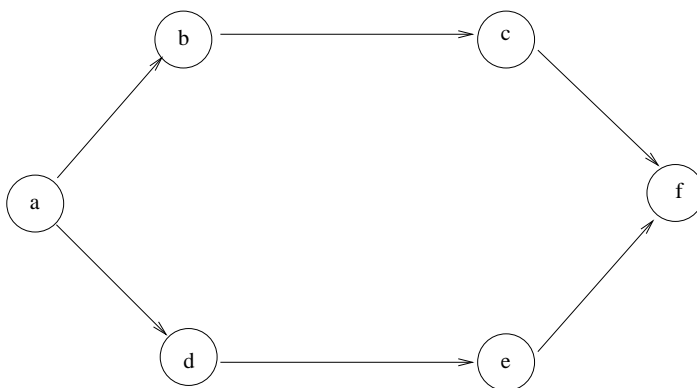


# CS 5633: Analysis of Algorithms

## Homework 8

Please turn in a hard copy in class on 3/31.

1. Consider a sequence of  $n$  operations on a data structure in which the cost  $c_i$  of the  $i$ th 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.