CS4246 / CS5446

Tutorial Week 5

Muhammad **Rizki** Maulana
rizki@u.nus.edu

First

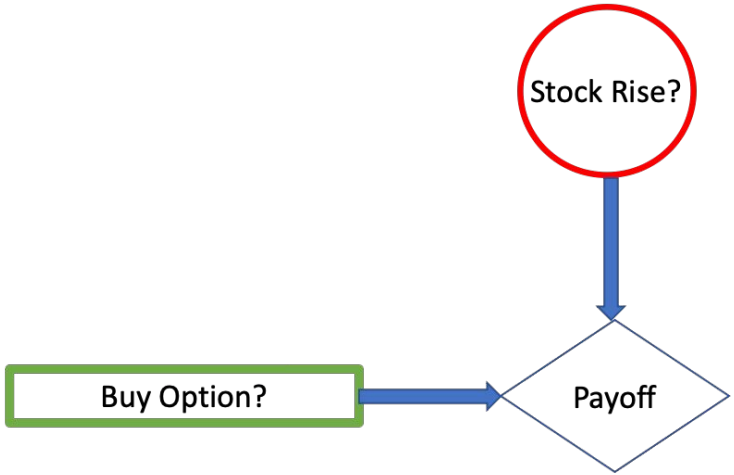
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Draw an influence diagram to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?

Question

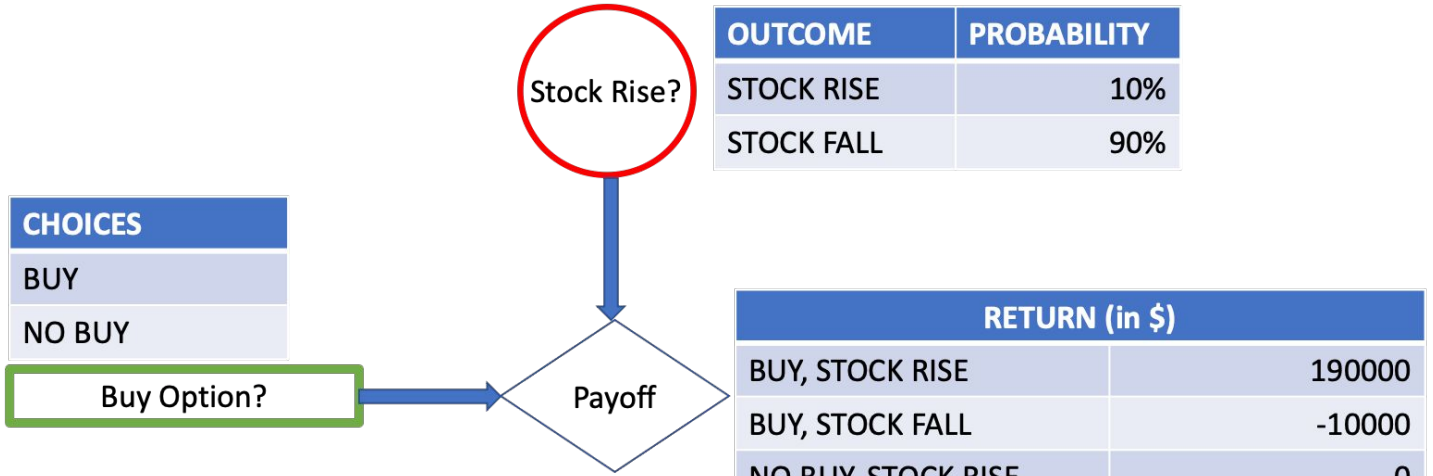
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Draw an influence diagram to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Draw an influence diagram to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



OUTCOME	PROBABILITY
STOCK RISE	10%
STOCK FALL	90%

CHOICES
BUY
NO BUY

RETURN (in $)	
BUY, STOCK RISE	190000
BUY, STOCK FALL	-10000
NO BUY, STOCK RISE	0
NO BUY, STOCK FALL	0

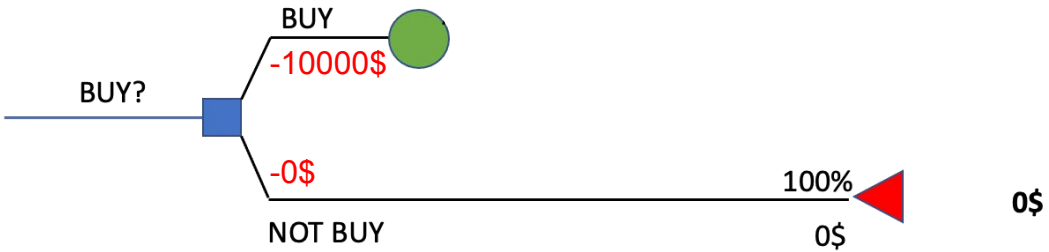
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?

Question

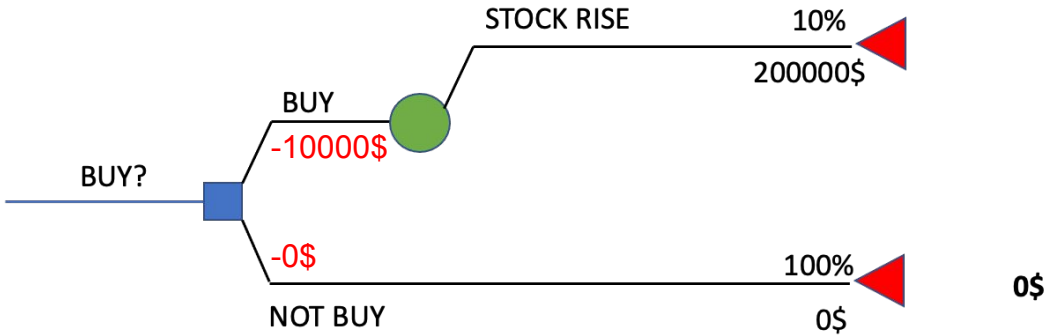
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



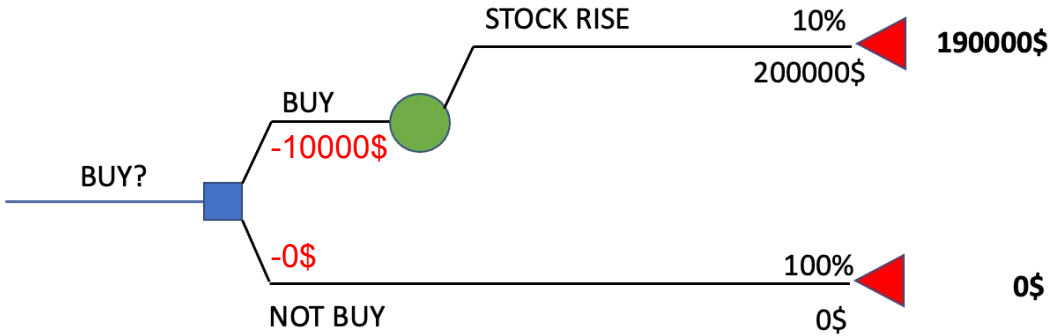
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



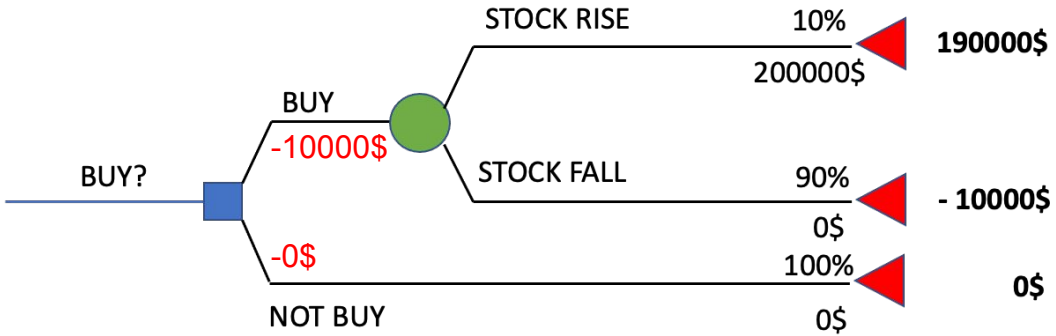
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



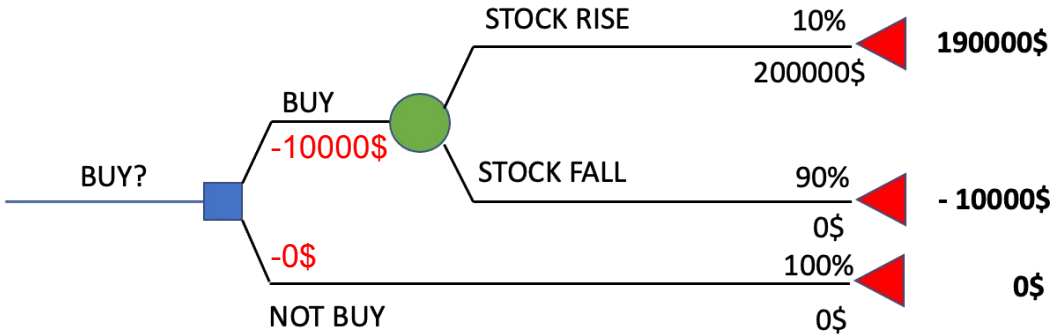
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

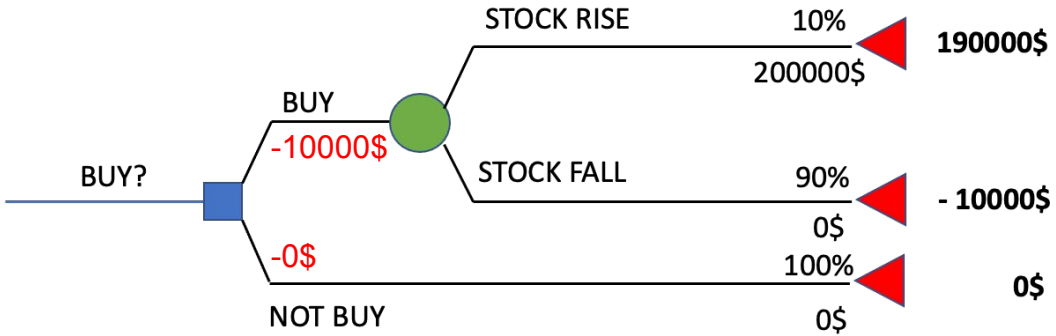
b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



EMV (BUY) = 190K*0.1 – 10K*0.9 = 10K

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

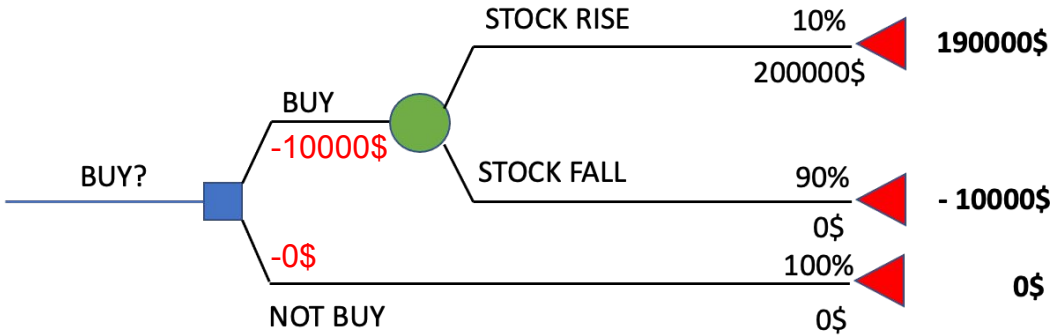
b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



EMV (BUY) = 190K*0.1 – 10K*0.9 = 10K
EMV (NOT BUY) = 0

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) Draw an decision tree to represent Mr. Bean's problem. Clearly indicate all the options/outcomes and numbers. Should he buy the options?



EMV (BUY) = 190K*0.1 – 10K*0.9 = 10K

EMV (NOT BUY) = 0

Second

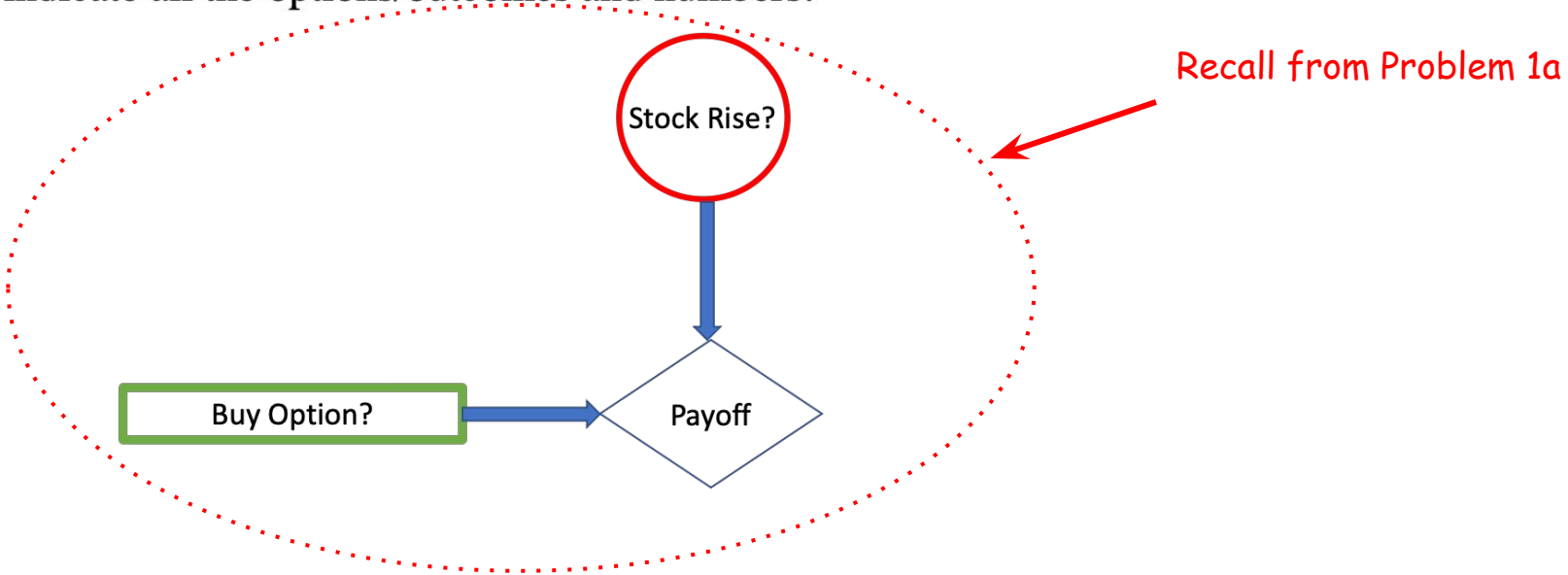
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Represent the hypothetical situation where Mr. Bean will get perfect information before he makes the decision. How to represent this situation in an influence diagram? Clearly indicate all the options/outcomes and numbers.

Question

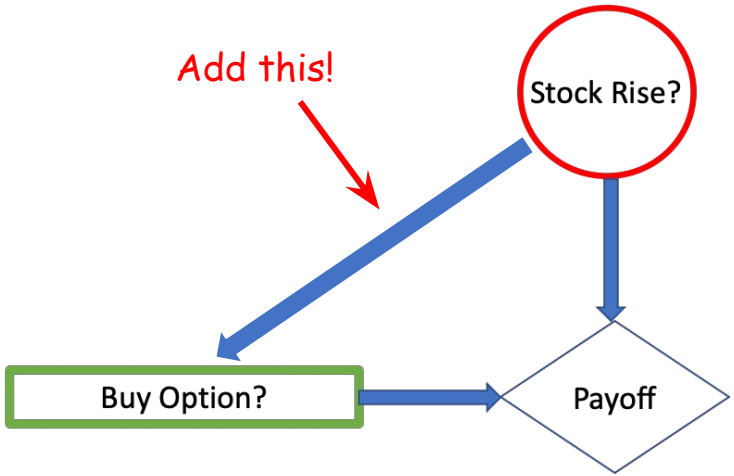
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Represent the hypothetical situation where Mr. Bean will get perfect information before he makes the decision. How to represent this situation in an influence diagram? Clearly indicate all the options/outcomes and numbers.



