COSC-223 Spring 2019 Midterm 1 Topics

This is a fairly complete list of topics we’ve covered so far in class. You (hopefully) have a lot more detail written in your notes than what appears on this page, and you are responsible for all of the course material up to this point.

- Probability on events
  - Definitions: experiment, outcome, sample space, event
  - Set operations: union, intersection, complement
  - Definitions: mutual exclusivity, partitioning
  - Three probability axioms
  - Conditional probability, chain rule for conditioning
  - Independence (2 definitions)
  - Mutual vs. pairwise independence of more than two events
  - Conditional independence
  - Law of Total Probability, Law of Total Probability for conditional probability
  - Bayes Law

- Discrete Random Variables
  - Definition: random variable (discrete vs. continuous)
  - Definition: probability mass function, cumulative distribution function
  - Examples of discrete distributions: Bernoulli(\(p\)), Binomial(\(n, p\)), Geometric(\(p\))
  - Joint pmf
  - Independence of RVs
  - Conditioning, law of total probability applied to RVs
  - Definition: expected value
  - Linearity of expectation
  - Conditional pmf, conditional expectation
  - Variance, three properties of variance

- CS Applications
  - Caching
  - Important performance metrics
  - Direct mapped vs. fully associative
  - Cache replacement policies: Random, LRU, LFU, FIFO