PHPE 400
Individual and Group Decision Making

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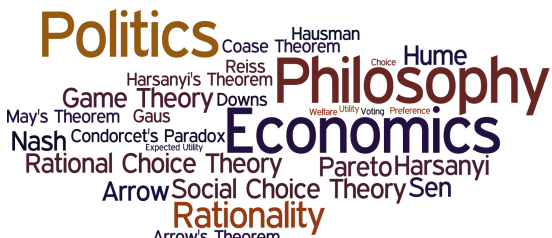
pacuit.org



Describing the Outcomes

Suppose you have a kitten, which you plan to give away to either Ann or Bob. Ann and Bob both want the kitten very much. Both are deserving, and both would care for the kitten. You are sure that giving the kitten to Ann (x) is at least as good as giving the kitten to Bob (y) (so $x \; R \; y$). But you think that would be unfair to Bob. You decide to flip a fair coin: if the coin lands heads, you will give the kitten to Bob, and if it lands tails, you will give the kitten to Ann.

(J. Drier, "Morality and Decision Theory" in *Handbook of Rationality*)

If $L_1 \; P \; L_2$, then for all $0 \leq p < 1$,

$$(1 \cdot L_1) \; P \; (p \cdot L_1 + (1 - p) \cdot L_2)$$

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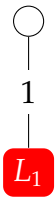

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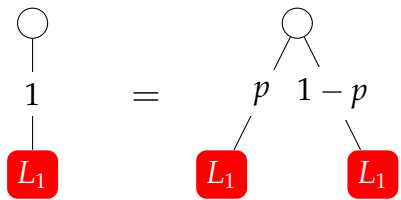

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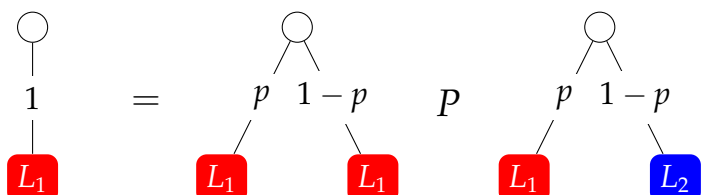
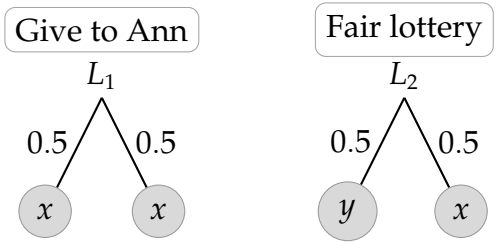
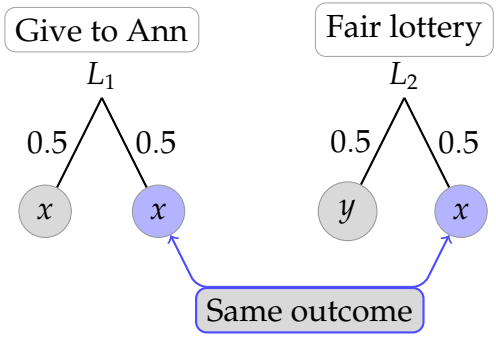




- x is the outcome "Ann gets the kitten"
- y is the outcome "Bob gets the kitten"



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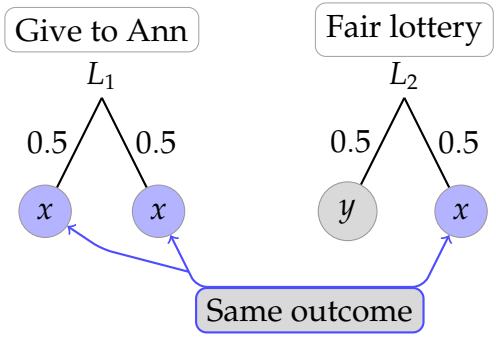

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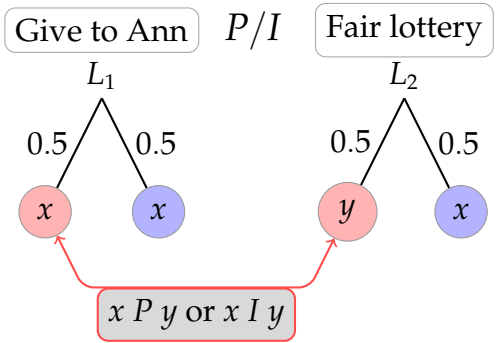

