




## Graphs II



## Announcements

- Wednesday
  - Huffman
- Friday
  - APT set 7
  - Extra credit
- All assignments **MUST** be submitted by 5:00pm on Friday



## Announcements

- Wednesday
  - Yes, we have class
- Friday
  - No, we do not have recitation
  - Use this time to study
- Tuesday, Dec 10
  - Final
    - 2:00 – 5:00pm



## Today

- Graphs!
  - Examples
  - DFS
  - BFS
  - Dijkstra's Algorithm

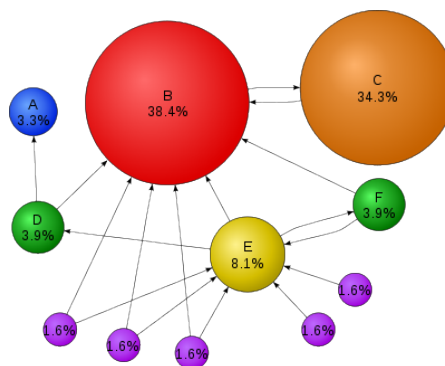
# Facebook

- Graph Search
  - <https://www.facebook.com/about/graphsearch>



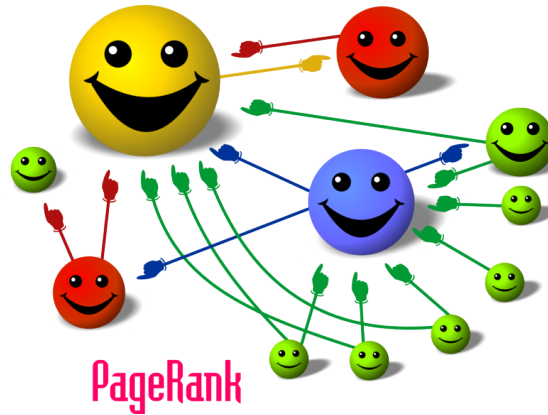
# PageRank

- Google web search algorithm for measuring importance



## PageRank

- Google web search algorithm for measuring importance
  - Named for inventor Larry Page