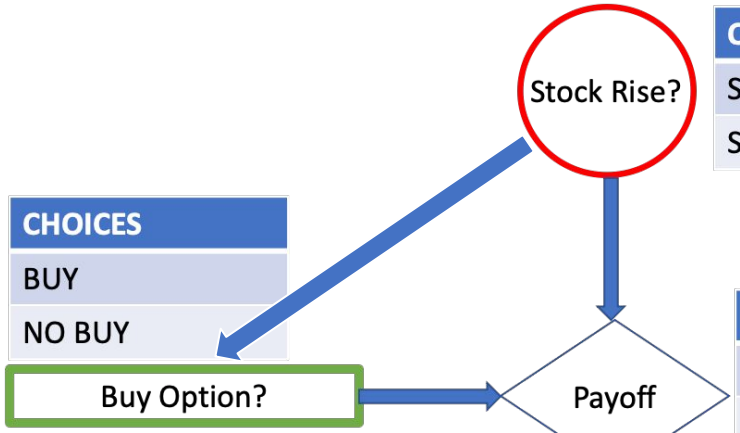
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Represent the hypothetical situation where Mr. Bean will get perfect information before he makes the decision. How to represent this situation in an influence diagram? Clearly indicate all the options/outcomes and numbers.



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

a) Represent the hypothetical situation where Mr. Bean will get perfect information before he makes the decision. How to represent this situation in an influence diagram? Clearly indicate all the options/outcomes and numbers.



OUTCOME	PROBABILITY
STOCK RISE	10%
STOCK FALL	90%

CHOICES
BUY
NO BUY

RETURN (in $)	
BUY, STOCK RISE	190000
BUY, STOCK FALL	-10000
NO BUY, STOCK RISE	0
NO BUY, STOCK FALL	0

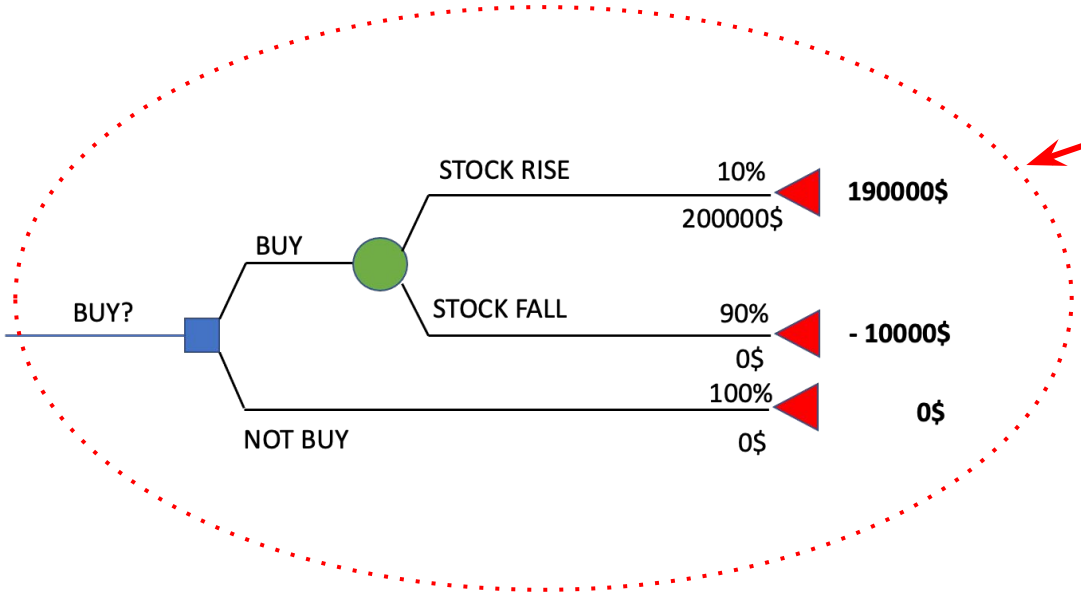
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

Question

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

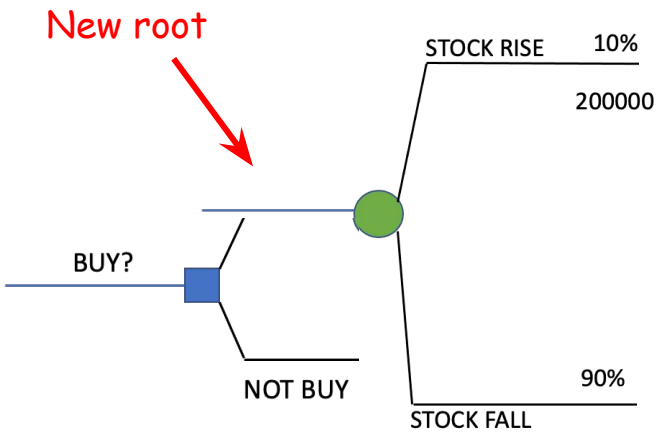
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



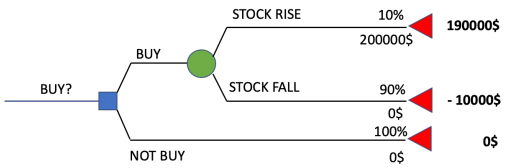
Recall from Problem 1b

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

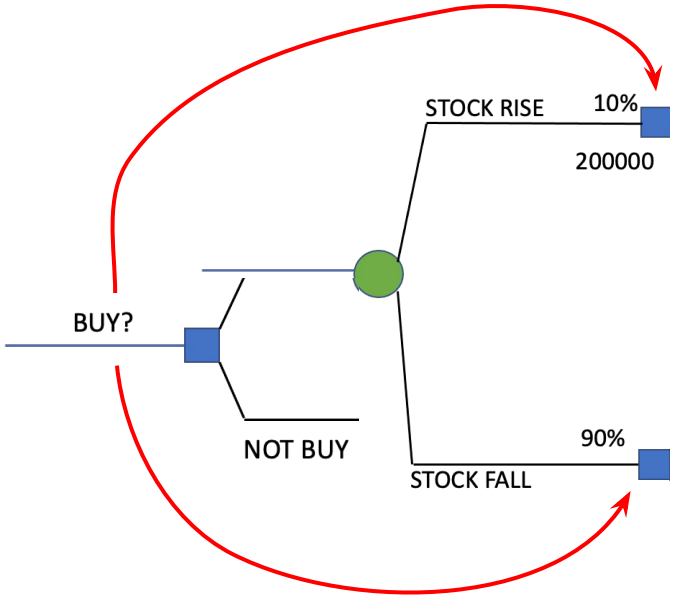


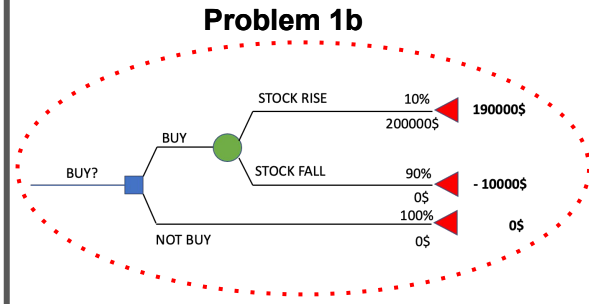
Problem 1b



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

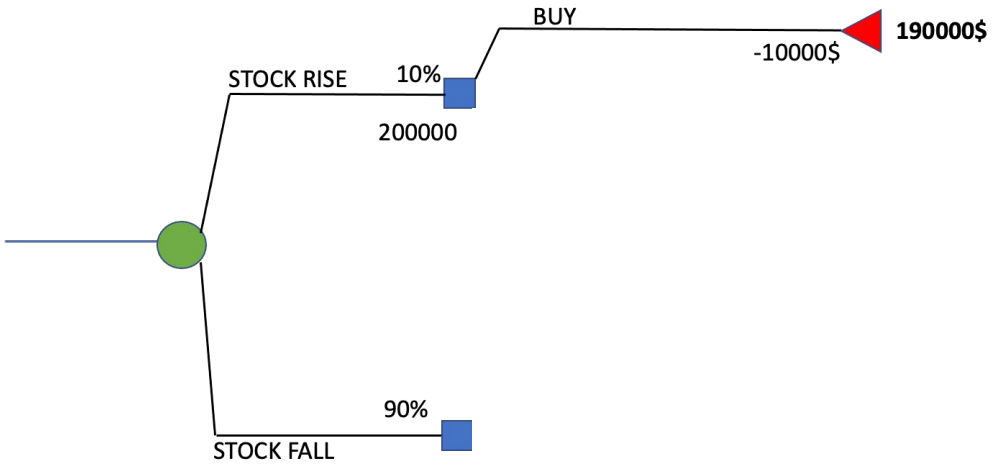
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

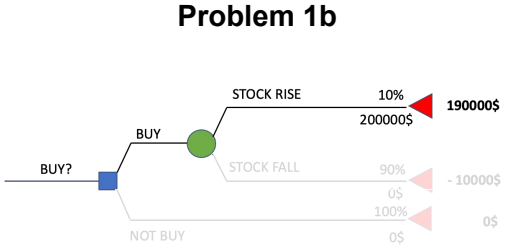




Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

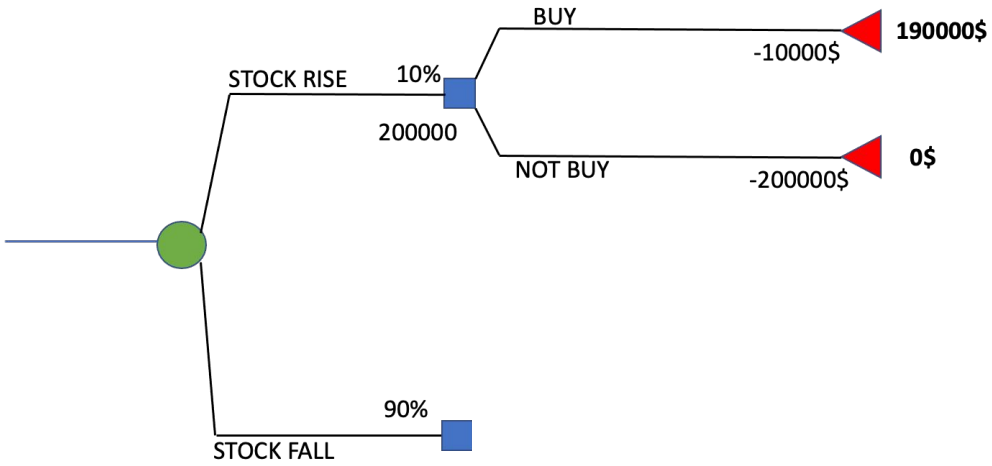
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

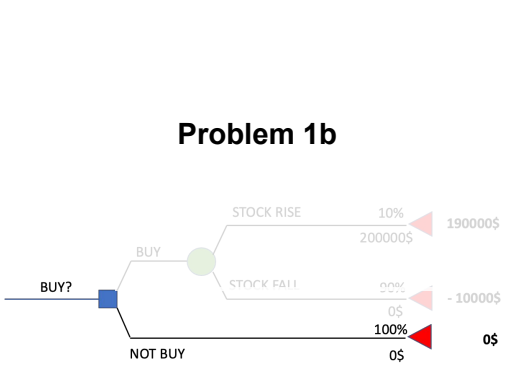




Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

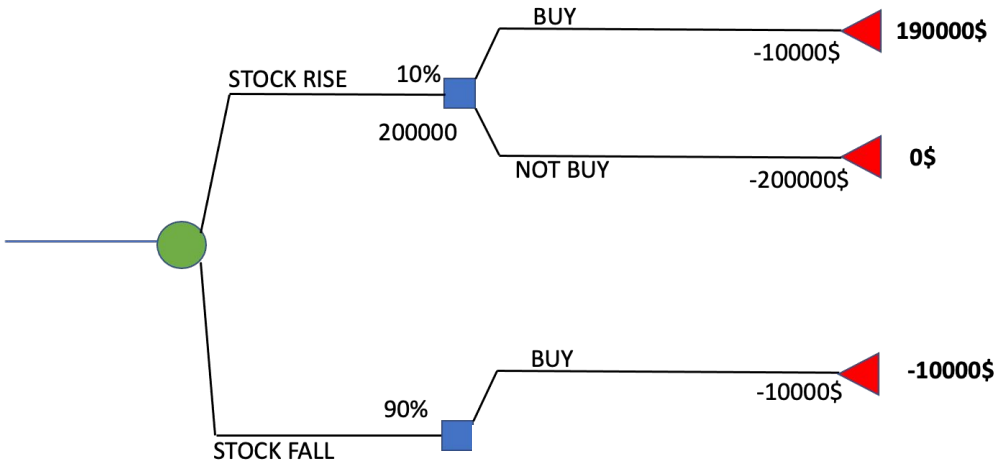
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

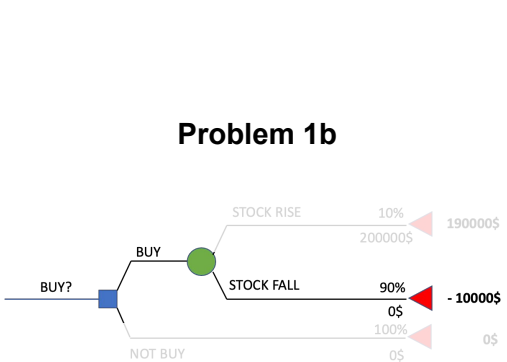




Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

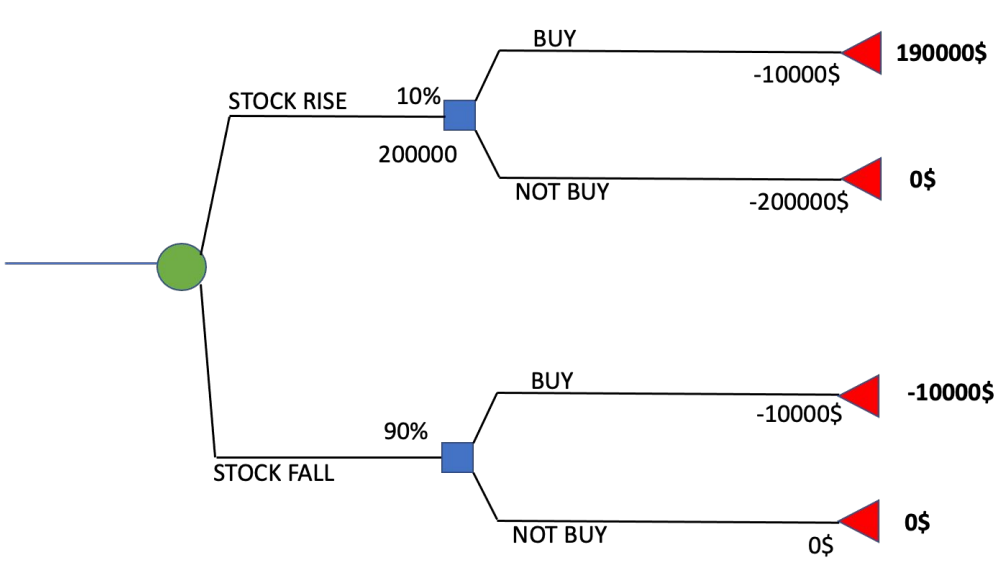
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

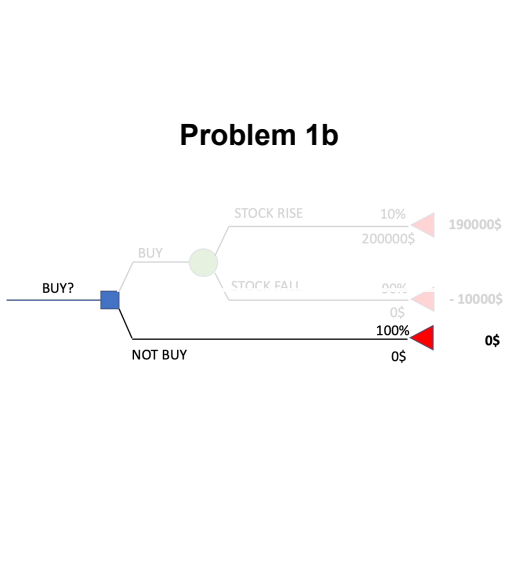




Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

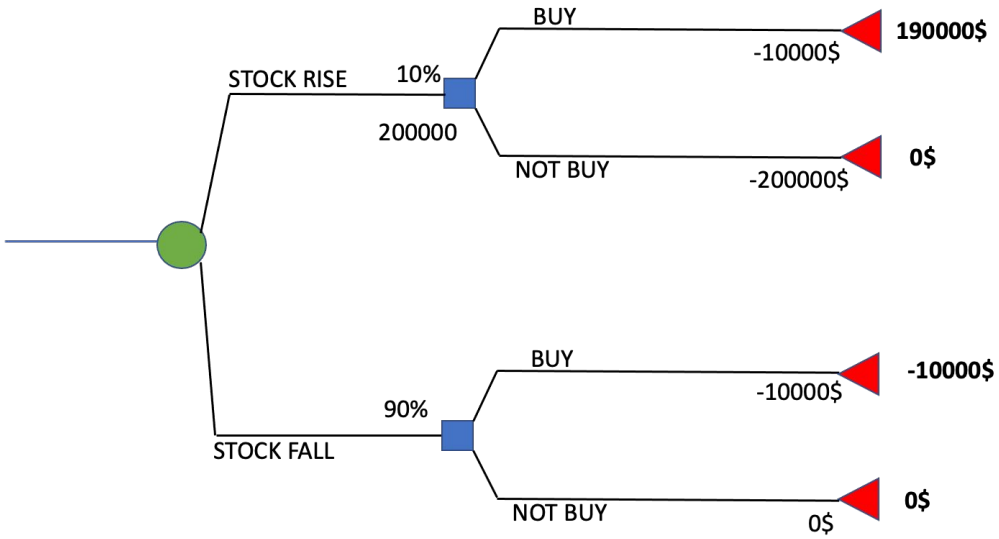
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?





