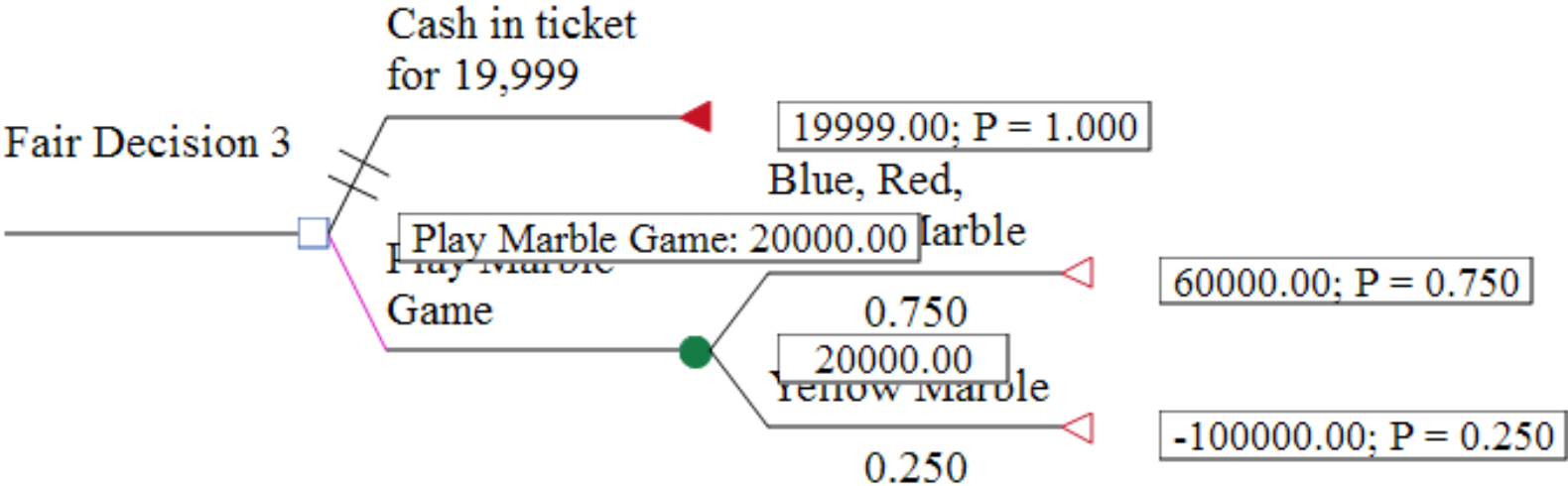
$$\text{EMV} = \$20,000$$

A multi-millionaire (or a risk-seeking fool) might play if he or she can cash in the ticket for \$20,000 or more.

Fair Decision Tree Three



Fair Decision Tree Three Rollback



Marble Roll (Back) Challenge

By George You've Got the Game!

Last Game –Tale of Two Jars

Jar number 1: Pay \$100.

There are 400 blue, 300 red, 300 yellow marbles.

If yours is blue - \$0. If it's red : \$400.

If it's yellow: \$800.