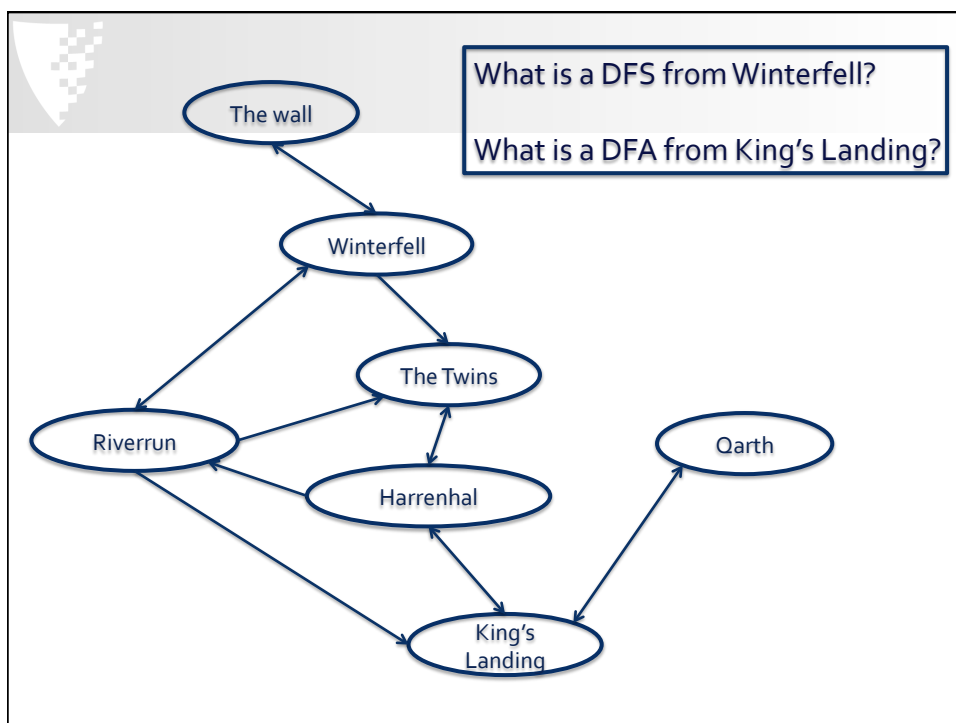


## Today

- Graphs!
  - Examples
  - DFS
  - BFS
  - Dijkstra's Algorithm

## DFS

```
1  private void dfs(String vertex,  
    Set<String> visited){  
  
2      if(visited.contains(vertex)) return;  
3  
4      visited.add(vertex);  
5  
6      System.out.print(vertex + " ");  
7  
8      for(String adj: myGraph.get(vertex)){  
9          dfs(adj, visited);  
10     }  
11 }
```