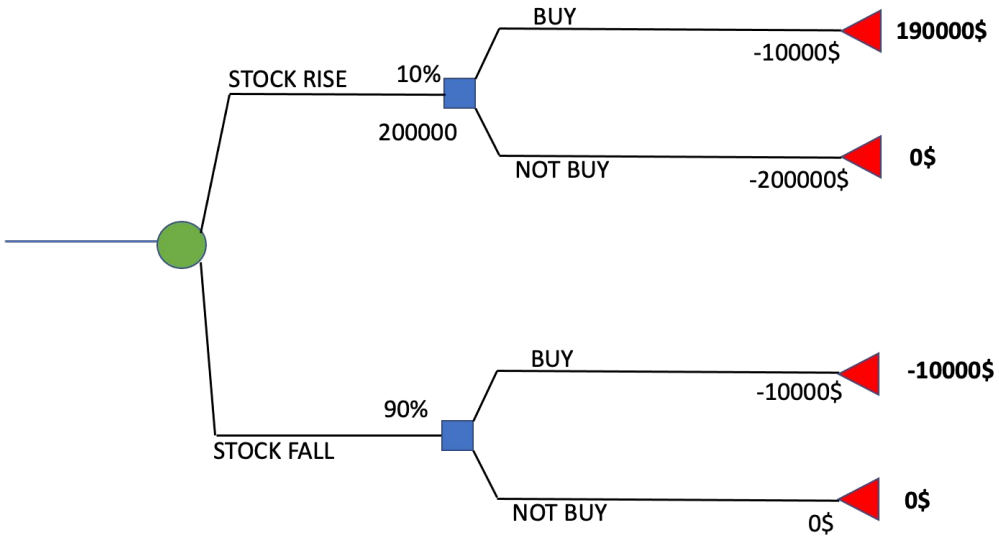
Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

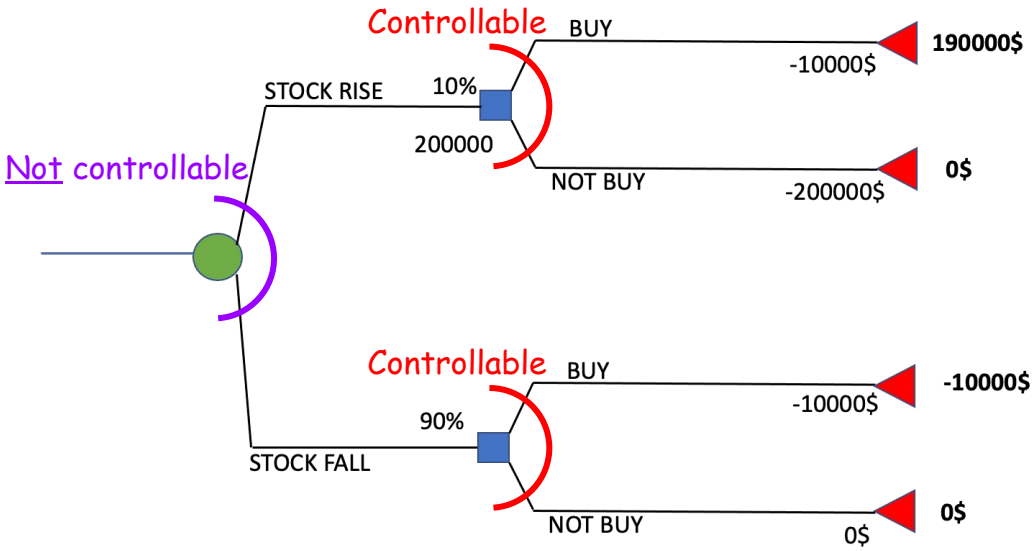
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



EMV(Buy with Oracle)?

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

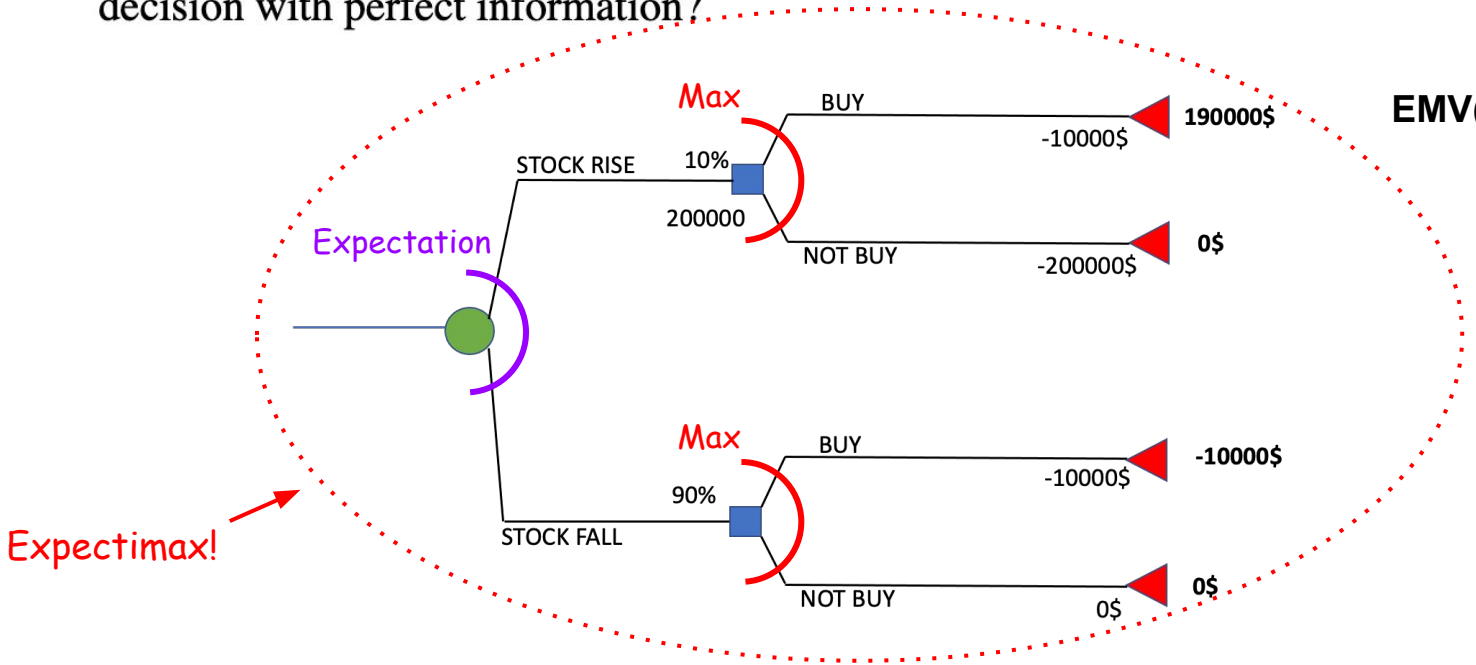
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



EMV(Buy with Oracle)?

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

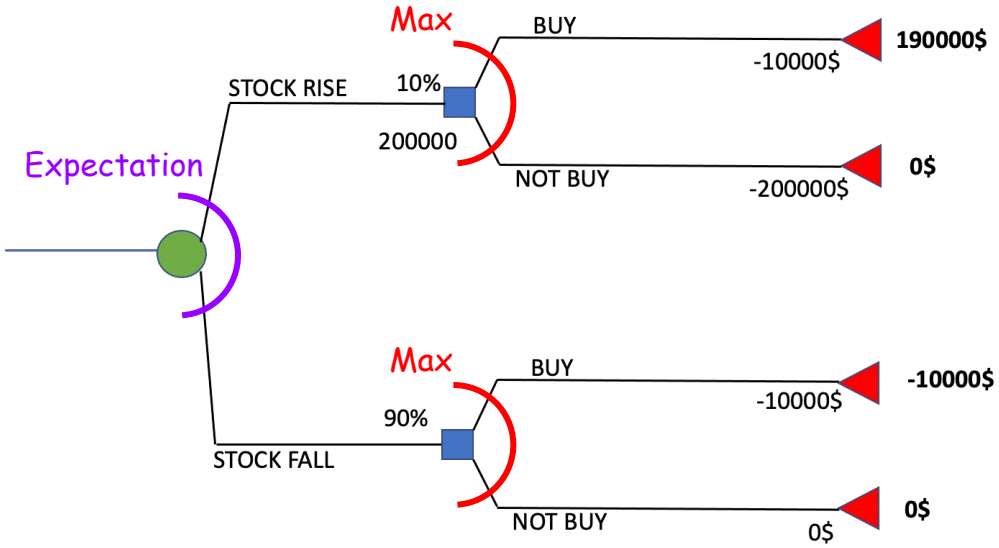
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



EMV(Buy with Oracle)?

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

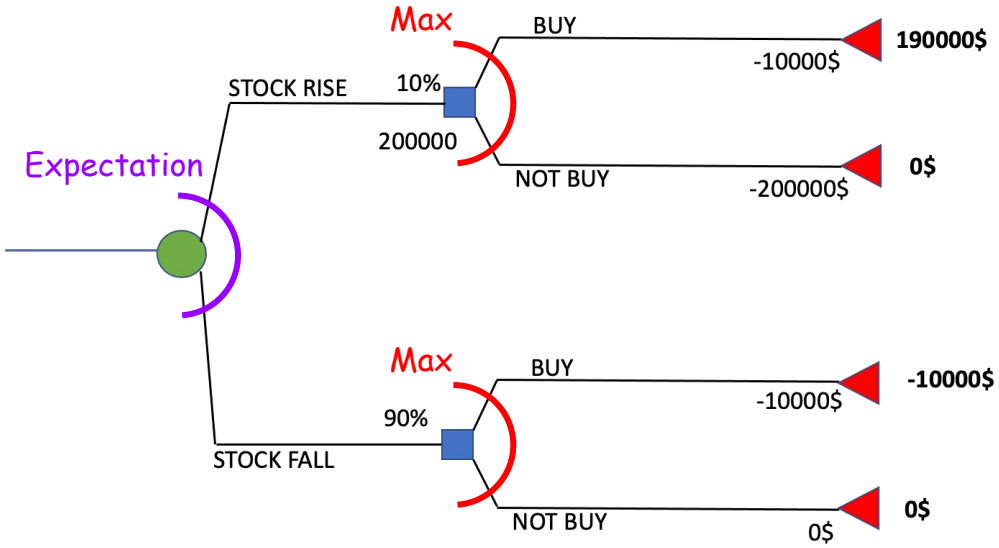
b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



EMV(Buy with Oracle)
= 190000 * 0.1+ 0 * 0.9
= 19000

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?

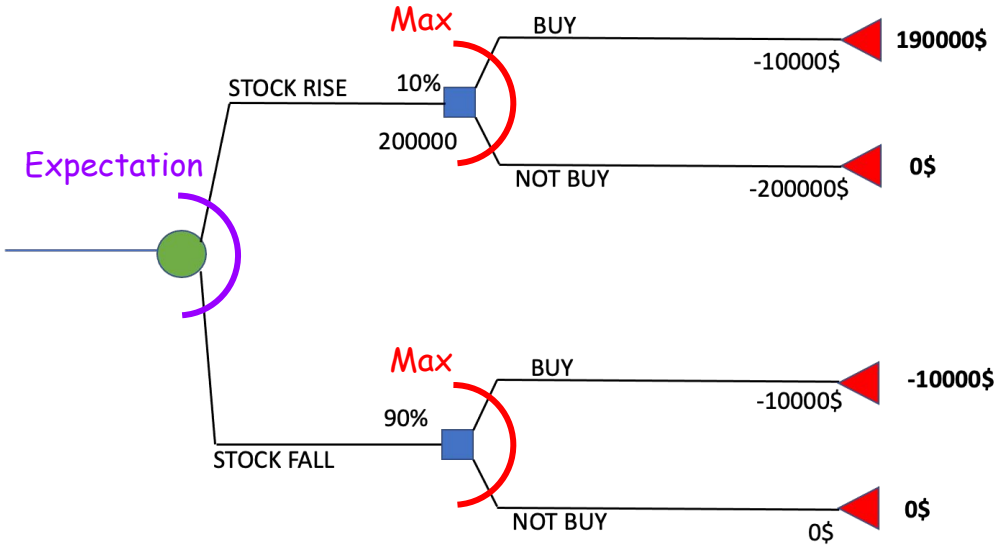


EMV(Buy with Oracle)
= 190000 * 0.1+ 0 * 0.9
= 19000

Expected Value of Perfect Information
= EMV(Buy with Oracle) - EMV(Buy)

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

b) How to represent this situation in the decision tree? What is the expected value of the decision with perfect information?



EMV(Buy with Oracle)
= 190000 * 0.1+ 0 * 0.9
= 19000

Expected Value of Perfect Information
= EMV(Buy with Oracle) - EMV(Buy)
= 19000 - 10000 = 9000

Third

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

Consult financial guru (Dr. Nut):

- Diamond exists (stock rise) : 95% say "good"
- Diamond doesn't exists (stock fall) : 85% say "poor"

Draw the decision tree and calculate the expected value. Should Mr. Bean hire this guy (-$7000)?

