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Homework

Homework due Jul 22, 2020 21:30 IST

The exercises below will count towards your grade. **You have only one chance to answer these questions**. Take your time, and think carefully before answering.

Problem 1

30.0/30.0 points (graded)

You are considering buying a lottery ticket. Each ticket costs $\$2$, and has a 1% chance of winning. If you win, you get $\$500$; otherwise you get nothing. (You care only about money, and assign value n to a situation in which you net n dollars.)

Which of the equations below corresponds to the right expected value calculation?

○ $EV(\text{Buying Ticket}) = (500)\,(.01) + (0)\,(.99)$

○ $EV(\text{Buying Ticket}) = (500)\,(.01) + (2)\,(.99)$

○ $EV(\text{Buying Ticket}) = (500)\,(.01) + (-2)\,(.99)$

● $EV(\text{Buying Ticket}) = (498)\,(.01) + (-2)\,(.99)$

✓

Explanation

Your options are: buying ticket and not buying ticket. There are two relevant states of the world: ticket wins, and ticket loses. If you buy a ticket and win, you will have won $\$500$ and spent $\$2$: the value of that to you equals 498 and the likelihood of its happening is 1%. If you lose, you will have won 0 and spent $\$2$: the value of that to you is -2 and the likelihood of its happening is 99%. This means that the expected value of buying the ticket is:

$$(498)\,(.01) + (-2)\,(.99)$$

Calculate the expected utility of buying a ticket and enter it here:

3 ✓ **Answer:** 3

3

Explanation

$$(498)(.01)+(-2)(.99)=4.98-1.98=3$$

Suppose your options are buying the ticket or not buying the ticket. According to the Principle of Expected Value Maximization, should you buy the ticket?

● You should buy the ticket.

○ You should *not* buy the ticket.

✓

Explanation

The expected value of not buying the ticket is 0 and (as noted above) the expected value of buying the ticket is 3. So, according to the Principle of Expected Value Maximization, you ought to buy the ticket, even though it is only 1% likely that you will win.

Submit You have used 1 of 1 attempt

ℹ Answers are displayed within the problem

Problem 2

20.0/20.0 points (graded)

There are two boxes before you: Open and Closed. You can see that Open contains $\$10$, but cannot see the contents of Closed. You are told, however, that either Closed is completely empty or it contains $\$100$.

You are given two choices: one-box or two-box. To one-box is to take the contents of Closed, and leave the contents of Open behind. To two-box is to take the contents of both boxes. The boxes have been filled ahead of time, and their contents will not be changed.

There is no predictor. Instead, a coin was flipped. If it landed Heads, Closed was filled with the $\$100$; if it landed Tails, Closed was left empty.

According to the Principle of Expected Value Maximization, what should you do? Should you one-box or two-box?

○ One-box

● Two-box

✓

Explanation

The Principle of Expected Value Maximization says that you should two-box. To see this, we need to calculate the expected value of each of your choices, as follows (where '$1B$' refers to one-boxing, '$2B$' to two-boxing, 'H' to heads, and 'T' to tails):

$$EV\,(1B) = v\,(1B\,H) \cdot p\,(H|1B) + v\,(1B\,T) \cdot p\,(T|1B) = 100 \cdot 0.5 + 0 \cdot 0.5 = 50$$

$$EV\,(2B) = v\,(2B\,H) \cdot p\,(H|2B) + v\,(2B\,T) \cdot p\,(T|2B) = 110 \cdot 0.5 + 10 \cdot 0.5 = 60$$

Because $EV\,(1B)$ is less than $EV\,(2B)$, the Principle of Expected Value Maximization says that you should two-box.

Now assume there is a predictor. Yesterday evening, Predictor was enlisted to make a prediction about whether you would one-box or two-box. If Predictor predicted that you would one-box, the $\$100$ was placed in Closed. Otherwise, Closed was left empty. Predictor is known to be accurate 60% of the time. The boxes have now been sealed, and their contents will not be changed.

