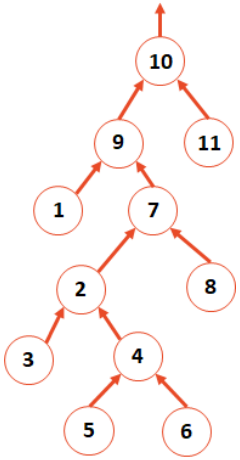
CS 225

#33: Introduction to Graphs

November 13, 2017 · *Wade Fagen-Ulmschneider*

UpTree + Path Compression:



UpTree Implementation

DisjointSets.cpp (partial)

```
1  int DisjointSets::find(int i) {
2    if ( arr_[i] < 0 ) { return i; }
3    else { return                find( arr_[i] ); }
4  }
```

DisjointSets.cpp (partial)

```
1  void DisjointSets::unionBySize(int root1, int root2) {
2    int newSize = arr_[root1] + arr_[root2];
3
4    // If arr_[root1] is less than (more negative), it is the larger
5    // set; we union the smaller set, root2, with root1.
6    if ( arr_[root1] < arr_[root2] ) {
7      arr_[root2] = root1;
8      arr_[root1] = newSize;
9    }
10
11   // Otherwise, do the opposite:
12   else {
13     arr_[root1] = root2;
14     arr_[root2] = newSize;
15   }
16 }
```

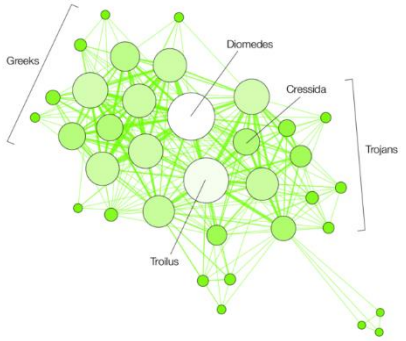
A Review of Data Structures

Array
- Sorted Array
- Unsorted Array
  - Stacks
  - Queues
  - Hashing
  - Heaps
    - Priority Queues
  - UpTrees
    - Disjoint Sets

List
- Doubly Linked List
- Skip List
- Trees
  - BTree
  - Binary Tree
    - Huffman Encoding
    - kd-Tree
    - AVL Tree

An Introduction to Graphs

HAMLET



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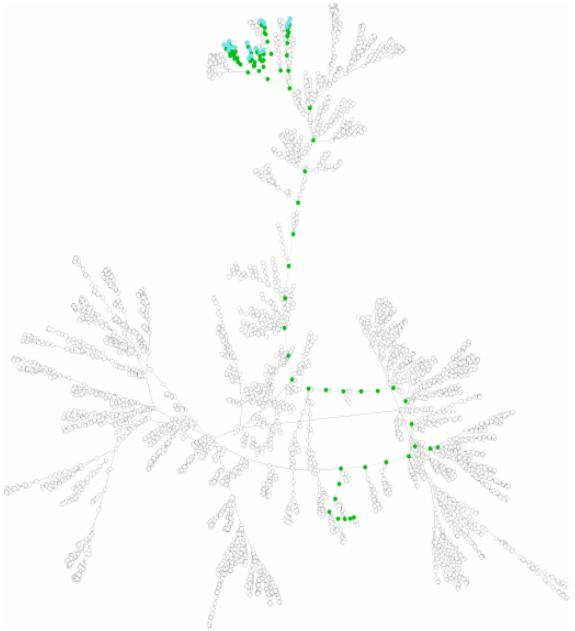