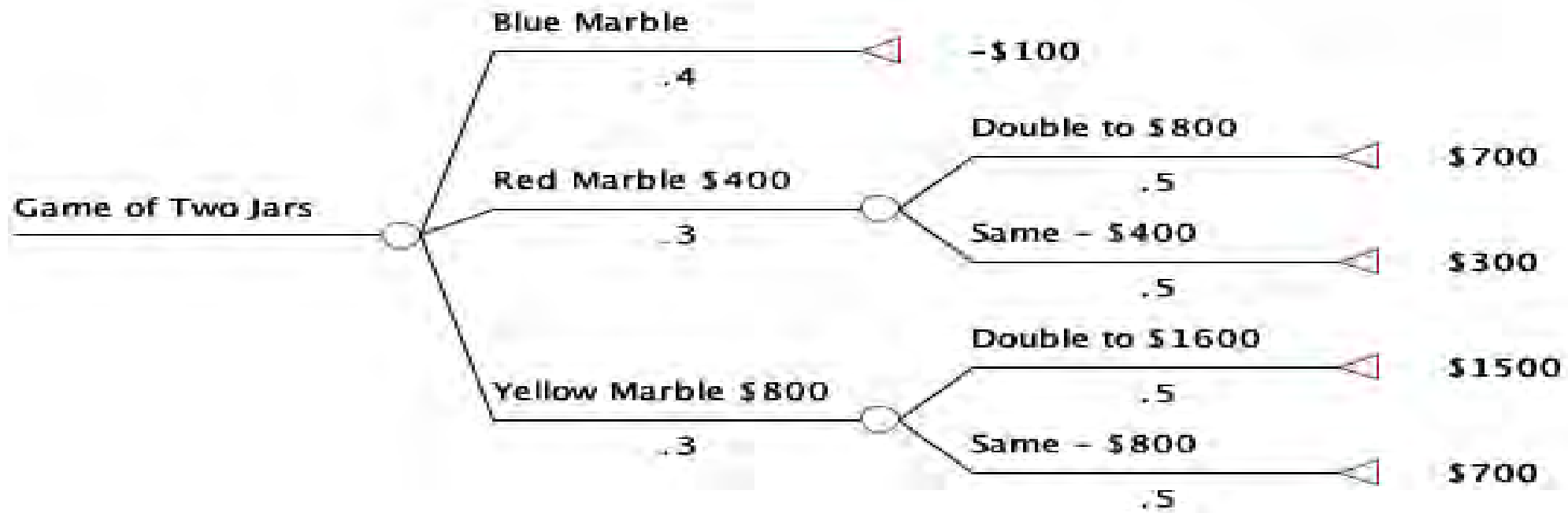
Jar number 2 : 500 orange and 500 green marbles.

If you pull out a green marble, you double your winnings from the previous jar. If you pull an orange marble, not more gain but you keep the jar #1 winning. No additional charge.

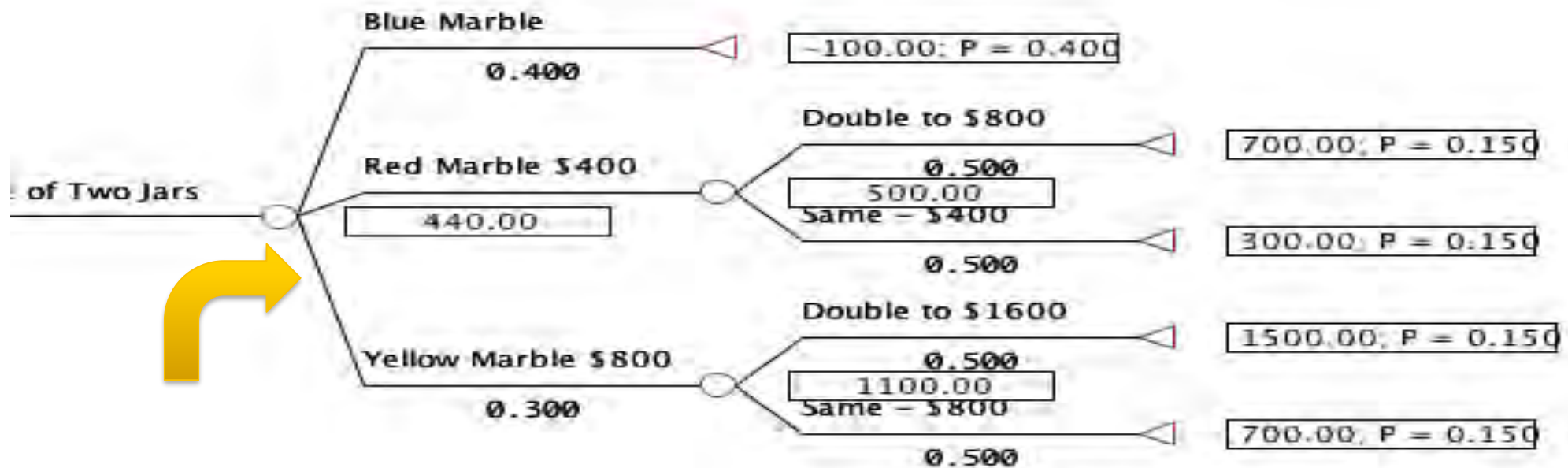
Put it on a tree, then roll it back!

What is it worth to play the two jars?

Two Jars – Tree Structure



Game of Two Jars – Rolled Back



Litigation is A Serious Game

How is it Like The Fair Game

In a legal dispute, all parties must decide whether to settle under certain terms, to cash in the ticket, or to play the litigation game.

