

# SPLASH 2012, Game Theory: Notation Cheat Sheet!

Since the review page (see the other document) is kind of long and intimidating, here's a really short page with just all the notation. I don't know how much we'll use, but I figured it was best to have it in case. If you don't know something here, feel free to look it up on the other review!

## 1 Logic notation

- $\vee$  (or)
- $\wedge$  (and)
- $\implies$  (implies)
- $\iff$  (if and only if)

## 2 Sets and Sequences

- set: unordered collection of unique elements  
e.g.  $\{1, 2, 3\}$ ,  $\mathbb{Z}$  (the integers),  $\{x|x \in \mathbb{Z}, x/2 \in \mathbb{Z}\}$  (even integers),  $\emptyset$  (the empty set)
- sequence: ordered collection of elements  
e.g.  $(1, 2, 2, 3)$ ,  $(2, 1, 2, 3)$ ,  $(1, 2, 3, \dots)$
- $\in$  (member of)
- $\forall$  (forall)
- $\exists$  (there exists)
- $\times$  (cross-product)
- $\sum$  (summation)
- $\prod$  (product)
- $\subseteq$  (subset of):  $A \subseteq B$  if  $\forall x \in A, x \in B$
- $|A|$  (cardinality):  $|A|$  is the number of elements in  $A$
- $\cup$  (union):  $A \cup B = \{x|x \in A \vee x \in B\}$
- $\cap$  (intersection):  $A \cap B = \{x|x \in A \wedge x \in B\}$
- $\bar{A}$  (complement): all elements not in  $A$
- $-$  (set removal):  $A - B = A \cap \bar{B}$
- disjoint:  $A, B$  disjoint if  $A \cap B = \emptyset$

## 3 Probability

- sample space ( $\Omega$ ): set of all possible outcomes
- random variable: function over random events
- complement ( $\bar{X} = \Omega - \{X\}$ ),  $\mathbb{P}(\bar{X}) = 1 - \mathbb{P}(X)$
- conditional probability:  $\mathbb{P}(A|B) = \frac{\mathbb{P}(A \cap B)}{\mathbb{P}(B)}$
- independence:  $A \perp B \iff \mathbb{P}(A|B) = \mathbb{P}(A) \iff \mathbb{P}(B|A) = \mathbb{P}(B) \iff \mathbb{P}(A \cap B) = \mathbb{P}(A) \mathbb{P}(B)$
- Bayes' Theorem:  $\mathbb{P}(B|A) = \frac{\mathbb{P}(A|B)\mathbb{P}(B)}{\mathbb{P}(A)}$
- Expectation:  $\mathbb{E}[X] = \sum_x x\mathbb{P}(x)$