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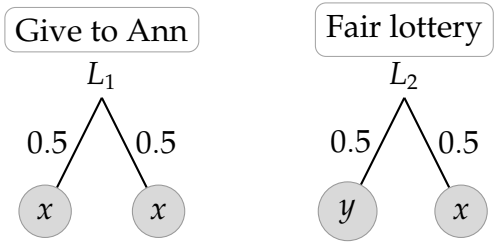
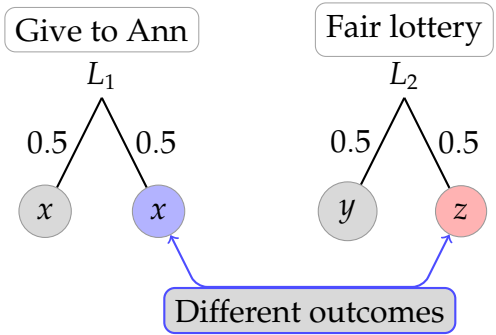
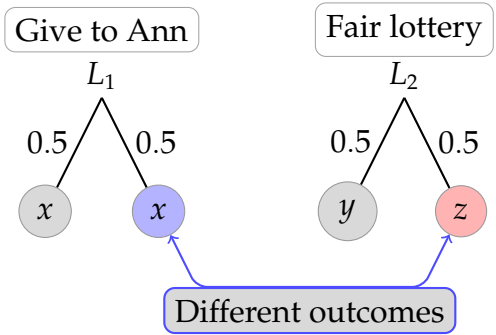


- x is the outcome "Ann gets the kitten, *in a fair way*"
- y is the outcome "Bob gets the kitten"



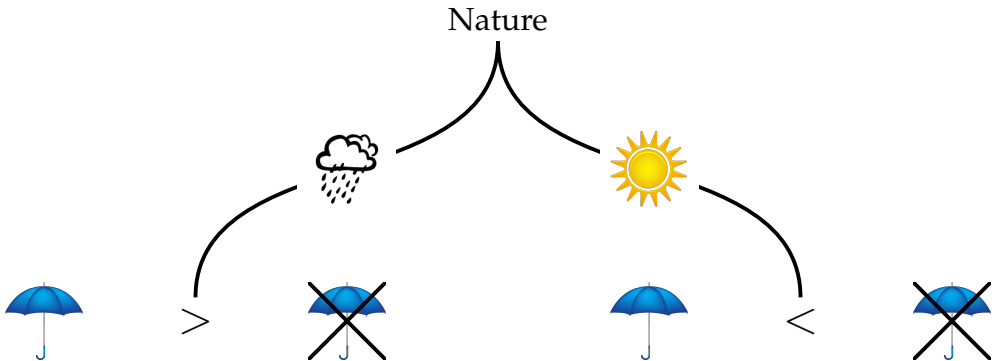
- x is the outcome "Ann gets the kitten"
- z is the outcome "Ann gets the outcome, *fairly*
- y is the outcome "Bob gets the kitten, *fairly*"



If all the agent cares about is who gets the kitten, then $L_1 \; P \; L_2$

If all the agent cares about is being **fair**, then $L_2 \; P \; L_1$

Decision problems


Nature
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wet	free, dry

States: it rains; it does not rain

Outcomes: encumbered, dry; wet; free, dry

Actions: take umbrella; leave umbrella

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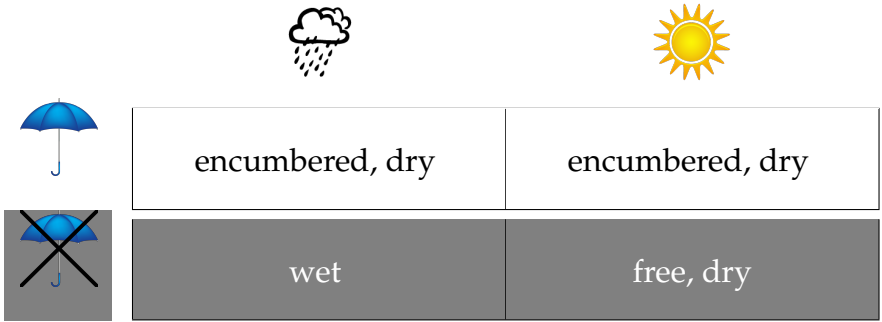