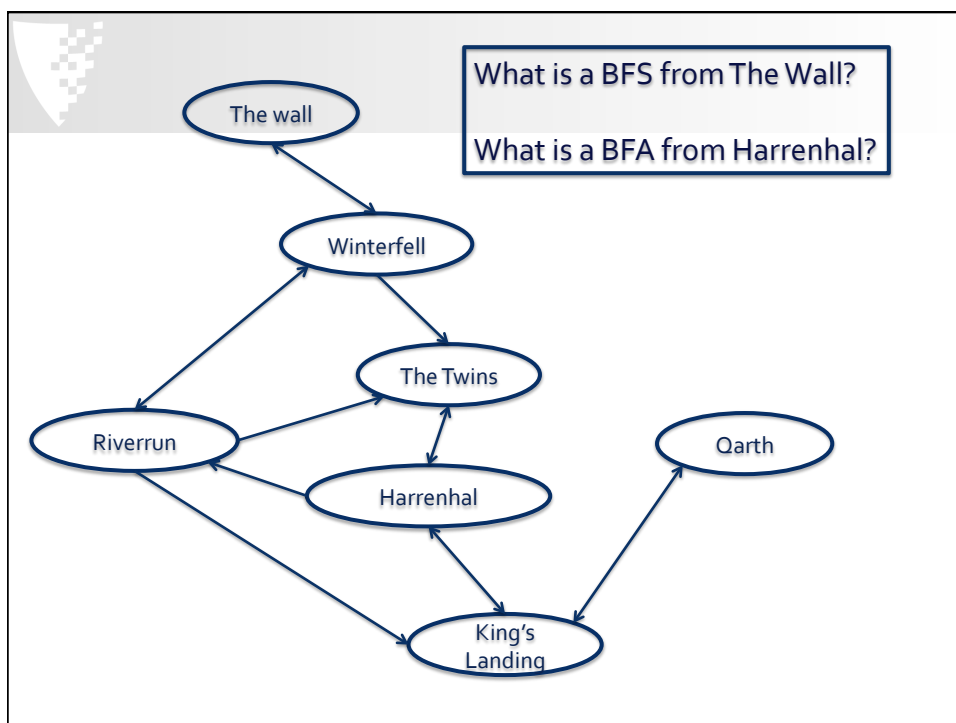


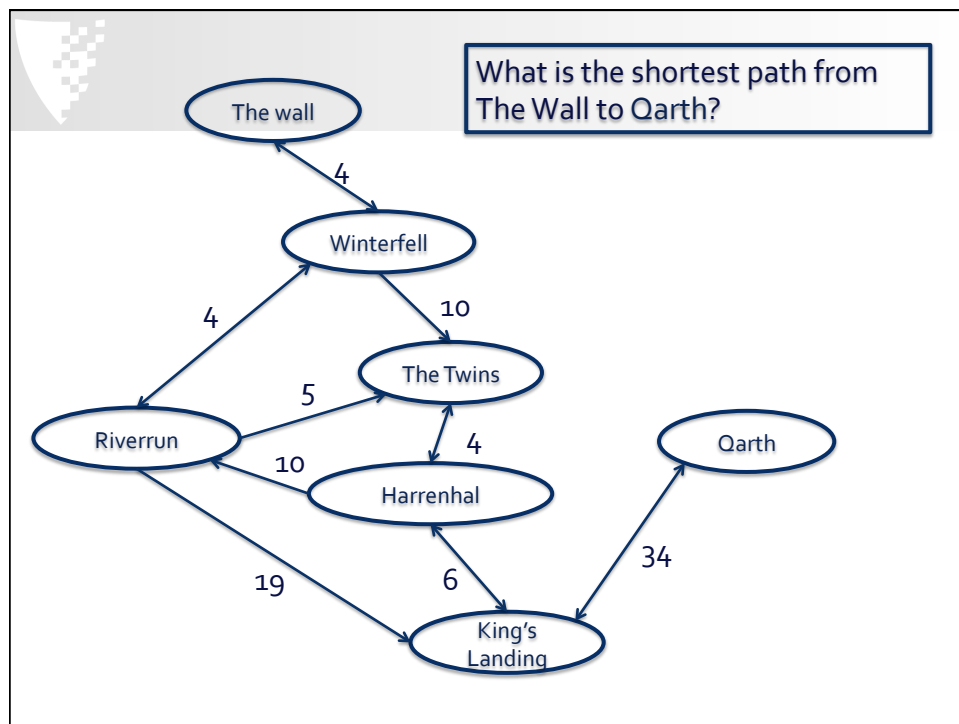
## BFS

```

1 private void bfs(String vertex, Queue<String> q){
2     Set<String> visited = new
    TreeSet<String>();
3     q.add(vertex);
4     visited.add(vertex);
5
6     while(!q.isEmpty()){
7         String v = q.remove();