Question

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

Consult financial guru (Dr. Nut):

- Diamond exists (stock rise) : 95% say "good"
- Diamond doesn't exists (stock fall) : 85% say "poor"

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P(rise) = 0.1
P(fall) = 1.0 - 0.1 = 0.9

Consult financial guru (Dr. Nut):

- Diamond exists (stock rise) : 95% say "good"
- Diamond doesn't exists (stock fall) : 85% say "poor"

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P(rise) = 0.1

P(fall) = 0.9

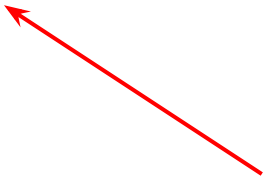
Consult financial guru (Dr. Nut):

- Diamond exists (stock rise) : 95% say "good" → P("good"|rise) = 0.95
- Diamond doesn't exists (stock fall) : 85% say "poor" → P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = P("good"|rise)P(rise) + P("good"|fall)P(fall)

P(rise)	= 0.1
P(fall)	= 0.9
P("good"|rise)	= 0.95
P("poor" |fall)	= 0.85



Law of total probability

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = P("good"|rise)P(rise) + P("good"|fall)P(fall)
= 0.95 * 0.1 + 0.15 * 0.9

P(rise)	= 0.1
P(fall)	= 0.9
P("good"|rise)	= 0.95
P("poor" |fall)	= 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = P("good"|rise)P(rise) + P("good"|fall)P(fall)
= 0.95 * 0.1 + 0.15 * 0.9
= 0.23

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23

P(rise)	= 0.1
P(fall)	= 0.9
P("good"|rise)	= 0.95
P("poor" |fall)	= 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 1.0 - P("good") = 0.77

P(rise)	= 0.1
P(fall)	= 0.9
P("good"|rise)	= 0.95
P("poor" |fall)	= 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

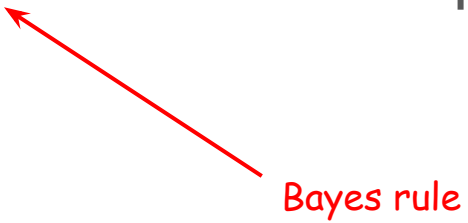
P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = P("good"|rise)P(rise) / P("good")

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85



Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = P("good"|rise)P(rise) / P("good")
= 0.95 * 0.1 / 0.23

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = P("good"|rise)P(rise) / P("good")
= 0.95 * 0.1 / 0.23
= 0.413

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = 0.413

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = 0.413 P(fall|"good") = 1.0 - P(rise|"good")

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = 0.413 P(fall|"good") = 0.587

P(rise) = 0.1
P(fall) = 0.9
P("good"|rise) = 0.95
P("poor" |fall) = 0.85

Richie Bean is trying to strike it big in the stock market during the economic downturn. He is considering buying some options to a very risky stock on a diamond mine in Africa. There is only a 10% chance that the stock price will rise if he exercises his options, but the payoff is $200,000. It costs $10,000 to buy and exercise the options. The alternative is not to buy at all, in which case Mr. Bean's profit is zero.

P("good") = 0.23 P("poor") = 0.77

P(rise|"good") = 0.413 P(fall|"good") = 0.587

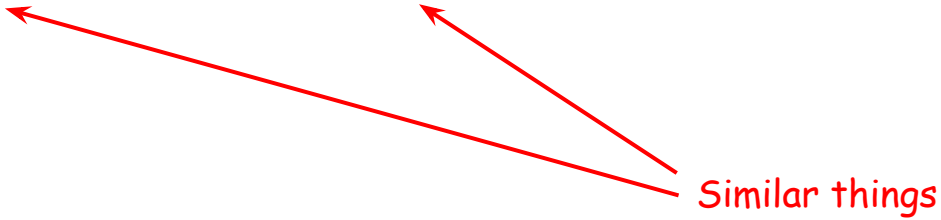
P(rise|"poor") = 0.065 P(fall|"poor") = 0.9935

P(rise) = 0.1

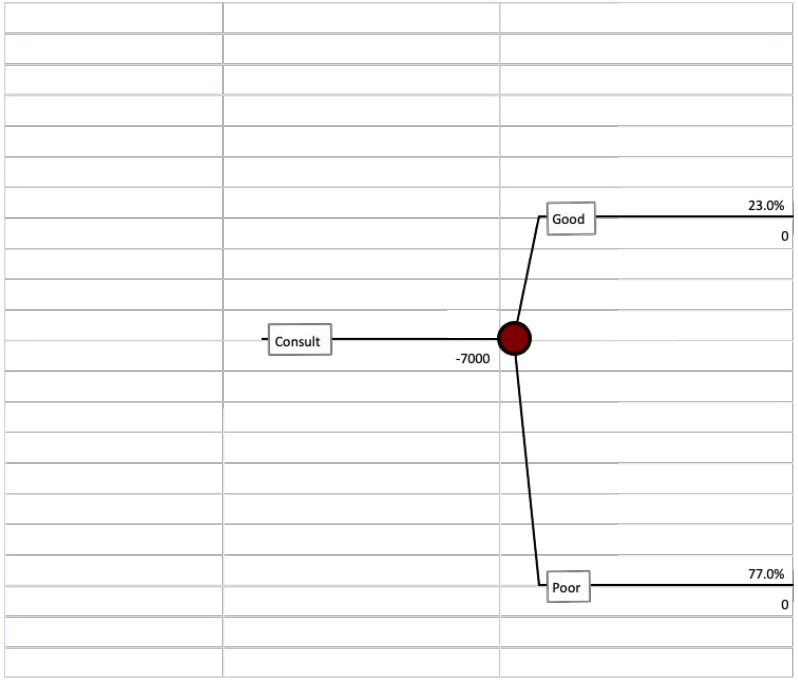
P(fall) = 0.9

P("good"|rise) = 0.95

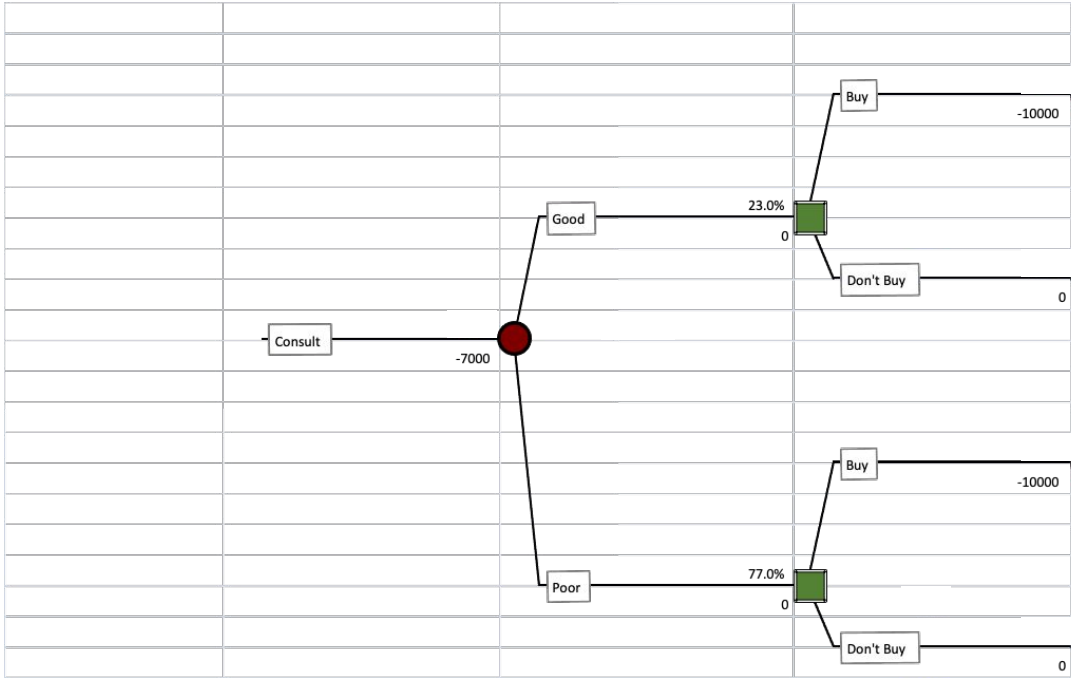
P("poor" |fall) = 0.85



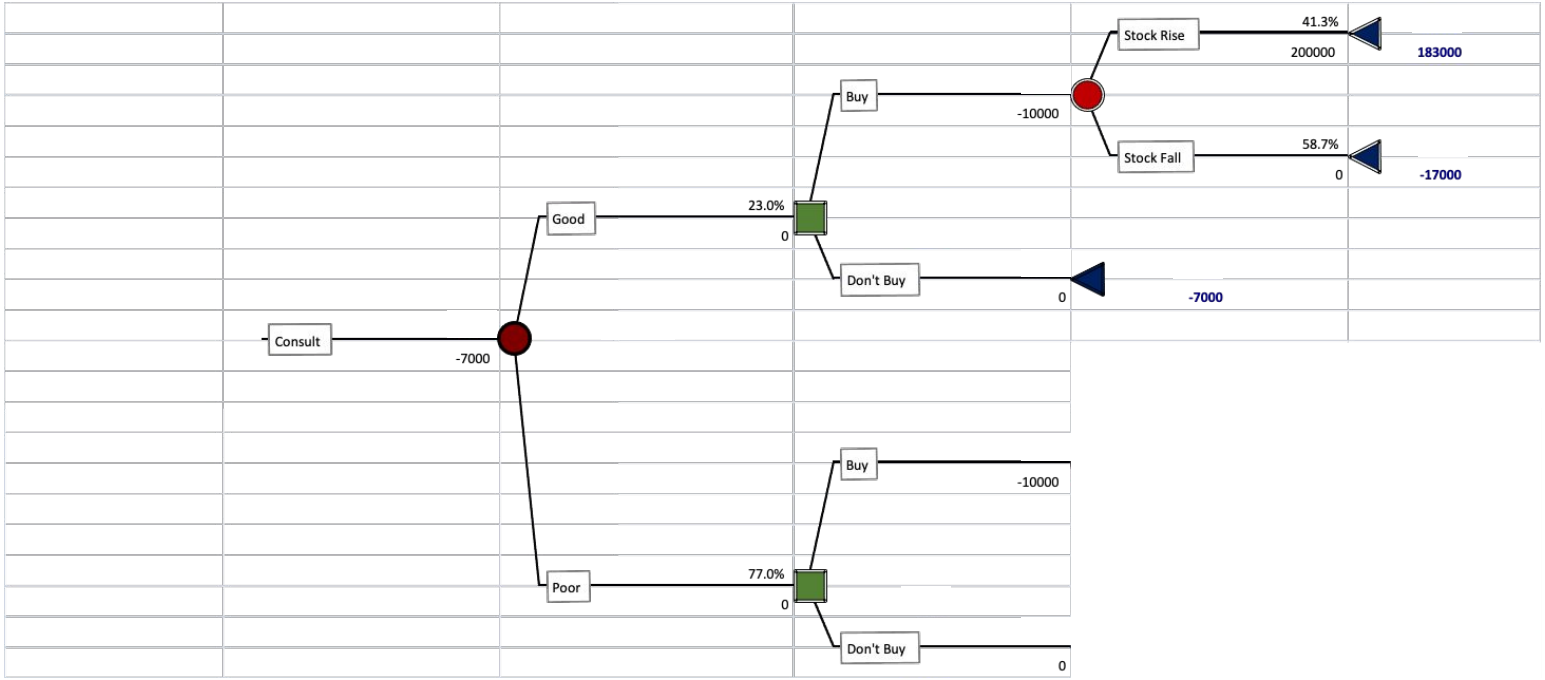
Let’s construct the tree!