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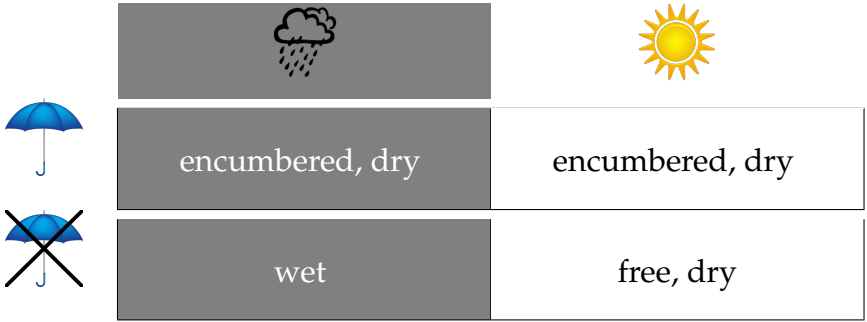

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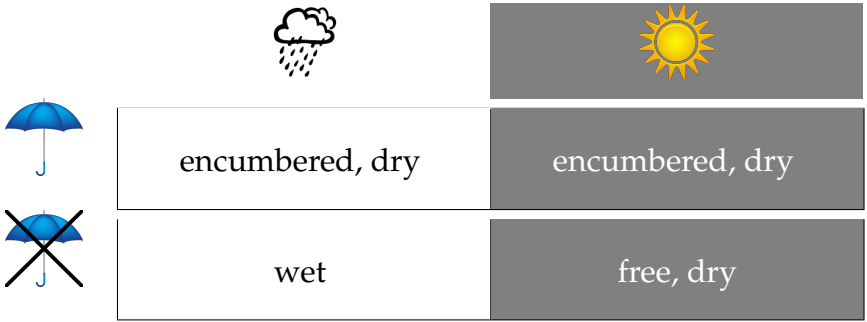

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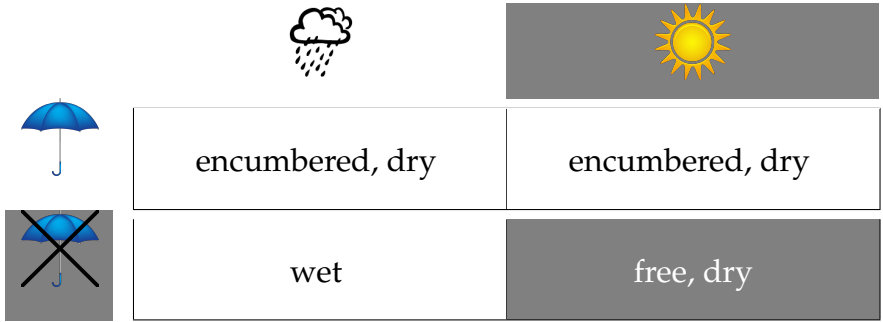

States: it rains; it does not rain

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	Rain (s_1)	No rain (s_2)
Take umbrella (A)	encumbered, dry (o_1)	encumbered, dry (o_1)
Leave umbrella (B)	free, wet (o_2)	free, dry (o_3)

$$A(s_1) = A(s_2) = o_1$$

$$B(s_1) = o_2, B(s_2) = o_3$$

	Rain (s_1)	No rain (s_2)
Take umbrella (A)	encumbered, dry (o_1)	encumbered, dry (o_1)
Leave umbrella (B)	free, wet (o_2)	free, dry (o_3)

Suppose that $P(s_1) = 0.6$ and $P(s_2) = 0.4$
(the decision maker believes that there is a 60% chance that it will rain).

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Take umbrella (A)	encumbered, dry (o_1)	encumbered, dry (o_1)
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Suppose that $P(s_1) = 0.6$ and $P(s_2) = 0.4$
(the decision maker believes that there is a 60% chance that it will rain).

Suppose that the decision maker's utility for the outcomes is:
$u(o_1) = 5$, $u(o_2) = 0$ and $u(o_3) = 10$.