Data Structures and Algorithms Homework 4

Due Wednesday Sept 25; Joseph Sepich (jps6444)

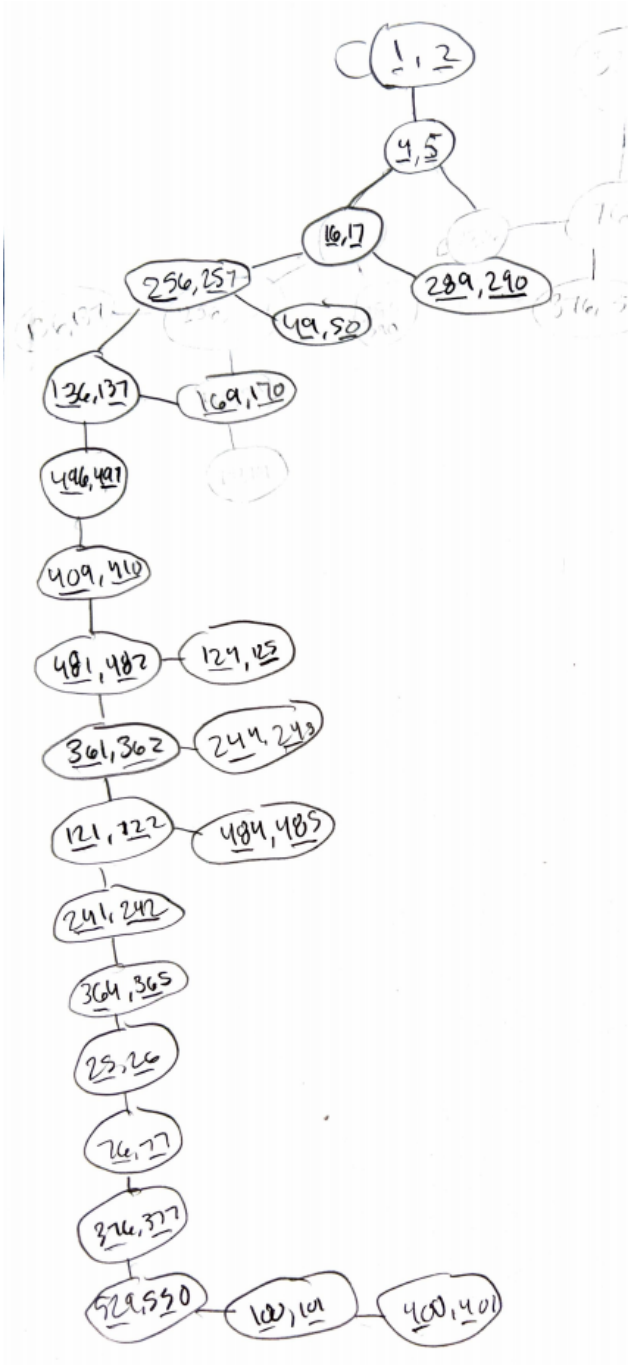
1 Problem 1 Pre and Post Processing

1.1 Part 1a

1.2 Part 1b

2 Problem 2 Funny Money

To find a combination to obtain a 10$ bill, we can create a DFS tree. Since there are only two options, connected to each node, it the tree is a binary tree. Leaves occur when both choice nodes already appeared as an ancestor to that node. We want a node that gives us [10, 11], since that means we currently can get a 10 dollar bill. An example of the tree can be found below.



According to this DFS tree I made of the possible options, there is no way to obtain a $10 bill through the printing machine starting with a 1 dollar bill.

3 Problem 3 Topological Ordering

3.1 Part 3a

- A - [1, 14]
- B - [15, 16]
- C - [2, 13]
- D - [3, 10]
- E - [11, 12]
- F - [4, 9]
- G - [5, 6]
- H - [7, 8]

3.2 Part 3b

The sources of the DAG are A and B. The sinks of the DAG are G and H.

3.3 Part 3c

1. B
2. A
3. C
4. E
5. D
6. F
7. H
8. G

3.4 Part 3d

4 Problem 4 One-Way Streets

4.1 Part 4a

4.2 Part 4b

5 Problem 5 City Hopping

5.1 Part 5a

5.2 Part 5b