P(“good”) = 0.23 P(“poor”) = 0.77



P(“good”) = 0.23 P(“poor”) = 0.77

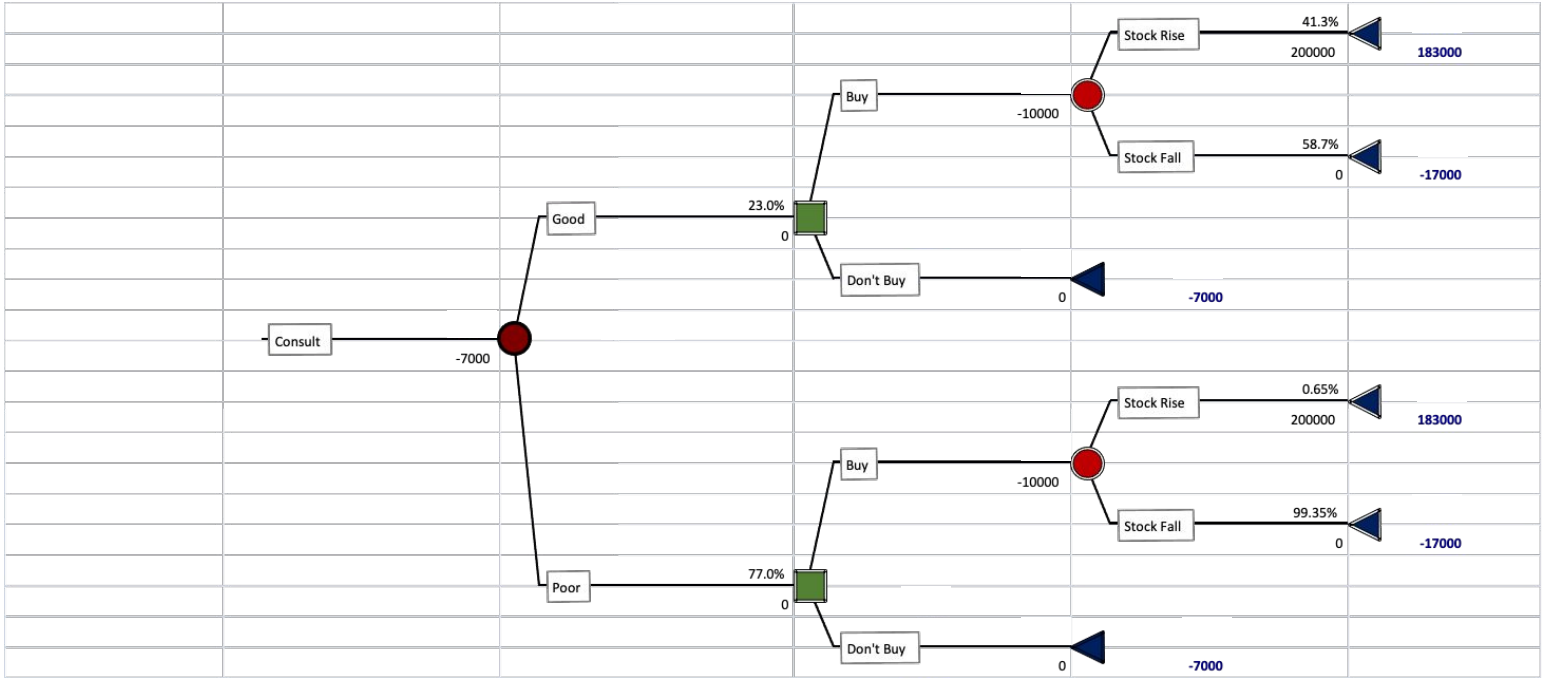


P(“good”) = 0.23

P(“poor”) = 0.77

P(rise|“good”) = 0.413

P(fall|“good”) = 0.587



P("good") = 0.23

P("poor") = 0.77

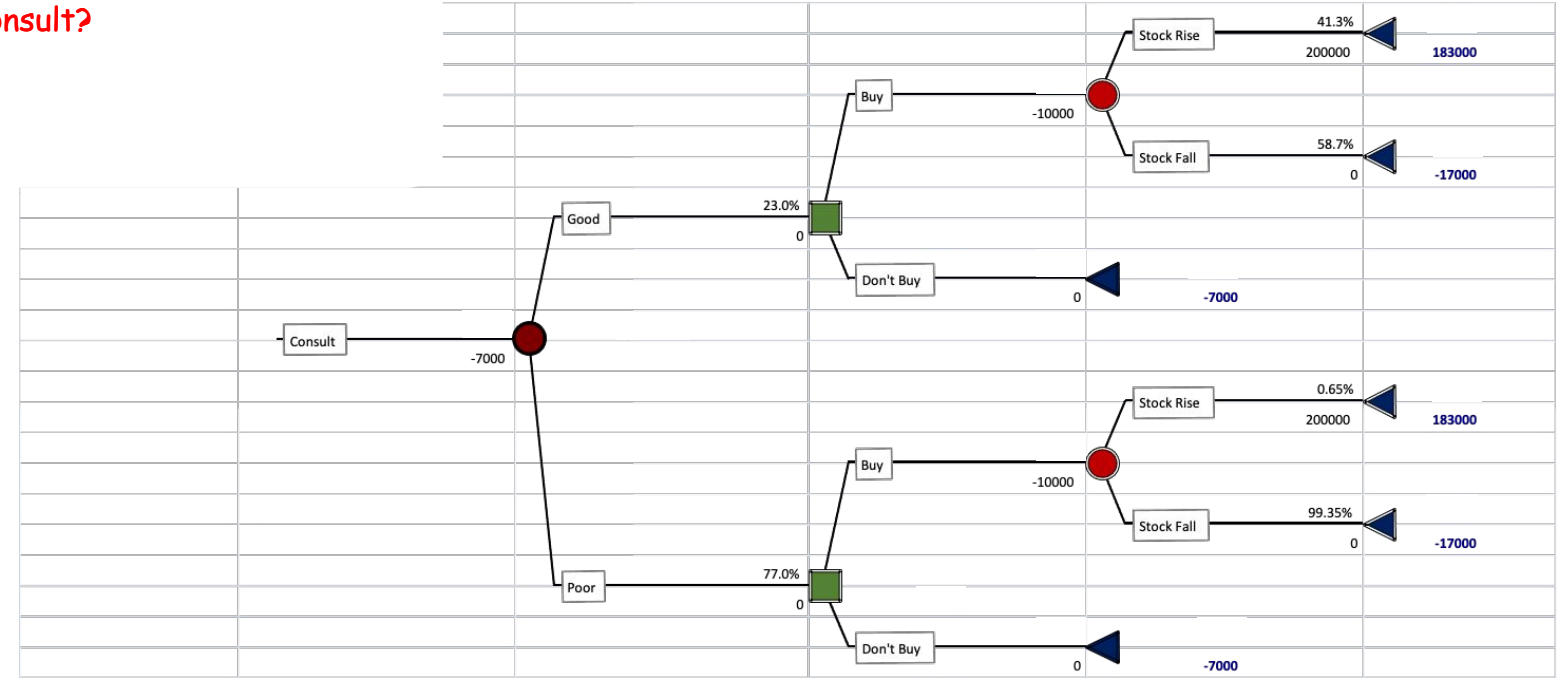
P(rise|"good") = 0.413

P(fall|"good") = 0.587

P(rise|"poor") = 0.065

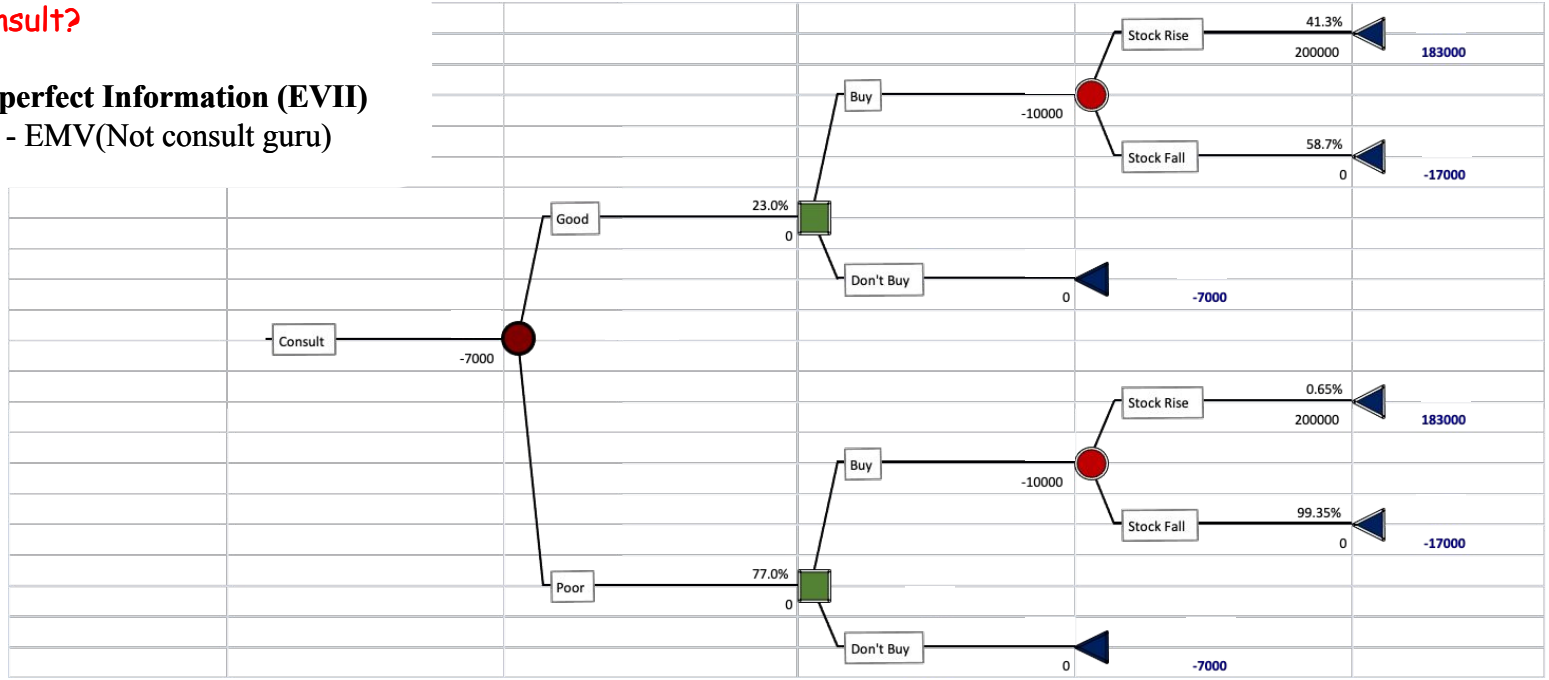
P(fall|"poor") = 0.9935

Should Mr. Bean consult?



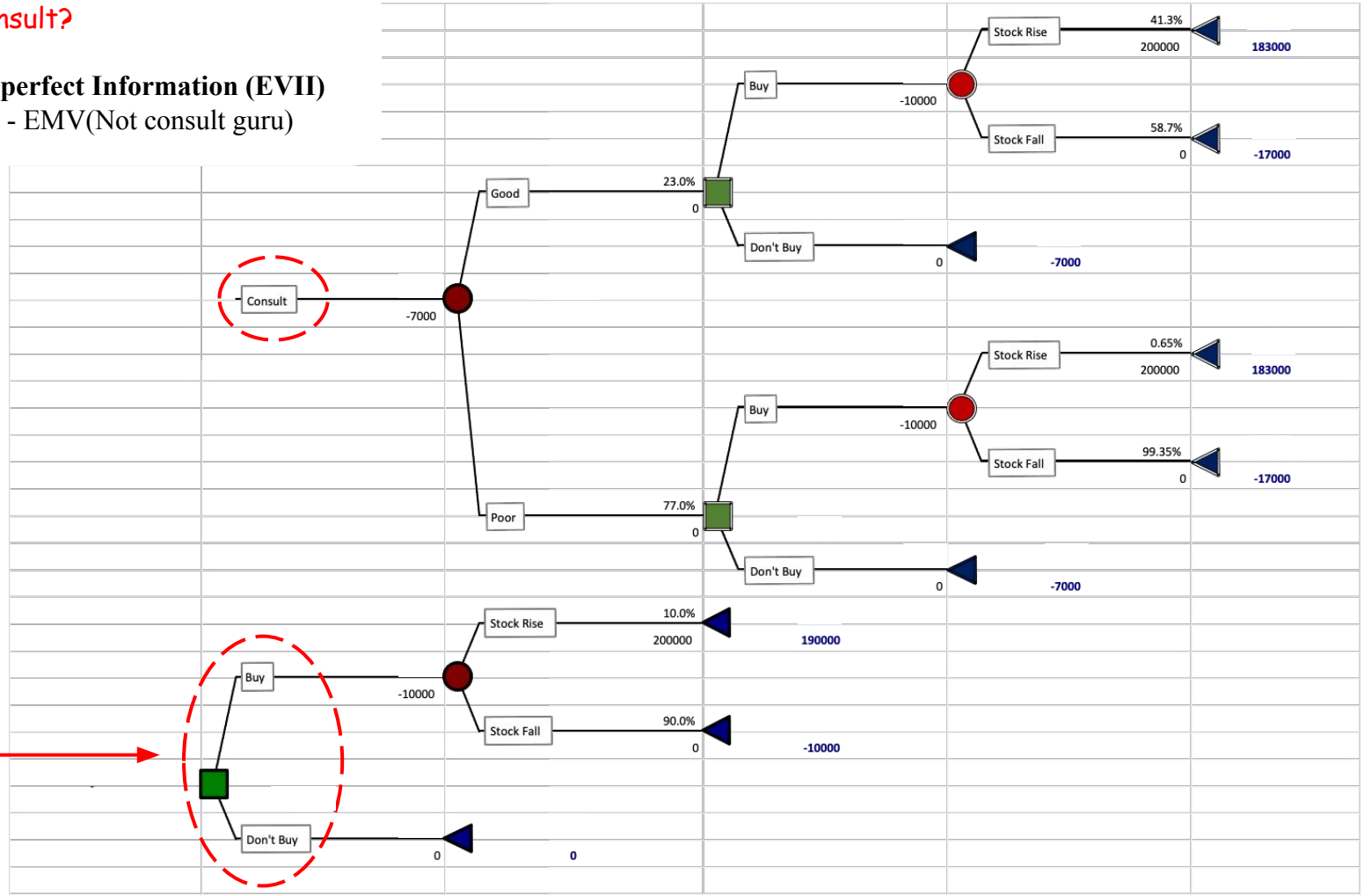
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Should Mr. Bean consult?

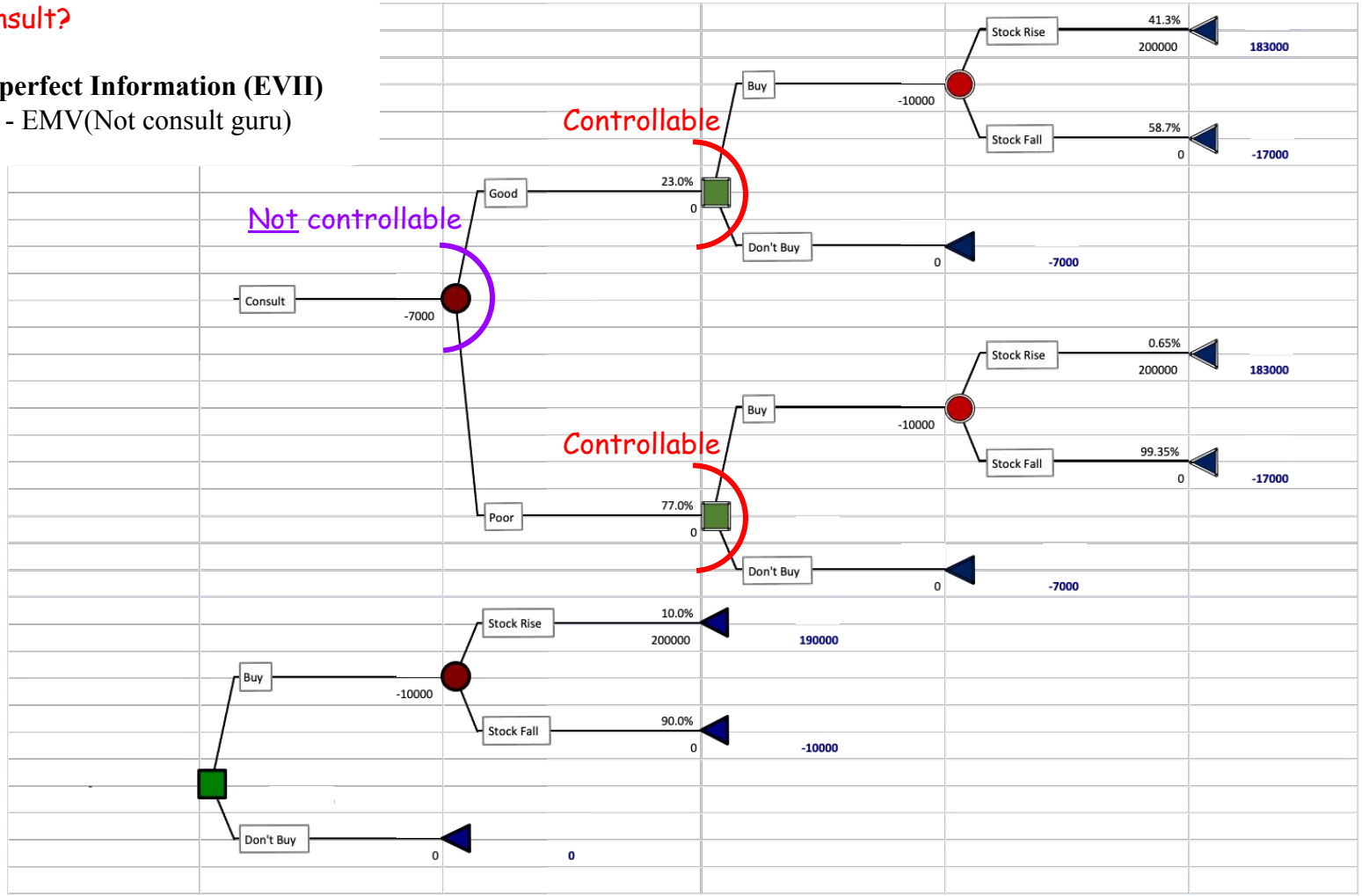
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Problem 1

Should Mr. Bean consult?

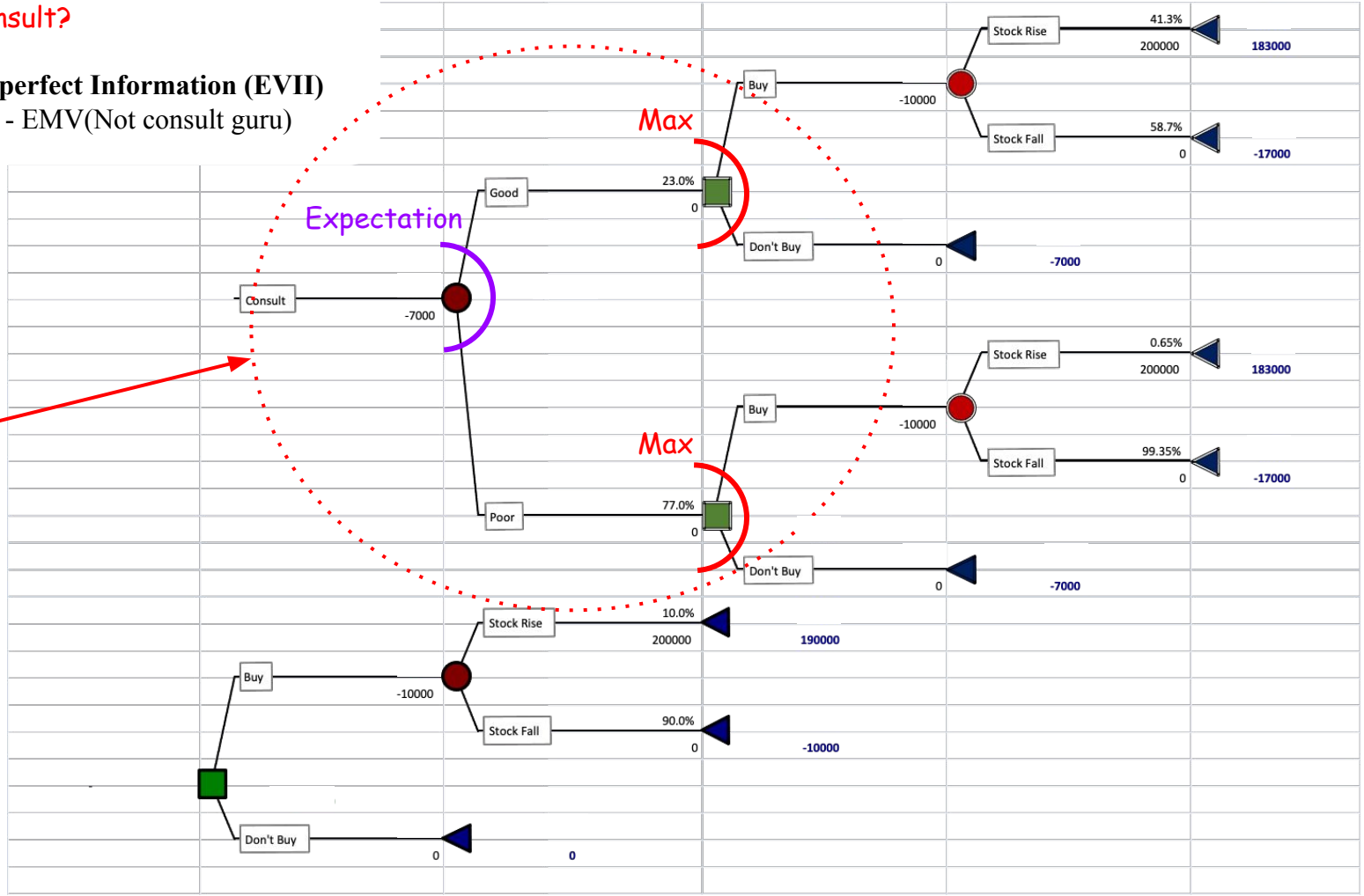
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Should Mr. Bean consult?