Their decisions will almost inevitably be based upon consideration of the possibilities, probabilities, pay-offs, and tolerance or taste for risk.

Apply the basics in the litigate or settle game

I won't settle this case for less than \$300,000!

Test it on a tree!

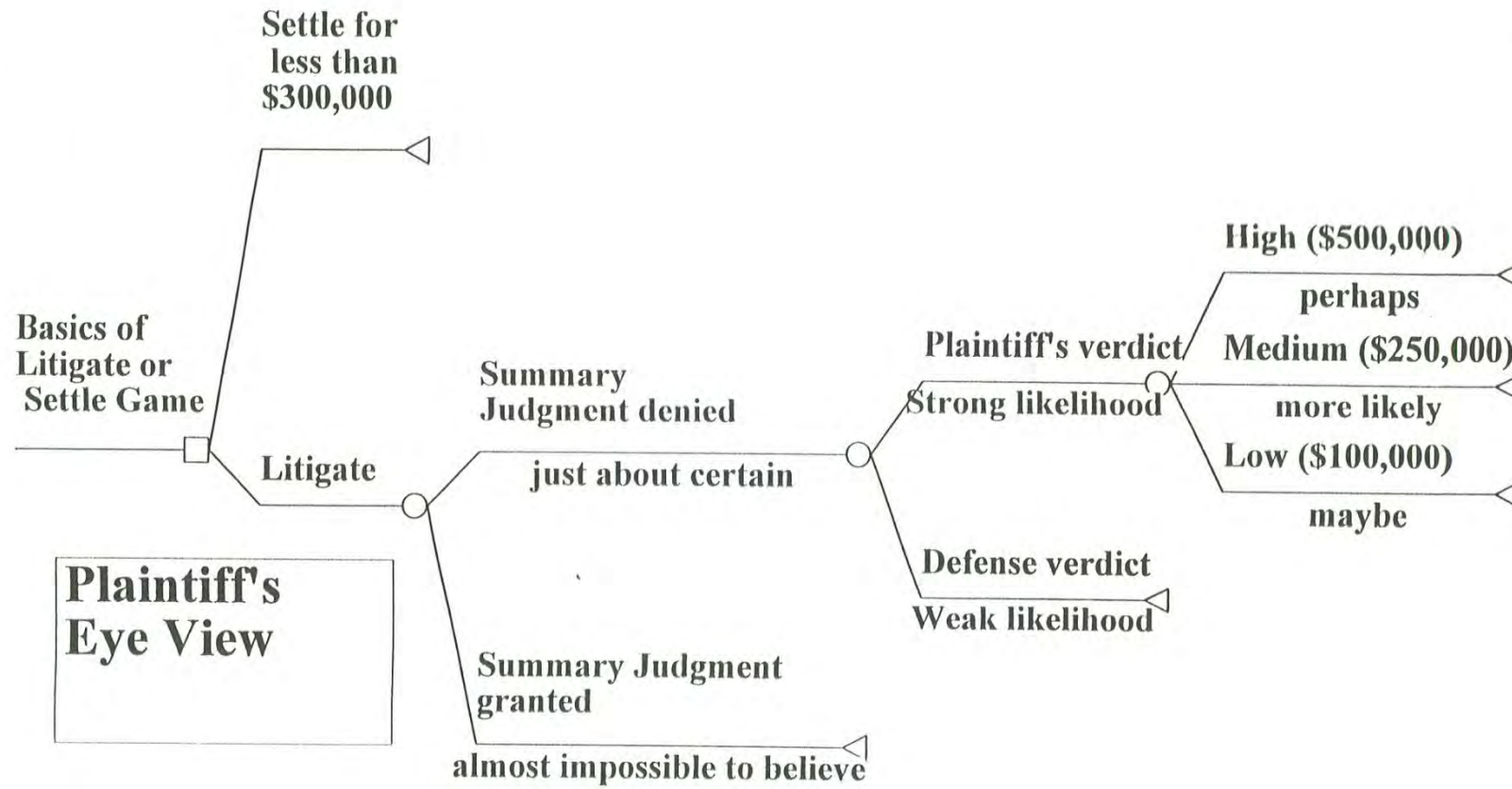
I will almost certainly survive summary judgment.

