CS 5633: Analysis of Algorithms

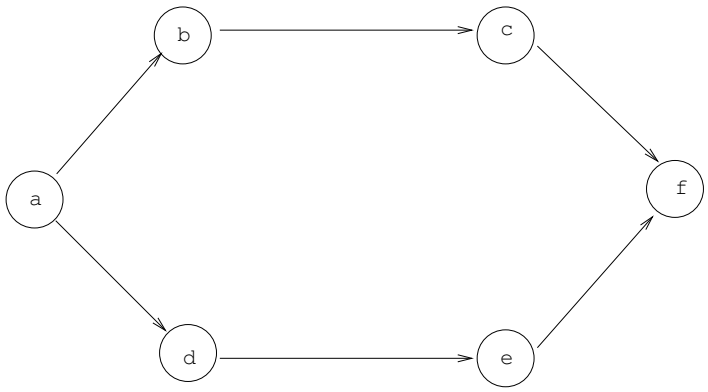
Homework 8

1. Consider a sequence of n operations on a data structure in which the cost c_i of the ith operation is defined as $c_i = i^2$ if i is a power of 2 and $c_i = 1$ otherwise.

   (a) Use aggregate analysis to get an upper bound on the cost of the n operations.

   (b) Use the accounting method to get an upper bound on the amortized cost of a single operation.

2. How many valid topological sorts are there for this DAG?



3. Give an algorithm which determines whether or not an undirected graph contains a cycle. The algorithm should run in $O(n + m)$ time.