As before, *your decision will have no effect on the contents of Closed*. If it now contains the $\$100$, it will continue to do so regardless of whether you decide to one-box or two-box.

According to the Principle of Expected Value Maximization, should you one-box or should you two-box?

● One-box

○ Two-box

✓

Explanation

The expected value of one-boxing is

$$(100 \times .6) + (0 \times (1 - .6)) = 60$$

and the expected value of two-boxing is

$$(110 \times (1 - .6)) + (10 \times .6) = 44 + 6 = 50$$

Because the expected value of one-boxing is greater than the expected value of two-boxing, the Principle of Expected Value Maximization says you should one-box.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Problem 3

20/20 points (graded)

Of each of the conditionals below, say whether it is indicative or not. (Hint: you might find it helpful to review the material in this section.)

If I left the door open, then the cat probably escaped.

● Indicative

○ Not Indicative

✓

If Abraham Lincoln had not gone to the theater, then he would not have been assassinated.

○ Indicative

● Not Indicative

✓

If you come pick me up from the train station, then I will buy you dinner.

● Indicative

○ Not Indicative

✓

If she promised she would be here, then she will be here.

● Indicative

○ Not Indicative

✓

If you had listened more carefully, then we would not be having this conversation.

○ Indicative

● Not Indicative

✓

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Problem 4

30/30 points (graded)

The following example is due to Caspar Hare:

> **Symmetrical Worlds**:Imagine that the universe is divided in two along a plane. As far as anyone can tell, the universe is completely symmetrical across this plane. Everything that happens on one side appears to be an exact mirror of everything that happens on the other side; there are so far no observed divergences from this pattern. The plane is a great tourist attraction. People go up to the plane to peer into the other side, and invariably see their symmetrical twin peering back at them.
>
> The plane alternates between being opaque and transparent, and scientists have established that when the plane is opaque, there are no causal interactions between events on different sides of the plane. A favorite activity of visitors is to wait until the plane turns opaque, and unveil some crazy prop or hold some ridiculous pose, only to find their twin displaying the same crazy prop or holding the same ridiculous pose when the plane turns transparent.
>
> You are having fun with your symmetry twin when then plane turns opaque. A mysterious but credible stranger comes up to you and offers you a deal. "Here is a thousand dollars," she says. "That's yours. But consider this: my symmetrical twin is right now giving your twin, on the other side of the opaque plane, a thousand dollars. If your twin burns her thousand dollars, I will give you a million dollars. Here is a lighter!"

According to an evidential decision theorist, what is the best way of maximizing your own profits in the Symmetrical World case?

● Burn the thousand!

○ Don't burn the thousand!

✓

Explanation

According to an evidential decision theorist, you should burn the thousand. Given the observed correlation between what happens on this side of the plane and what happens on the other side, you know that, if you don't burn the thousand, it is overwhelmingly likely that neither will your twin, and you'll end up with a thousand dollars. On the other hand, you know that if you burn the thousand, it is overwhelmingly likely that your twin will too, and you'll end up with a million dollars. A million dollars is better than a thousand dollars, so: burn the thousand!

According to an causal decision theorist, what is the best way of maximizing your own profits in the Symmetrical World case?

○ Burn the thousand!

● Don't burn the thousand!

✓

Explanation

According to a causal decision theorist, you shouldn't burn the thousand. When the plane is opaque, there is no causal influence between this side of the plane and the other side. So your twin is either going to burn her money, or not; there's nothing you can do to affect what she does. Now, if she were to not burn her money, you would obviously be better off not burning your money; otherwise, you would end up with nothing. And suppose she were to burn her money? Then you would still be better off not burning your money; you would end up with a million plus a thousand, rather than just a million. Either way, you would be better off not burning the money. So: don't burn the money!

(Hint: you might find it helpful to review the material in this section.)

Submit You have used 1 of 1 attempt

Answers are displayed within the problem