I have a strong case on liability.

The damages are serious, perhaps as high as \$500,000 if we really hit big, more likely in the \$250,000 range, and if the jury is stingy, maybe \$100,000.

Plaintiff's Eye View

Draw the tree, put in pay offs & probabilities.



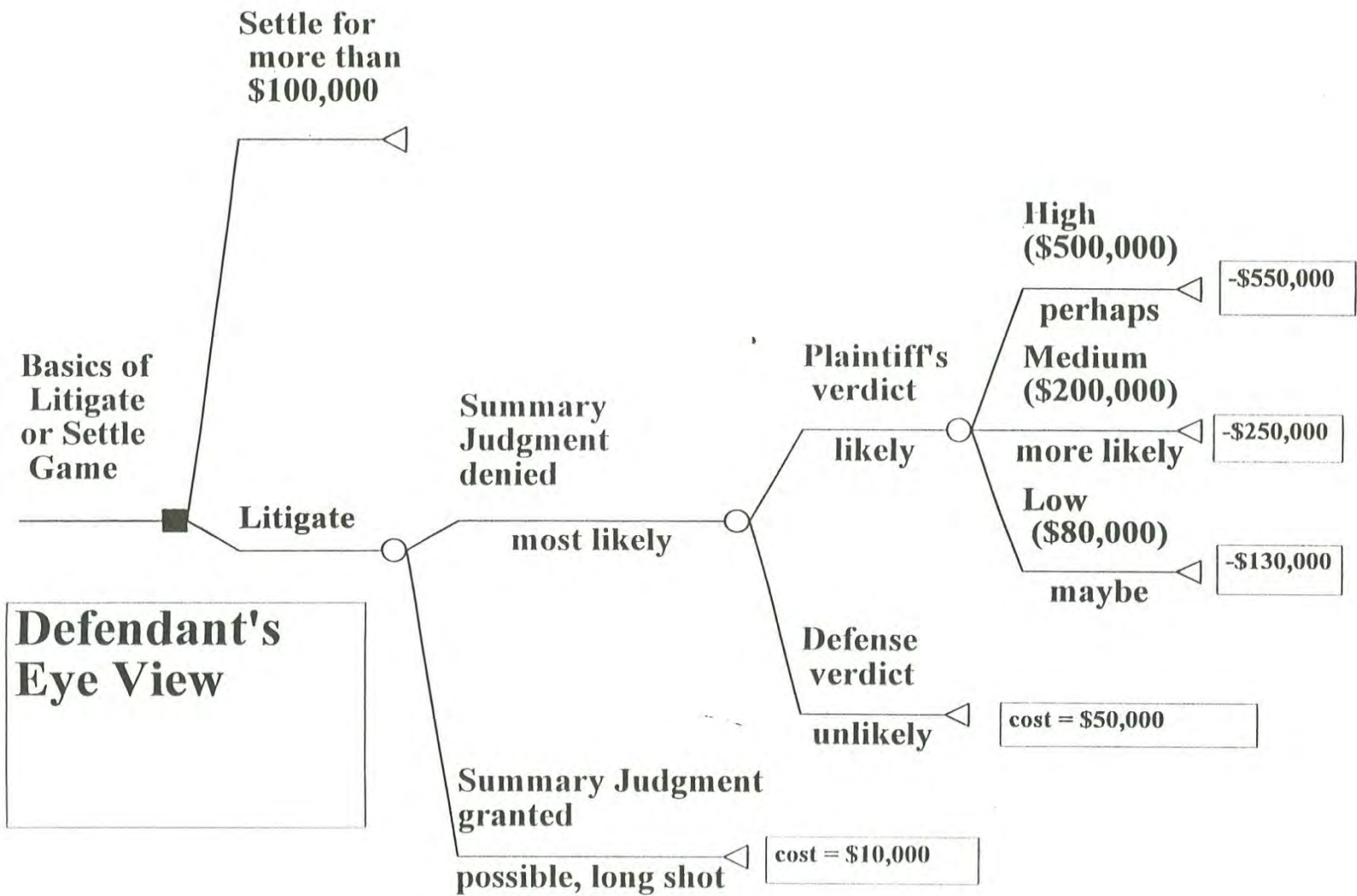
Defendant's eye view

I will never pay more than \$100,000 for this case.

