

## MIDTERM STUDY SHEET

## DECISIONS, GAMES & RATIONAL CHOICE

Be able to supply definitions for, and apply, the following concepts.

Instrumental Rationality	Dutch Book
Ordinal Utility	Cardinal Utility
A Strongly Dominates B	Independence of Irrelevant Alternatives
A Weakly Dominates B	Hedonism
Decision Under Uncertainty	Objective-List Theory
Decision Under Risk	Preference-Satisfaction Theory
Synchronic Rationality	Rule of Conditionalization
Diachronic Rationality	A is probabilistically independent of B
Objective Probability	Prior Credences
Subjective Probability	Posterior Credences (or $P_E$ )
Dutch Book Theorem	The regret of choice $C$ at state $S$
Expected Utility	States being independent of choices
A wager of \$n at a:b odds	Dutch Book Theorem

You should be able to apply these rules  
to a decision problem or decision table:

You should be able to make use of  
these rules:

Strong Dominance Rule	$P(\neg a) = 1 - P(a)$
Weak Dominance Rule	$P(a \vee b) = P(a) + P(b) - P(a \& b)$
Maximax Rule	$P(a \& b) = P(a)P(b a)$
Maximin Rule	$P(a b) = \frac{P(a \& b)}{P(b)}$
Minimax Regret Rule	$P(a b) = \frac{P(a)P(b a)}{P(b)}$

You should be able to:

Ascertain Conditional Probabilities (i.e.  $P(d|e)$ ) for simple cases  
(like exercise 3 on problem set 2)

Apply Bayes' Theorem to cases when the relevant probabilities are given

Compute the Expected Utility of a relatively simple case  
(like exercise 2 on problem set 3)

Determine payoffs of a bet given the betting odds and a wager