8         System.out.print(v + " ");
9         for(String adj: myGraph.get(v)){
10             if(!visited.contains(adj)){
11                 q.add(adj);
12                 visited.add(adj);
13             }
14         }
15     }
16 }

```

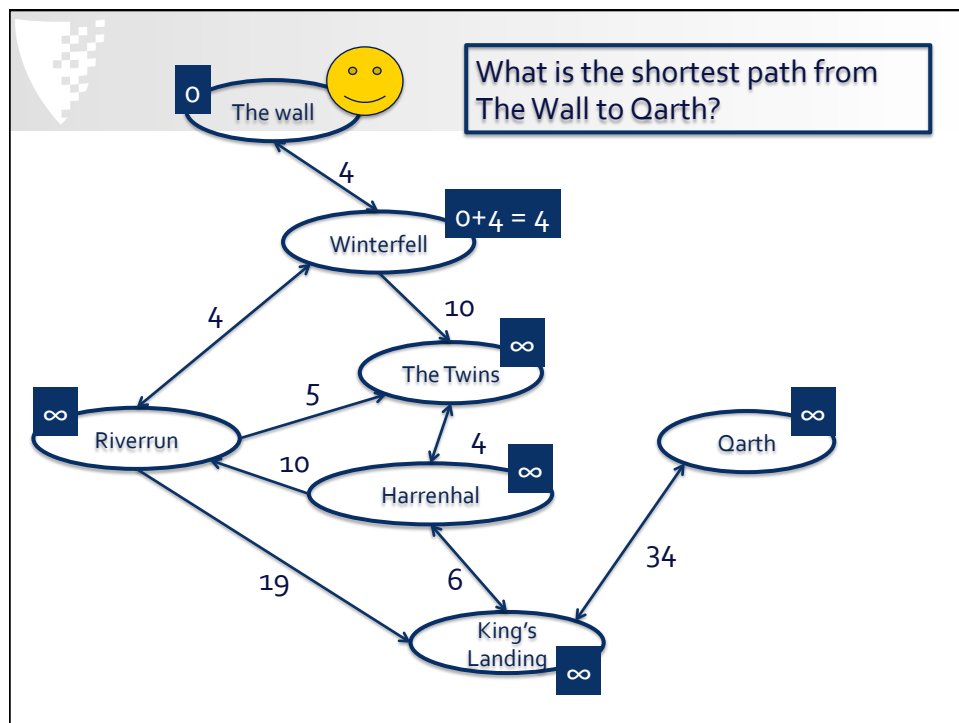
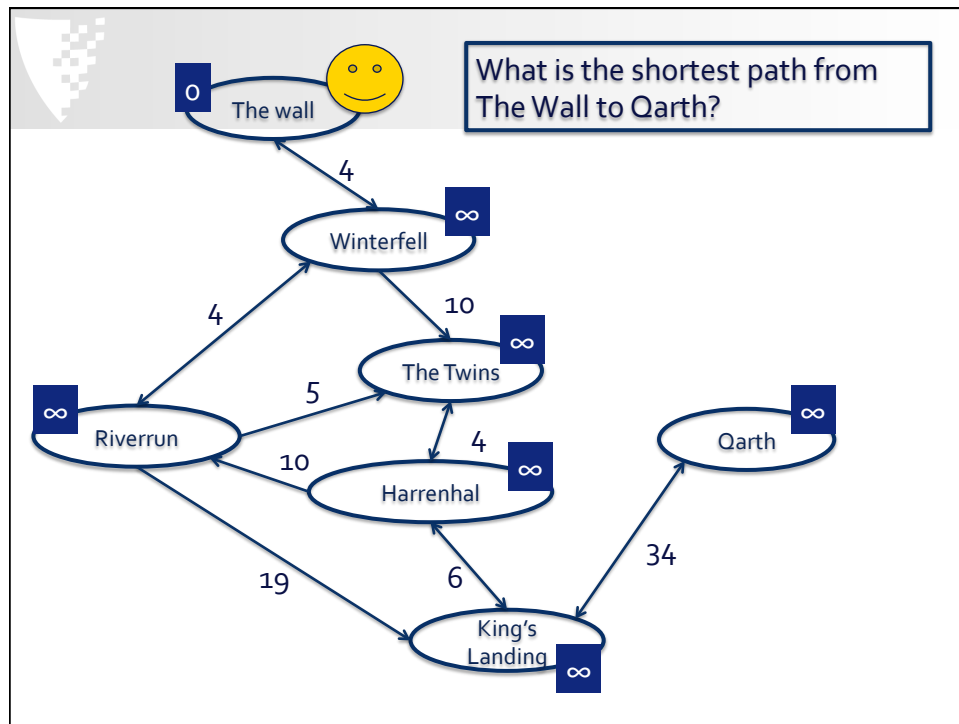




