Homework 2
CS 3330 : Algorithms (Summer 2018)
Due in class on Wed, June 27

Instructions:

• Collaboration is permitted, but you must write the solutions by yourself without assistance, and be ready to explain them orally to a member of the course staff if asked. You must also identify your collaborators. Getting solutions from outside sources such as the Web or students not enrolled in the class is strictly forbidden.

• For problems that require you to provide an algorithm, you must give a precise description of the algorithm, together with a proof of correctness and an analysis of its running time. You may use algorithms from class as subroutines. You may also use any facts that we proved in class.

• Check the late policy from course Web page.

1. (Encoding a Song) Chapter 2, problem 7.

2. (Independent Set) You are given an n-vertex graph $G = (V, E)$ with the property that it consists of a bunch of connected components, each of which has size $O(\log n)$. Design an algorithm for the maximum independent set problem with this input, running in polynomial time.


4. (Number of Shortest Paths) Chapter 3, problem 10.

5. (Spread of an Online Virus) Chapter 3, problem 11.

6. (Number of Topological Orderings) Chapter 3, problem 1.