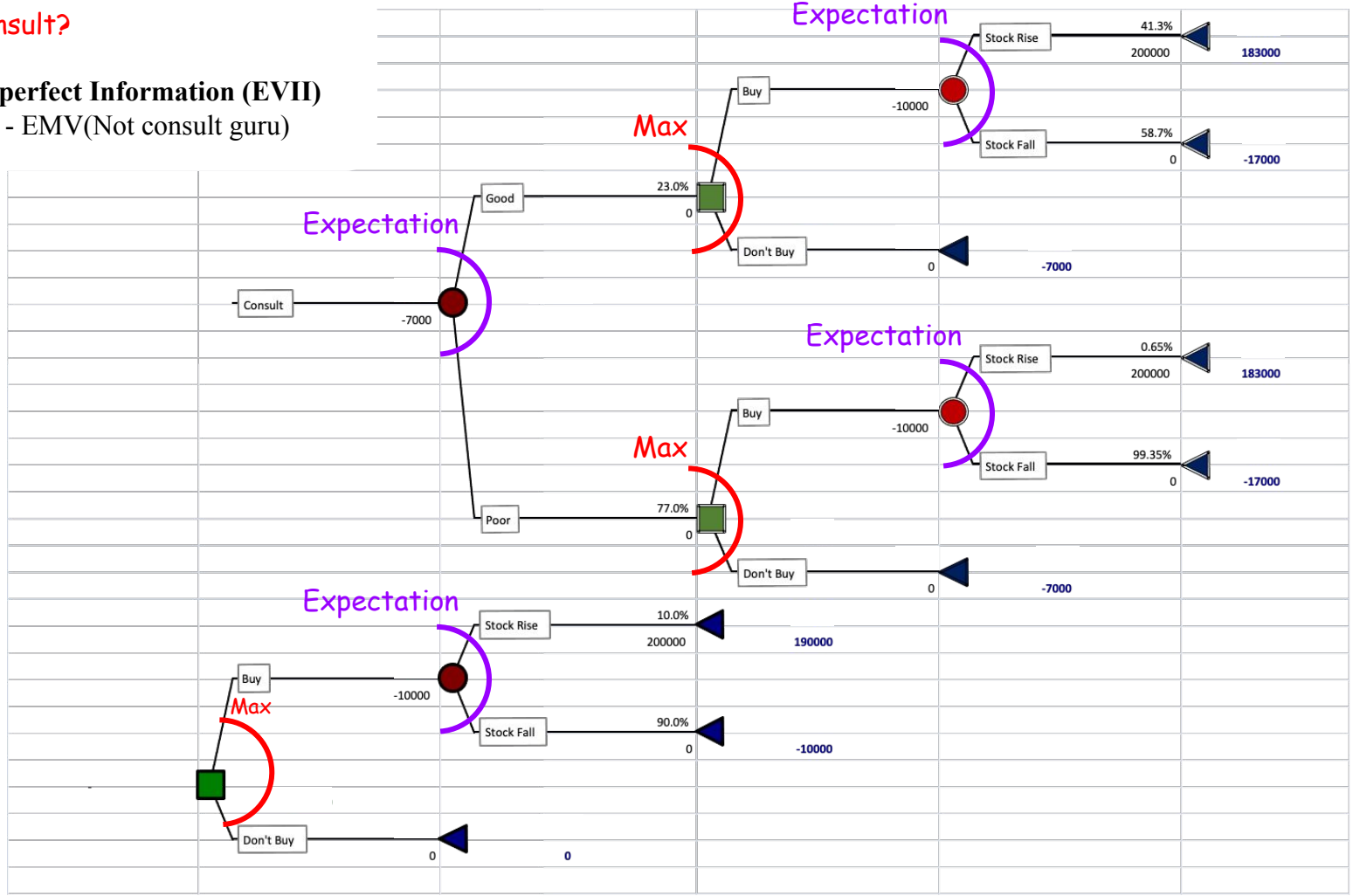
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)

Expectimax!



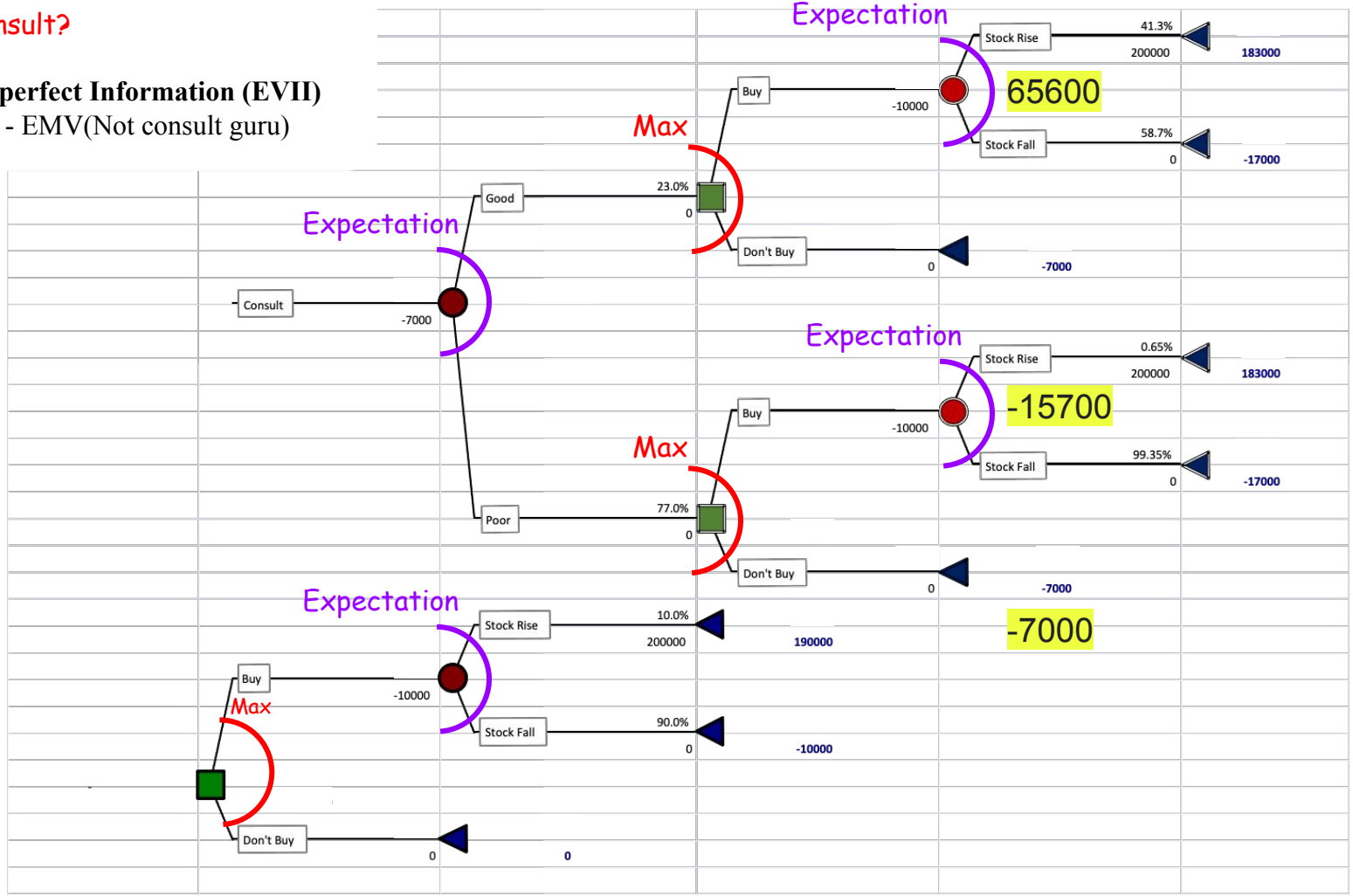
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



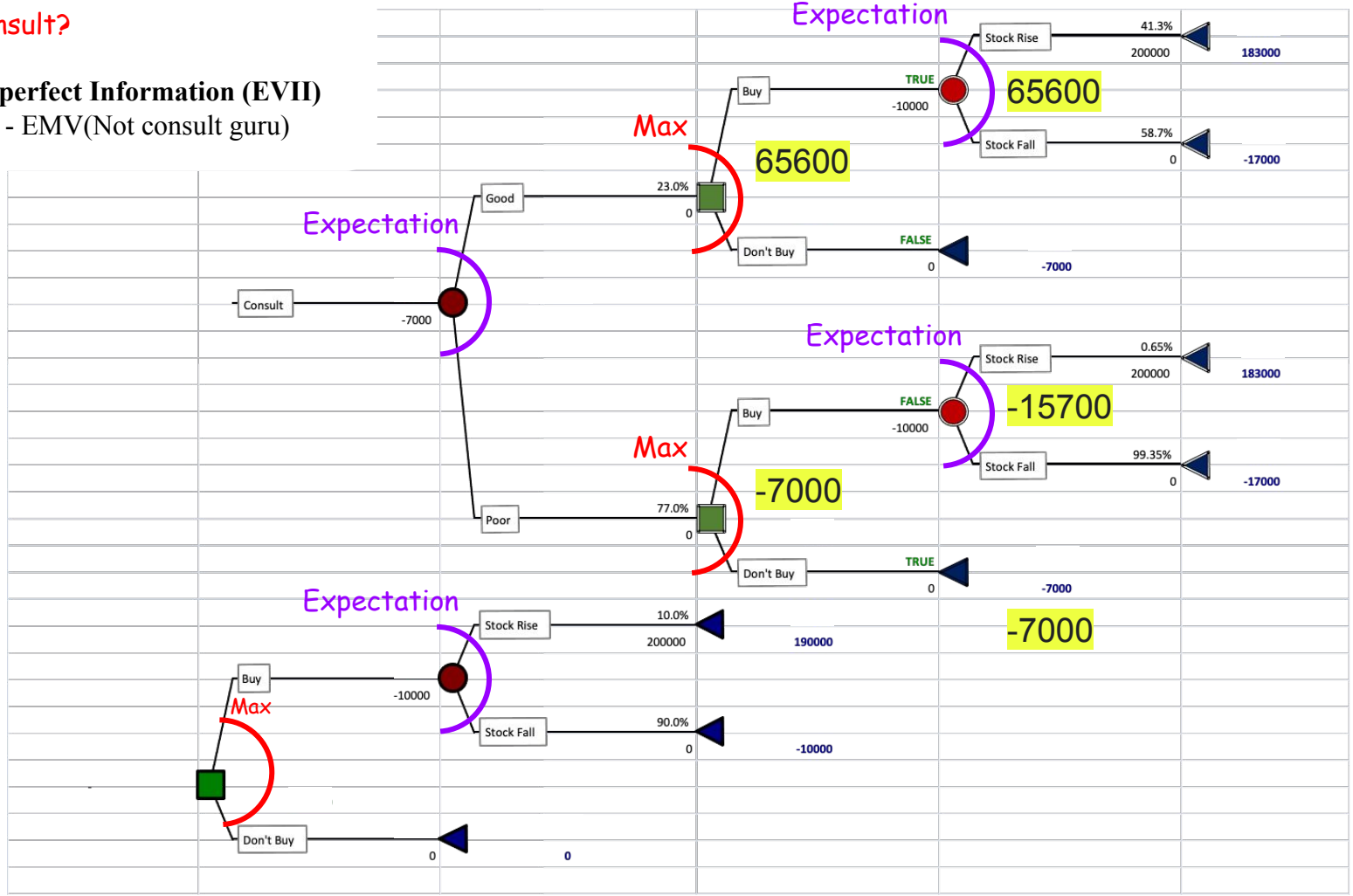
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



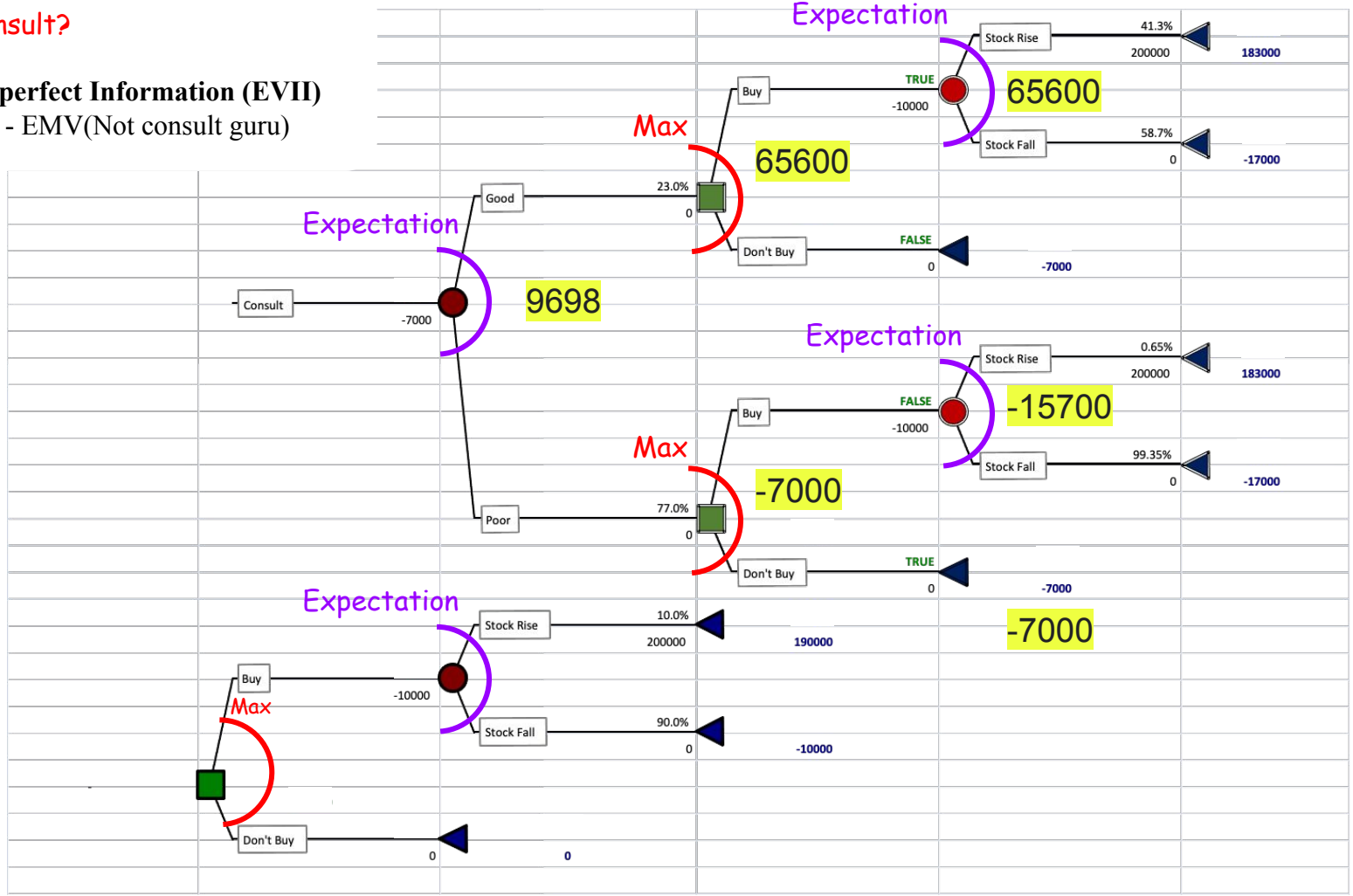
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