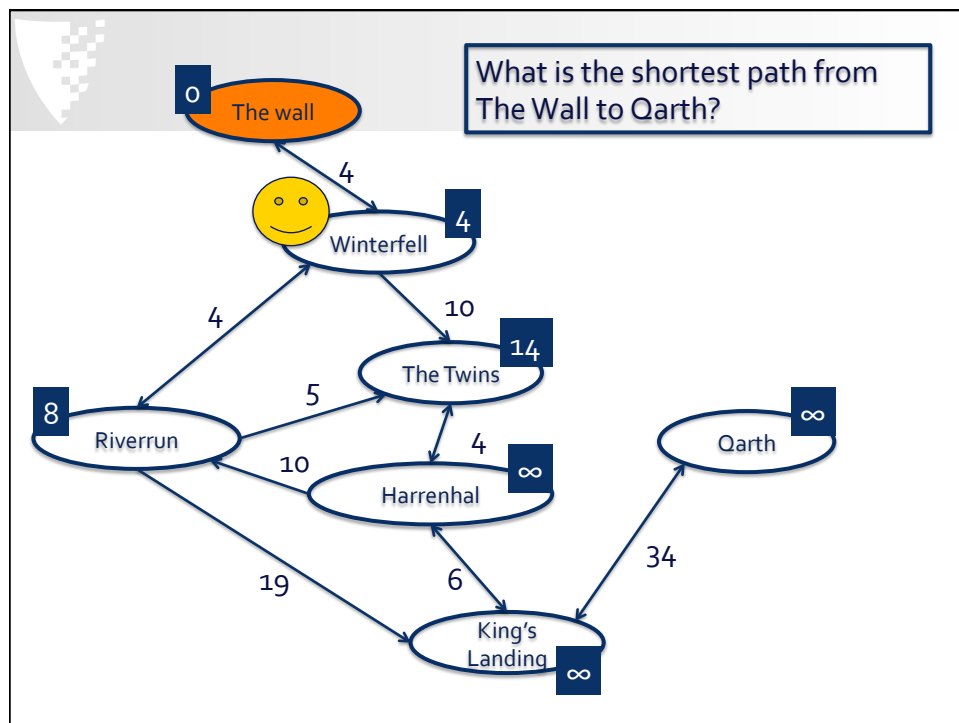
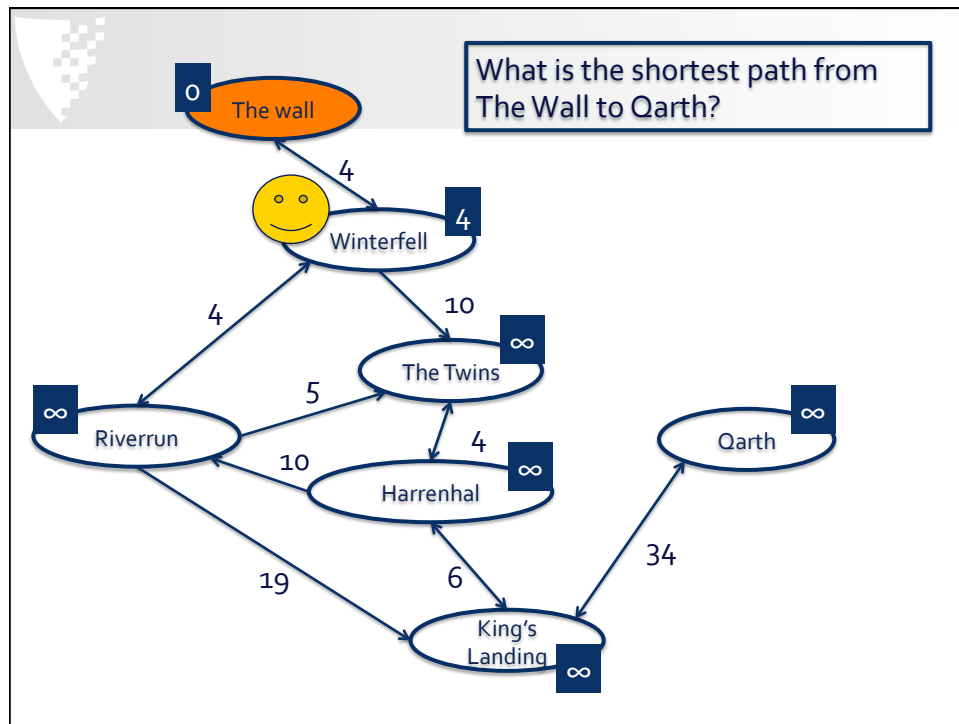
## Dijkstra's Algorithm