Summary judgment is possible, but a long shot, and it will cost \$10,000.

We could get a defense verdict, but I admit that the jury is likely to sympathize with the plaintiff.

The damages are overblown, but a runaway jury could hit \$500,000. \$200,000ish is more likely. If the jury sees through the smoke, it may come in as low as \$80,000. It will cost \$40,000 through trial (plus the cost of the summary judgment motion).



Decision Analysis-The Ten Step Program

1. Define the decision at hand.
2. Consider possible (but not certain) events that would affect the outcome
 - Name the events
 - Count costs at each stage
 - Sketch the tree
3. Check that the tree accurately describes the structure of the decision (particularly the structure of uncertain events).
4. Estimate the value of possible outcomes.
5. Assign probabilities to each uncertain event.

Decision Analysis -The Ten Step Program

6. Estimate timing of each event and convert \$ to present value.
7. Estimate costs (discounted?) and subtract them from each outcome.
8. Calculate expected monetary value (roll back the tree).
9. Consider the distribution of outcomes & probabilities; test sensitivities.
10. Consider risk tolerance or aversion –the value of taking chances or avoiding risk – selling the lottery ticket.

Qualitative Resisters Surrender

This case is unassailable on liability. Damages will unquestionably be at \$500,000. What is a reasonable settlement?

I have a very strong case on liability and the damages proof is equally strong in support of a \$500,000 award. What is a reasonable settlement?

I have quite a good case on liability and my damages are likely to come in as high as \$500,000. What is a reasonable settlement?

Qualitative Resisters Surrender!

If you would ultimately arrive at a settlement number for the first that is quite high, the second not quite as high, and the third even lower, then you are already quantifying in order to discount.

To assign a percentage to a qualitative phrase is just to lay bare what was already there!

Prose vs. Percentages

1. It is very likely that x will win this suit.
2. X is likely to win this suit.
3. X should win this suit.
4. There is a good possibility that x will win this suit.

Prose vs. Percentages – cont' d.

5. It is extremely likely that x will win this suit
6. You have a very good case on liability
7. You have an excellent case on liability
8. Your case is shaky on liability

Prose vs. Percentages

Last year

- | | |
|--|------------|
| 1. <i>It is very likely that x will win this suit.</i> | 90-50 (40) |
| 2. <i>X is likely to win this suit.</i> | 80-50 |
| 3. <i>X should win this suit.</i> | 83-35 |
| 4. <i>There is a good possibility that x will win this suit.</i> | 90-50 (30) |

Prose vs. Percentages – cont' d

Last year

- | | |
|---|------------|
| 5. It is extremely likely that x will win this suit | 90-75 |
| 6. You have a very good case on liability. | 80-50 |
| 7. You have an excellent case on liability. | 98-65 (45) |
| 8. Your case is shaky on liability. | 55-20 |

The Value of Quantifying Probabilities

- Clarifies thought
- Minimizes misinterpretation
- Exposes divergence
- Allows arithmetic for calculation

The precision of percentages is illusory.

They are no more right than prose.

Application of Decision Analysis: Wrongful Death Case

Threshold Charitable Limitation Issue - \$20,000 each claim - \$40,000 total.

Questionable Liability. VERY high Exposure – Pain & suffering, loss of companionship, loss of consortium.

Possibilities of appeal.

How does an insurer grapple with this one?

How does the husband separate settlement value from the value of his wife's life?

Post Traumatic Stress Claim in Unusual Circumstances, Imprecision & High Sensitivity Acknowledged

Post Traumatic Stress Syndrome

Questionable Liability – Complexities of Diagnosis

Analysis of High, Mid-Level, and Low End
Damages

Close Judgments Lead to Large Swings (High
Sensitivities to % probabilities)

Post Traumatic Stress Case Telephone Conversation: Sensitivity of Analysis Dictates against Digging In

Business client – risk
analysis estimates

70% no liability

Damages

10% - \$1.2 million

80% - \$400,000

10% - \$65,000

EMV = \$193,000

\$143,000 + \$50,000 fees

Mediator (or Attorney) - risk
analysis estimates

65% no liability

Damages

10% - \$2.5 million

80% - \$400,000

10% - \$65,000

EMV- \$300,000

\$250,000 + \$50,000 fees

Mapping the Outcomes

We have a \$95,000 offer on the table.