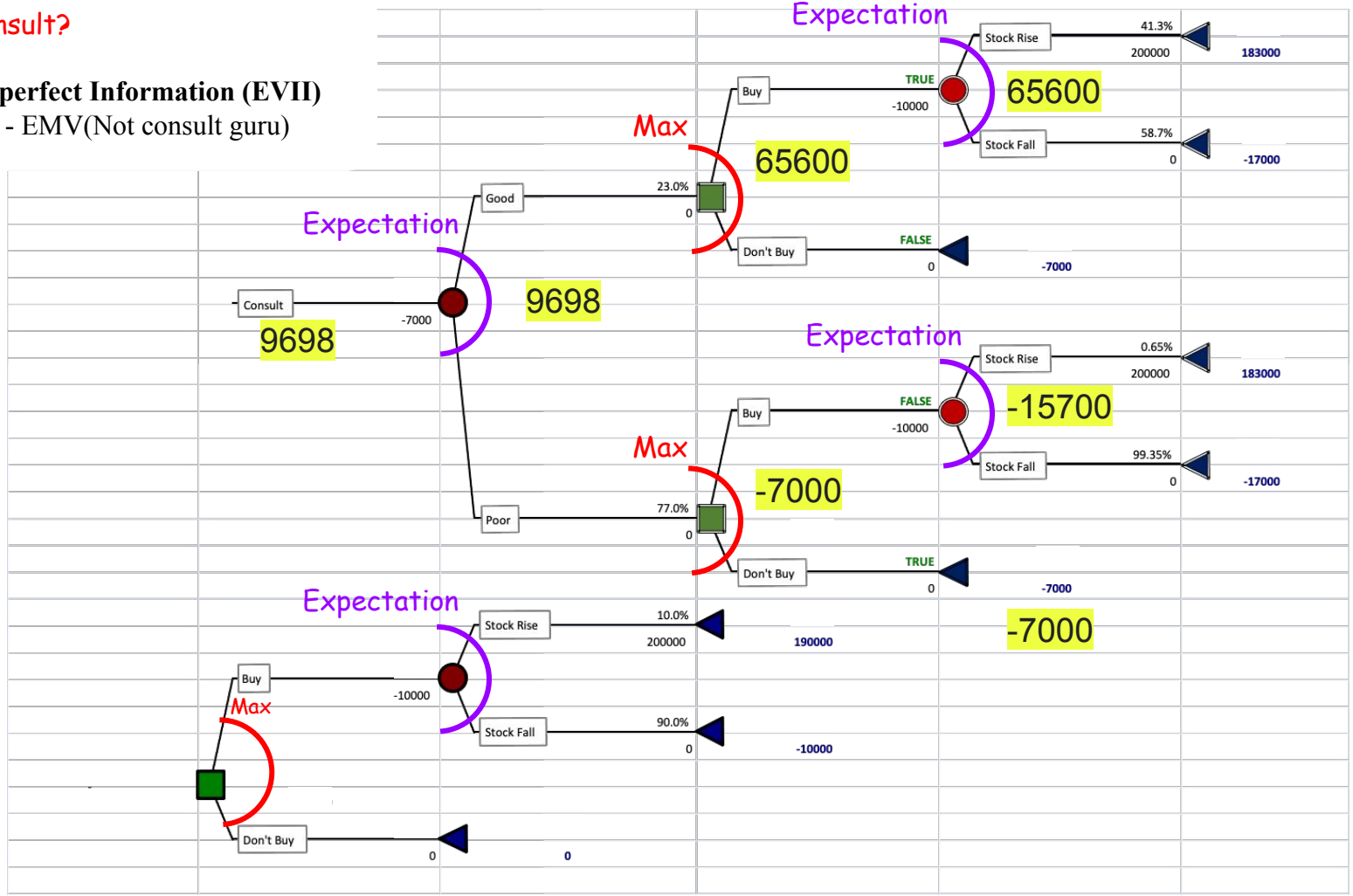
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Should Mr. Bean consult?

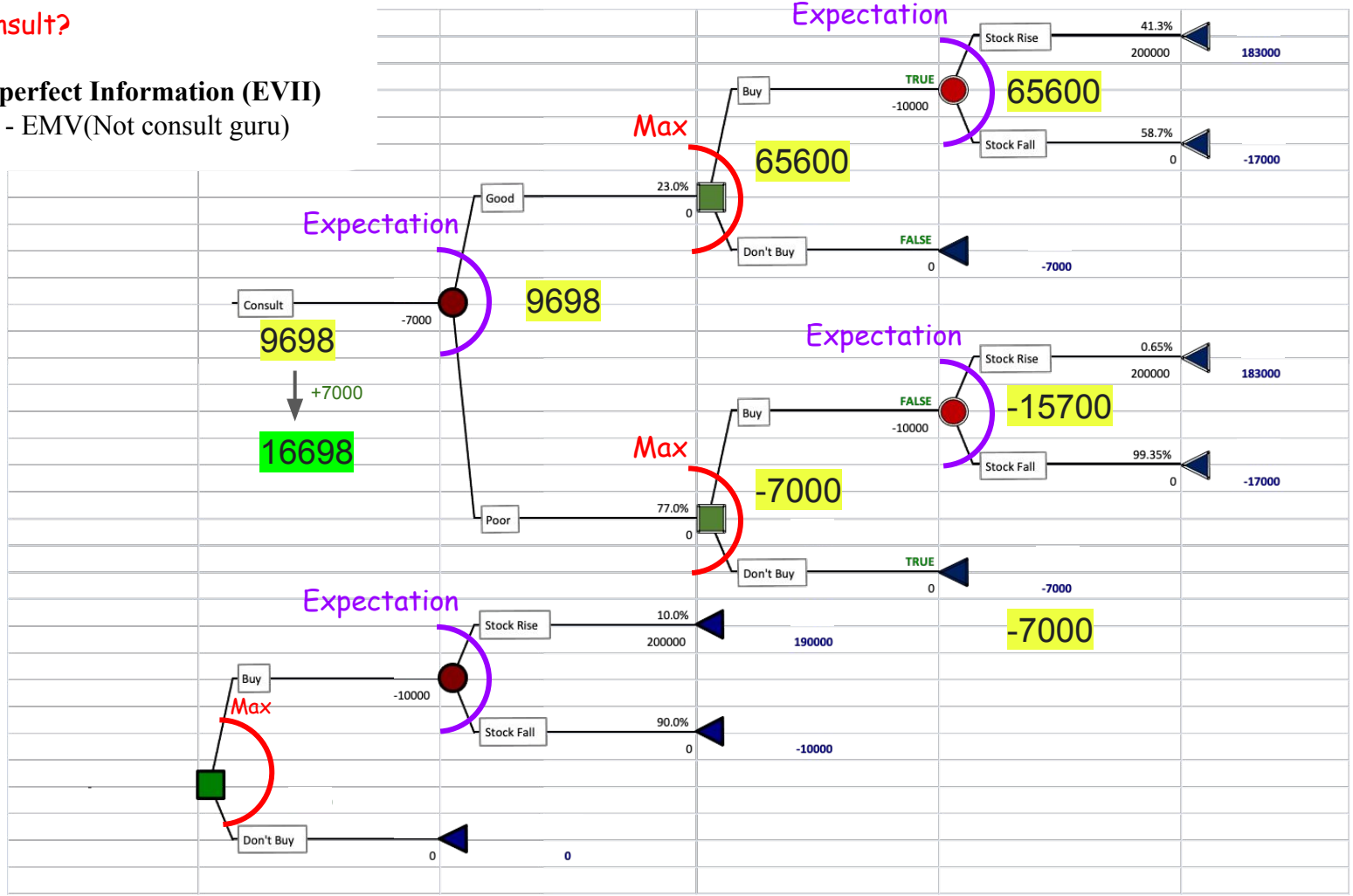
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Should Mr. Bean consult?

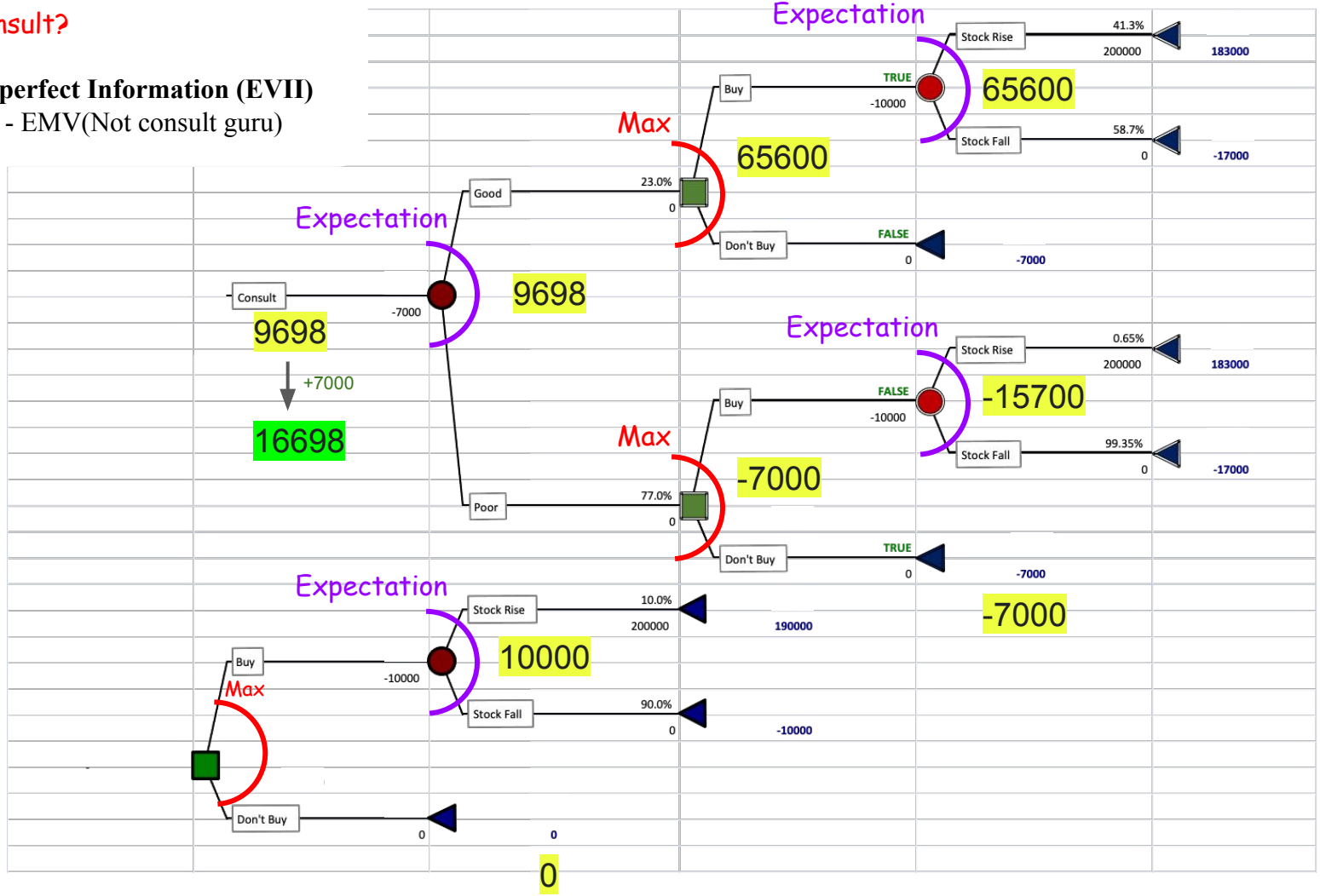
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)

EVII is always calculated <u>assuming the cost is zero</u>, i.e., assuming the information is free.



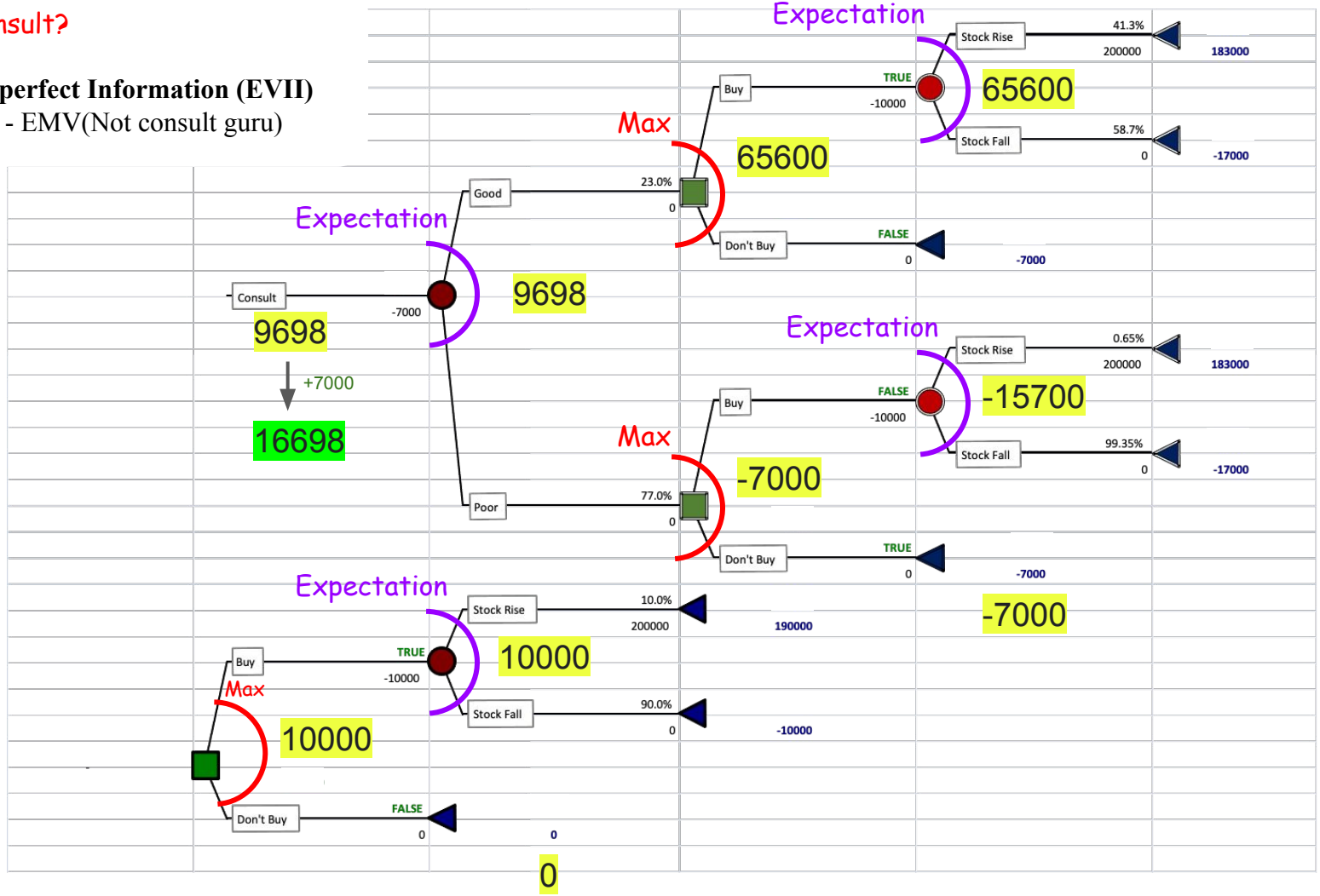
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



