CS 4700
Fall 2019
Homework 1

Due: Monday, September 16, 2:40pm
Late: Wednesday, September 18, 2:40pm (50% off)

1. Consider a tree where every node at an even level has *a* descendants and every node at an odd level has *b* descendants (where *a* and *b* are positive integers). Treat the root node as being at level 0, so that it has *a* descendants. The tree has *k* levels total, where *k* is an even number.
    a. How many nodes are at even level $2n \leq k$?
    b. How many nodes are in the full tree?
    c. What is the runtime of a preorder traversal of the tree? Use big-O notation.

2. Give two different sets of truth values to propositional symbols P, Q, R, and S that make the following sentence in propositional logic be True: $(P \wedge Q) \Rightarrow (R \wedge S)$.

3. Imagine you have a bag containing 100 balls of which 20 are red and 80 are green. 90% of the red balls have a stripe and 10% are without a stripe, whereas 70% of the green balls are striped and 30% are without a stripe. If you pull out one ball and it has a stripe what is the probability that it is red?