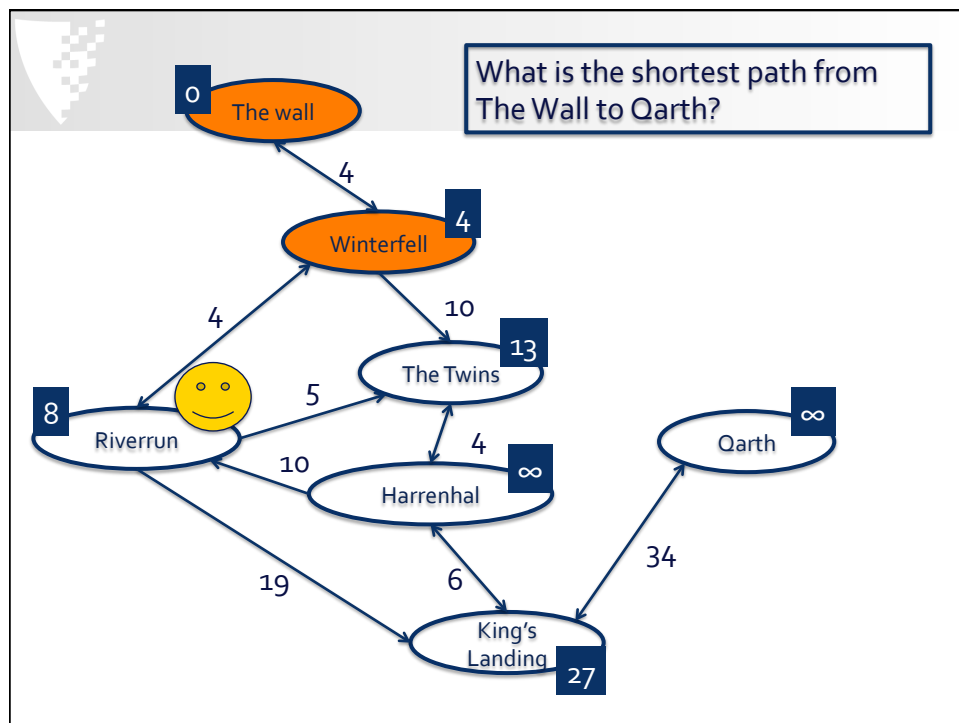
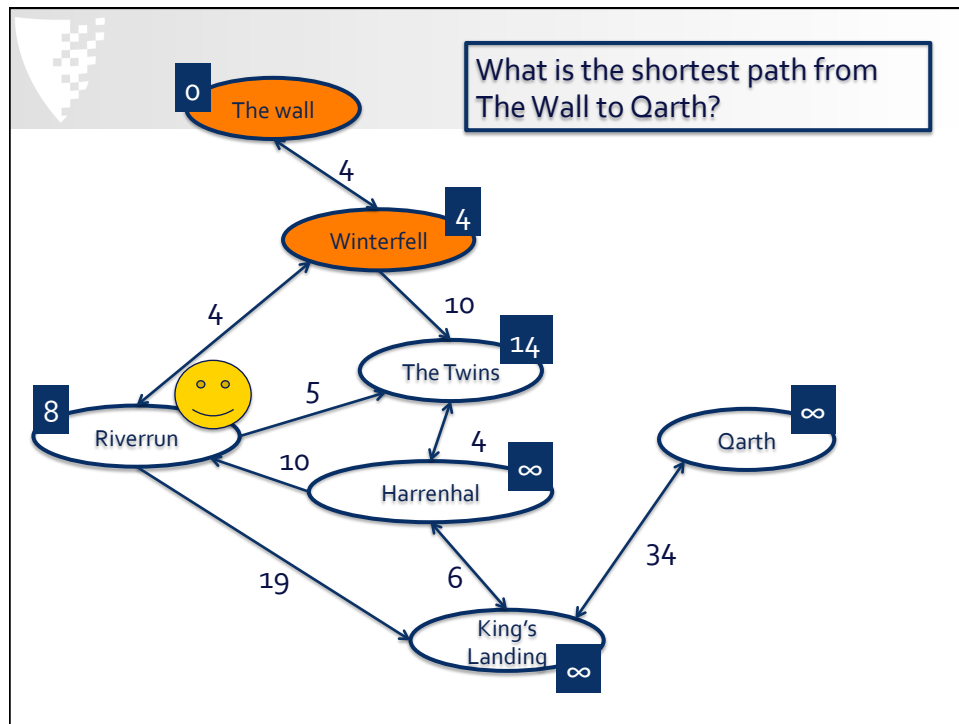
- Solve shortest-path problem from A to B for non-negative path weights.