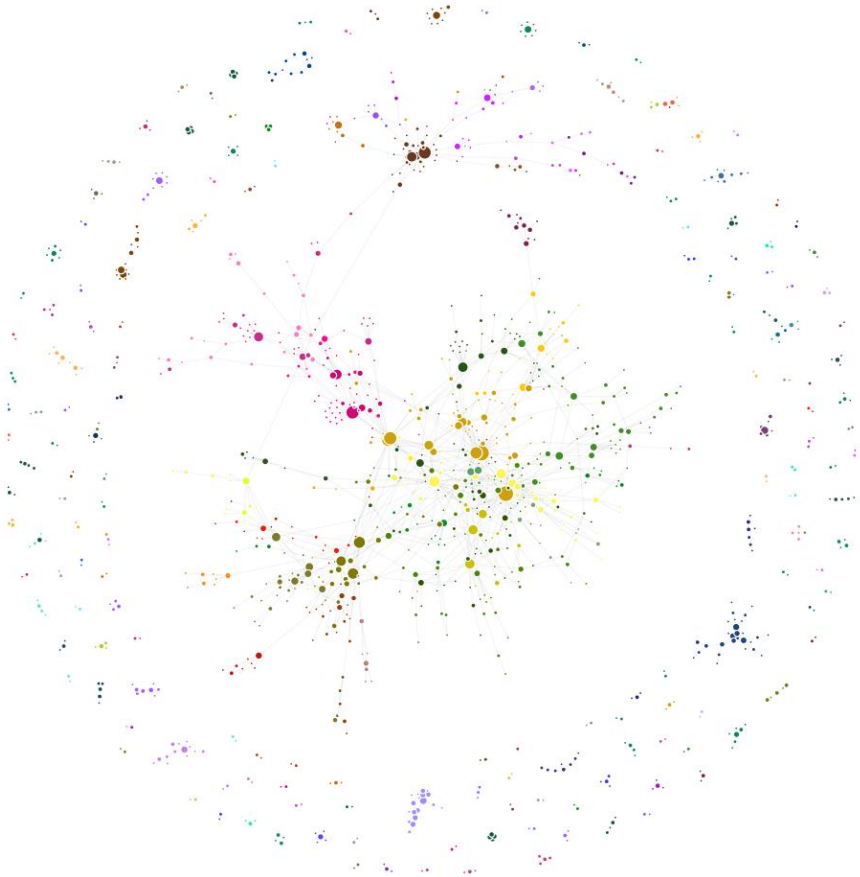

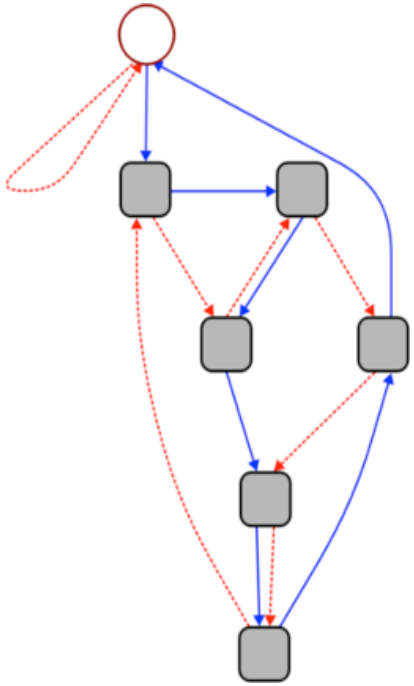

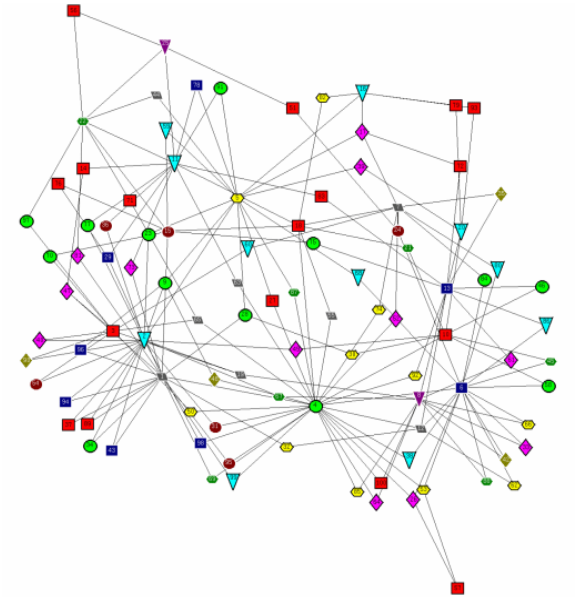

CS 225 – Things To Be Doing:

1. Exam #10 (programming) is ongoing
2. MP6 due Friday, Nov. 17 (Friday before break starts)
3. lab_dict released Wednesday; due Wed. Nov. 29 @ 7pm
4. Daily POTDs