

# Phil/LPS 31 Introduction to Inductive Logic

## Lecture 15

David Mwakima

[dmwakima@uci.edu](mailto:dmwakima@uci.edu)

Department of Logic and Philosophy of Science  
University of California, Irvine

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# Topics

- ▶ Ordinal Utilities
- ▶ Strict Dominance Principle
- ▶ Cardinal Utilities
- ▶ Expected Utility and Risk
- ▶ Principles of Rational Choice

# Decision Problems: Rational Choice

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- ▶ What do think is the best decision here?

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- ▶ Suppose President Biden after returning from his trip from Japan knows that the odds that U.S. House of Representatives will agree to a deal are 3 : 5, what is the risk of each act that President Biden may take?
- ▶ How would you advise President Biden?

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- ▶ This will lead to the concept of expected utility or expected loss (or risk)



# Decision Problems Under Ignorance

# Ordinal Utilities

# Strict Dominance Principle

# Maximin Principle

# Cardinal Utilities

Minimax: MINimize the MAXimum regret

# Decision Problems Under Uncertainty

## Expected Utility and Risk

$$\begin{aligned} U(A_1) &= u(A|S_1)P(S_1) + u(A|S_2)P(S_1) + \dots u(A|S_n)P(S_n) \\ &= \sum_i^n u(A | S_i)P(S_i) \end{aligned}$$



# Maximize Expected Utility