Yes, you COULD recover \$200,000.

If you look at the end of the tree, you see that if you tried the case 100 times, 10% of the time you'd get \$200,000.

But, 90% of the time, your recovery would be \$100,000 or less, indeed, 40% of the time it would be \$0 or less than \$30,000.

Will you take that bet?????

A Decision Analysis Mediation Story With Trees

No names, numbers changed to protect confidentiality

Simple Insights

“A light bulb went on!”

[Quote the Attorney, for the Client.]

- Mediating a highly specialized type of insurance claim, with acknowledged risk of summary judgment, based on policy language, but also real and acknowledged chance of getting past that.
- Policy amount of \$300,000 was clear.

Light bulb! Array of Analyses Offer equivalent to \$108,000 – \$110,000

- Rollback – \$36,000 **88% chance - \$0**
12% chance - \$300,000

Or

- Rollback - \$75,000 **75% chance - \$0**
25% chance - \$300,000

Or

- Rollback - \$108,000 **64% chance - \$0**
36% chance - \$300,000

Or

- Rollback - \$126,000 **58% chance - \$0**
42% chance - \$300,000

The Added Value of Decision Tree Analysis in Client Communication

Enables more rigorous evaluation of the litigation alternative.

Introduces a constructive, shared logic.

Provides a framework for client decisions.

Facilitates clear communication and understanding.

So, How Can I Think and Talk it Through?

- A boring series of questions
 - What will happen next?
 - What will happen after that?
 - Is that the only possibility?
 - If you go to trial and liability is found, what are the likely damages?
 - Punitive or compensatory?
 - Stingy jury, reasonable jury, great jury?

Introducing Decision Analysis

- How do you decide when to bet and when not to?
- You can think of your litigation claims as a lottery ticket – you could win, you could lose. The exact amounts are hard to tell.
- The question is at what point you'd feel better selling the lottery ticket for an amount certain.
- This is how a computer might make the decision. Of course, you are not a computer, but this might be an interesting data point for you to consider.

In Practice Pointers

- Build the tree based upon your analysis of what will and what might happen over time.
- Consider writing in (mapping out) time frames
- Discuss sources/research behind estimates of probabilities and damages. REMEMBER not to claim “There IS a 60% chance” - Instead, we would bet, that if the case were tried 100 times, we’d win about 60 of them. DOWNPLAY THE PRECISION – it’s NOT.
- Emphasize that the EMV is NOT what anyone gets.

More Practice Pointers

- Permit your client to see the tree (once) with his/her HUGE numbers, tempered with more likely #s.
- Play with different percentages and numbers, test certainties (sensitivity analysis sounds fancy, but it's just playing).
- Look at the distribution of possible outcomes – probabilities of each.
- Back away from the tree – it need not dictate – many other things will affect the client's decision.

Decision Trees are a Client Communication Tool

Simple trees fit on legal pads or napkins.

Calculation requires no fancy calculator.

In complex cases, calculators help; computer is king.

Decision trees reframe to a decision problem.

Decision trees more clearly set forth the structures and timeline of the litigation alternative.

The tree neutralizes client dialog, depersonalizes concessions, helps the client detach, move, settle.

Decision Trees Promote Rigor (vs. a sweep of the hand)

- Once you become comfortable with the method, you become comfortable with a “real map”.
- The US is not east coast – west coast and a blur in between. Landing “somewhere in there” may not be good enough.
- This method allows us to ask LOTS of questions about what might happen, and have a method of figuring out what to do with the resulting thoughts.

Technical Difficulties

- A tree that is too simple may distort reality – validate sloppy thinking.
- A tree that accurately reflects every twist and turn in a case may be hopelessly complicated.
- A tree that reflects every LOGICAL or potential possibility in an effort to be rigorous and careful may also distort (is the jury really going to break its thought process down that carefully?).
- Our method of assigning probabilities or estimated payoffs may (unintentionally) skew the numbers we assign.

Significance and Value Caveats

- The tree is ONLY as valuable as the judgment of the builder/estimator
- The tree is ONLY as valuable as the user believes it to be
- EMV on even the BEST tree is only a data point, and it is premised on a fiction (if you were to try this case 100 times)
- A look at the whole tree and chance of each possible outcome, respects your client's decision on whether to take the risk

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