

Review

- Probability
 - Random Variables
 - Joint and Marginal Distributions
 - Conditional Distribution
 - Product Rule, Chain Rule, Bayes' Rule
 - Inference
 - Independence

Random Variables

- A random variable is some aspect of the world about which we (may) have uncertainty
 - R = Is it raining?
 - D = How long will it take to drive to work?
 - L = Where am I?
- We denote random variables with capital letters
- Like variables in a CSP, random variables have domains
 - R in $\{\text{true}, \text{false}\}$ (sometimes write as $\{+r, \neg r\}$)
 - D in $[0, \infty)$
 - L in possible locations, maybe $\{(0,0), (0,1), \dots\}$

Probability Distributions

- Unobserved random variables have distributions

$P(T)$

T	P
warm	0.5
cold	0.5

$P(W)$

W	P
sun	0.6
rain	0.1
fog	0.3
meteor	0.0

- A distribution is a TABLE of probabilities of values
- A probability (lower case value) is a single number

$$P(W = \text{rain}) = 0.1$$

$$P(\text{rain}) = 0.1$$

- Must have: $\forall x P(x) \geq 0$ $\sum_x P(x) = 1$