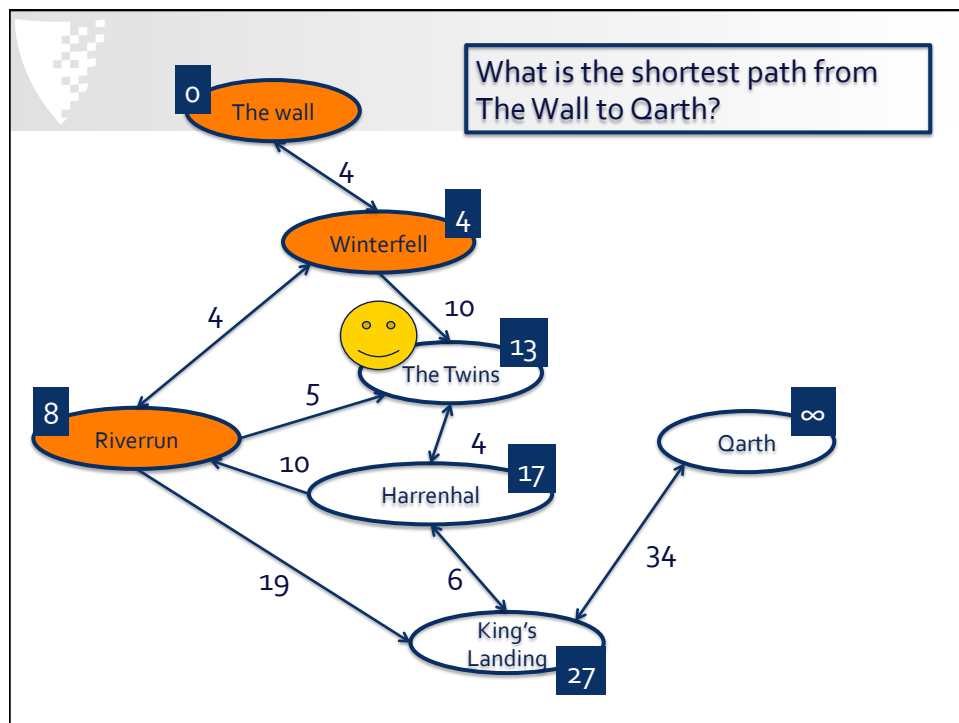
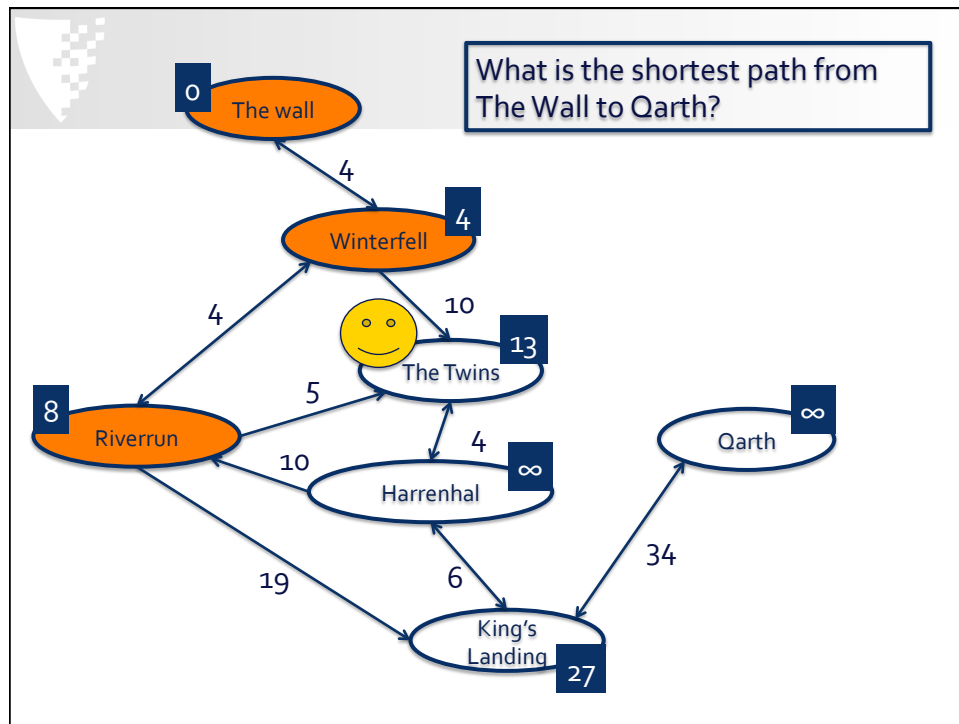