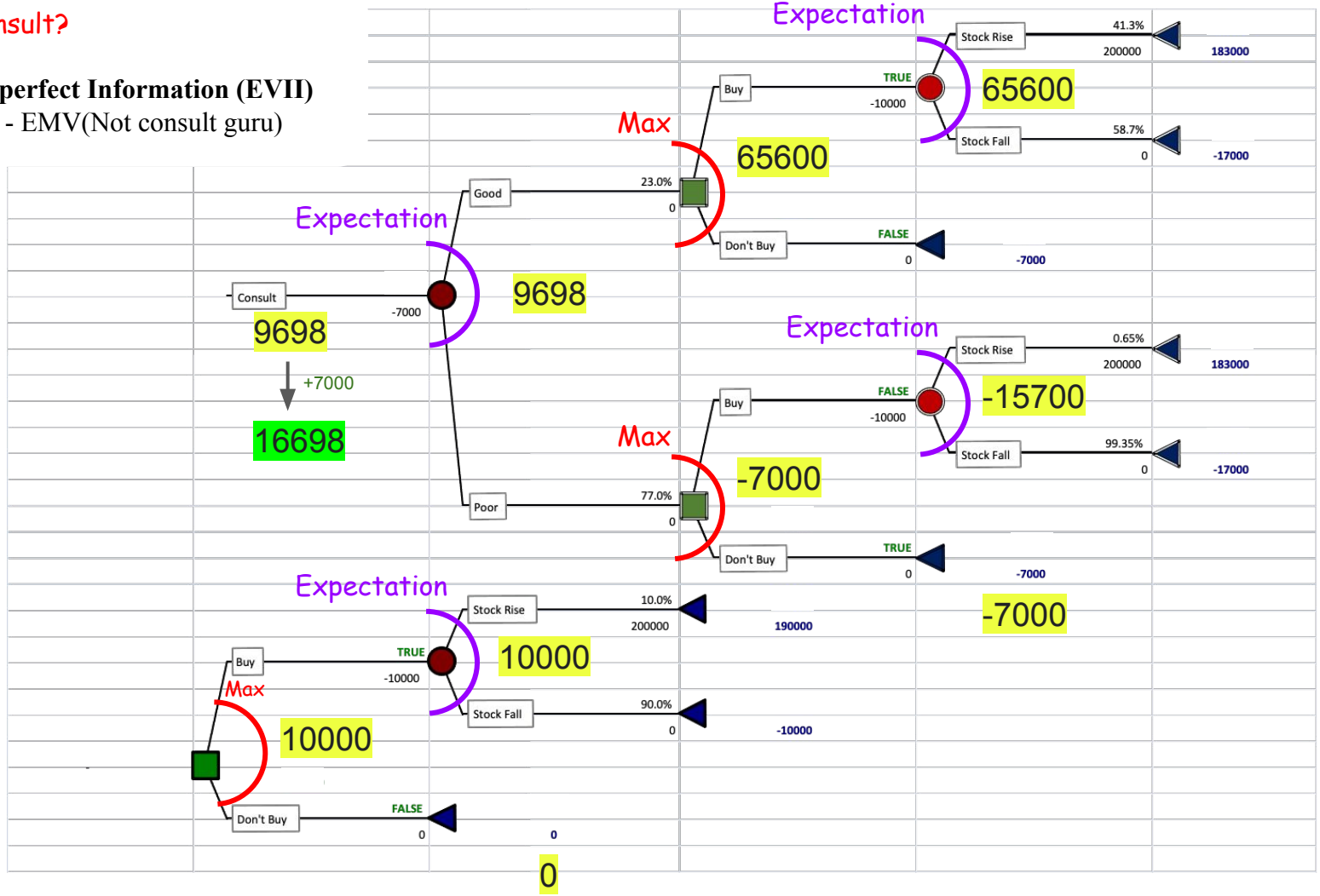
Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)



Should Mr. Bean consult?

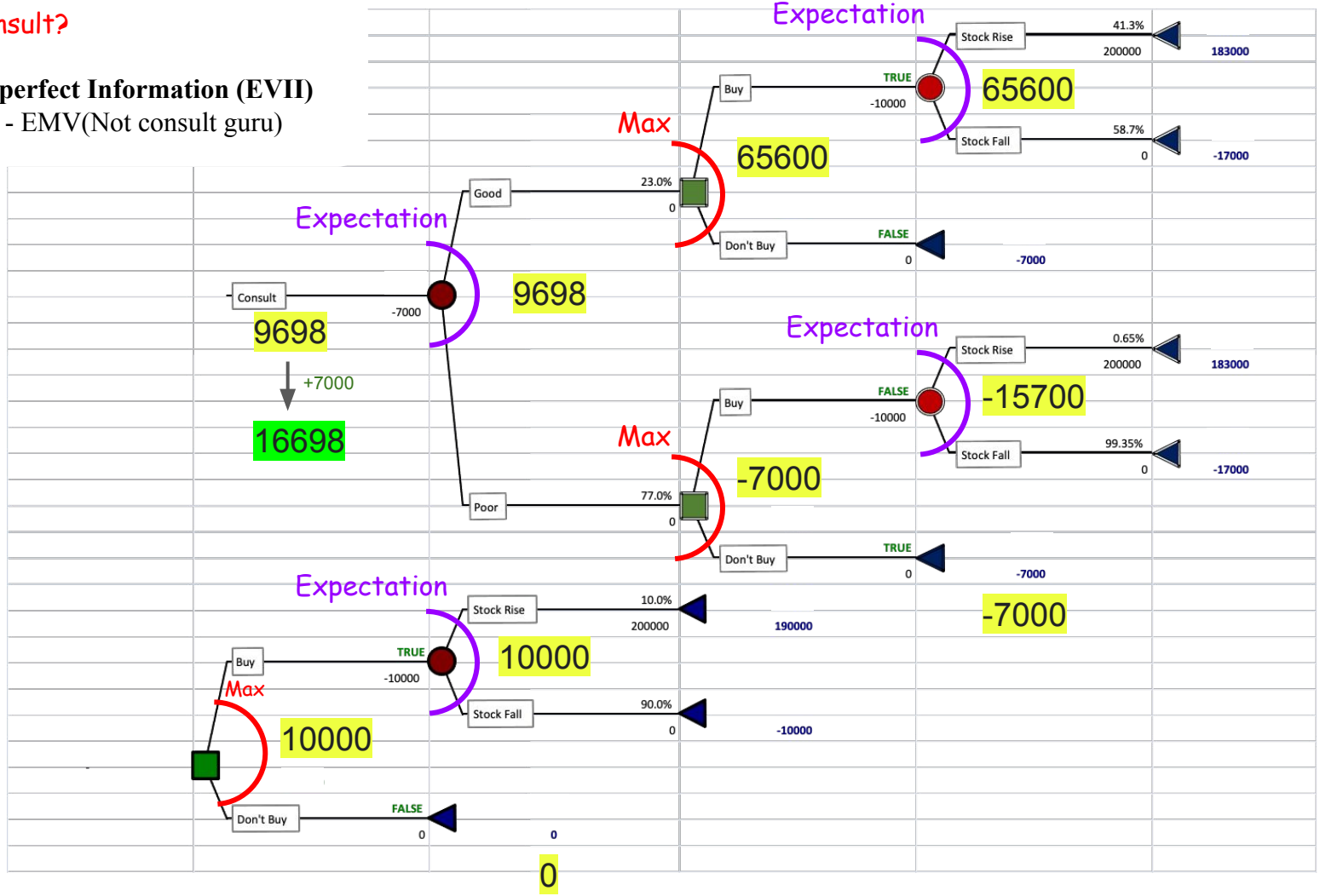
Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)
= 16698 - 10000
= **6698**



Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)
= 16698 - 10000
= **6698** < 7000 (cost)

Not worth it!

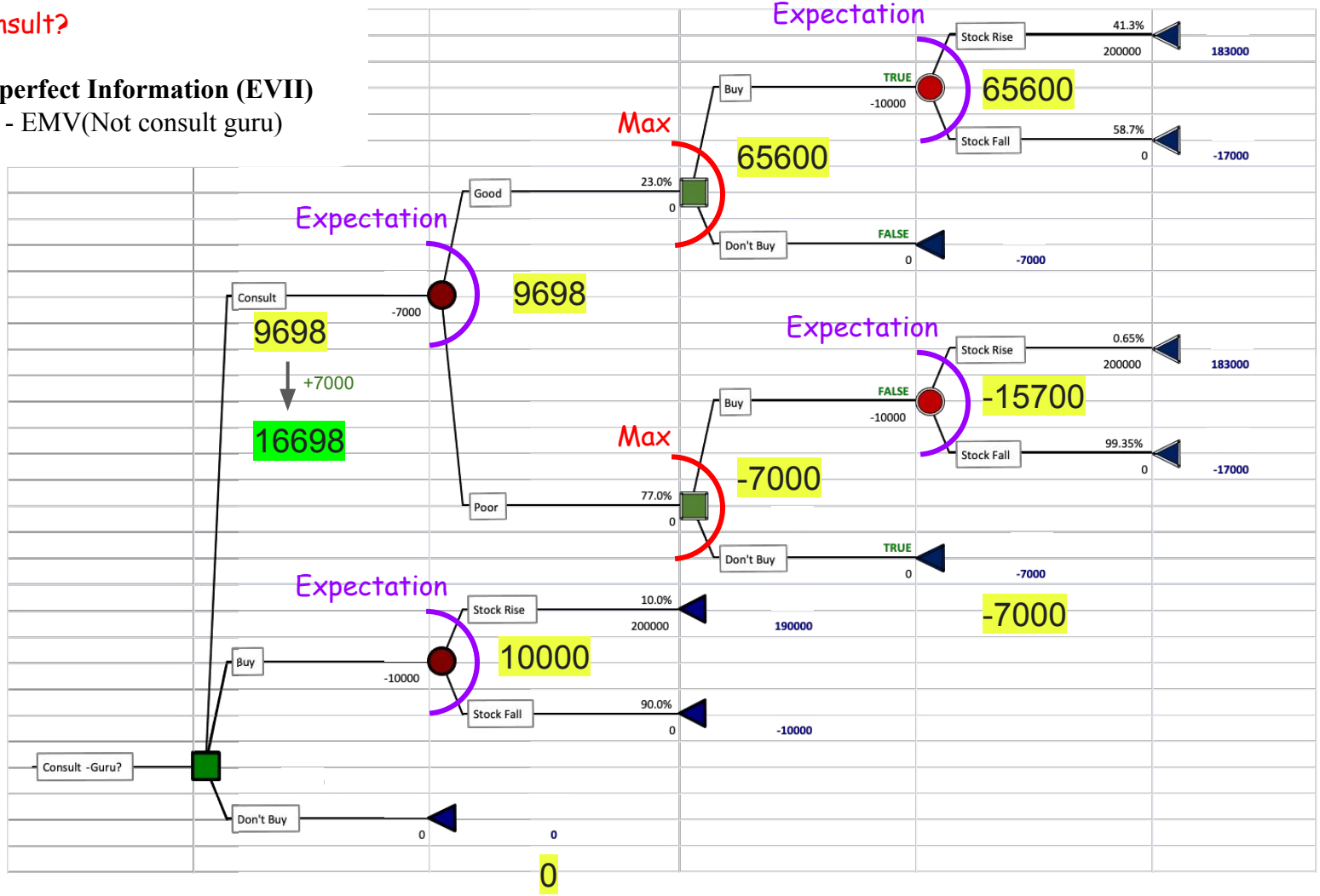


Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)
= 16698 - 10000
= **6698** < 7000 (cost)

Not worth it!

Complete tree:

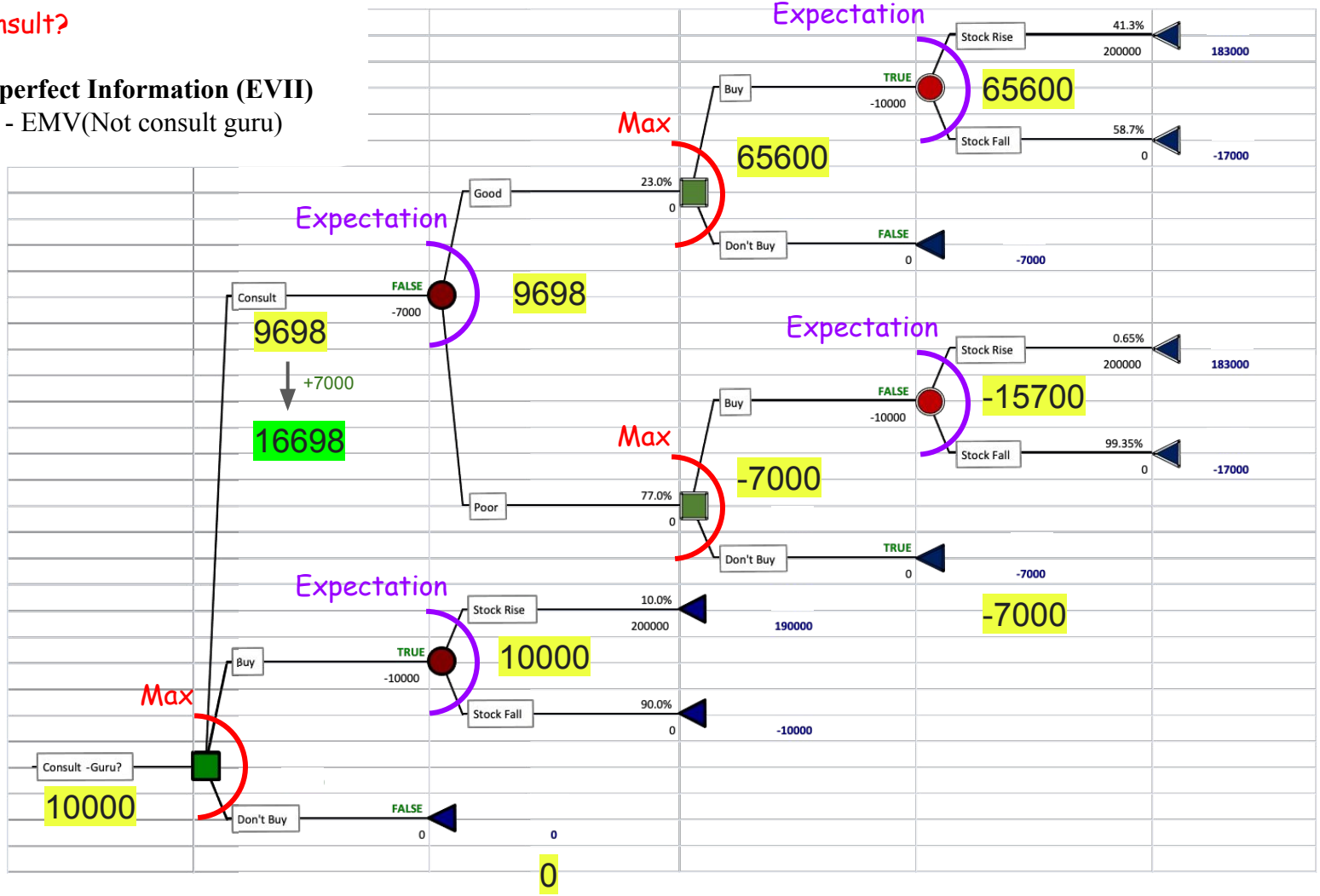


Should Mr. Bean consult?

Expected Value of Imperfect Information (EVII)
= EMV(Consult Guru) - EMV(Not consult guru)
= 16698 - 10000
= **6698** < 7000 (cost)

Not worth it!

Complete tree:



Question?

<EOF>

Credits

Decision tree and influence diagram images are adapted (with modifications) from the amazing works by **Abhinit** and **Evangelos**.