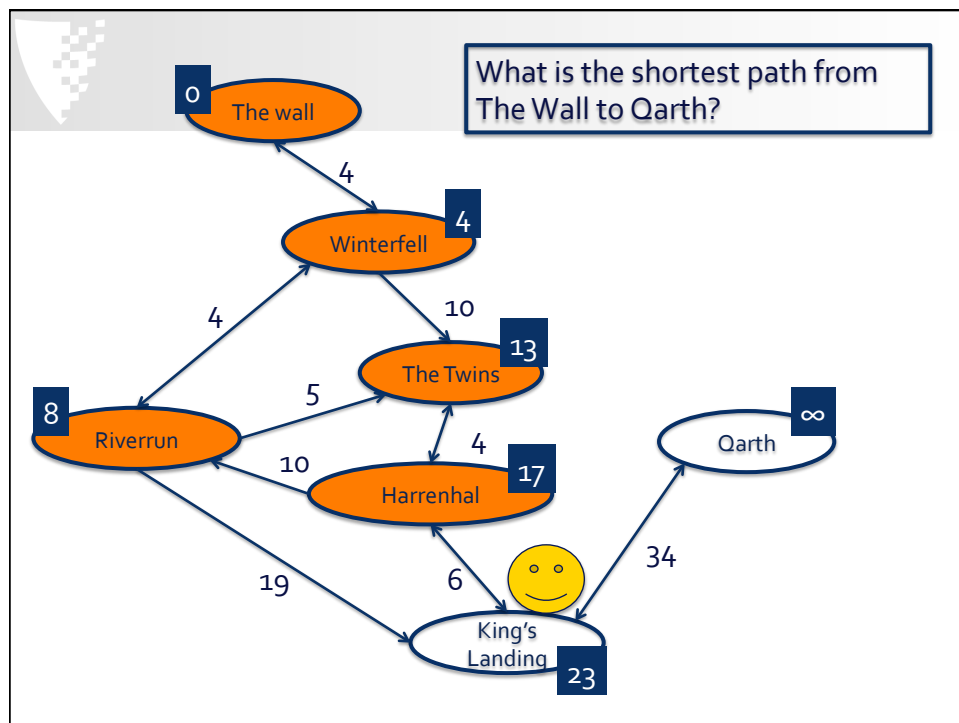
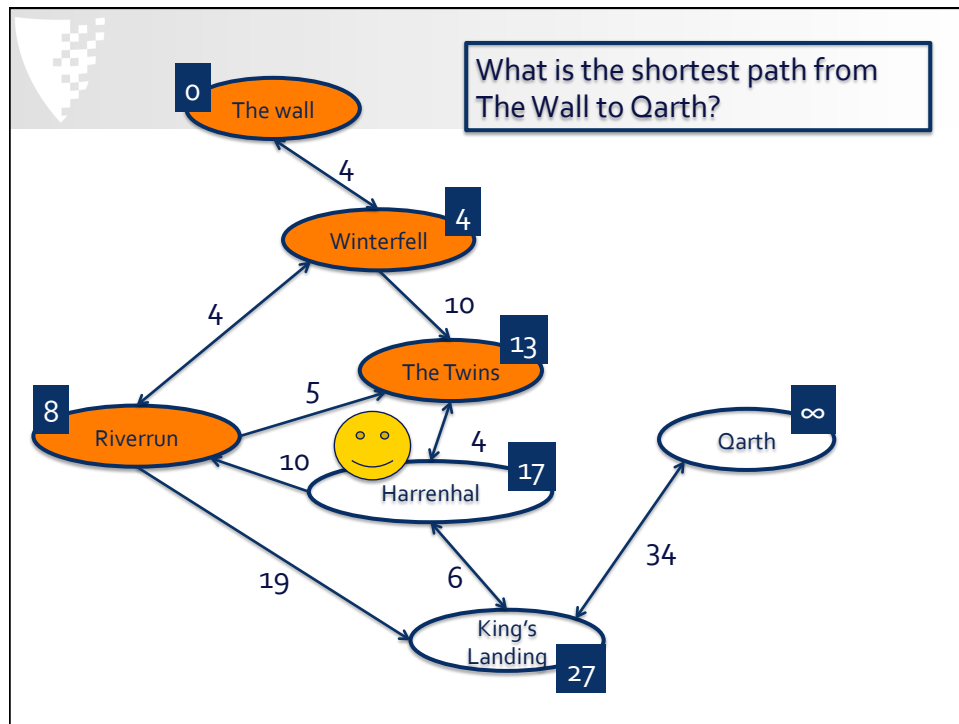


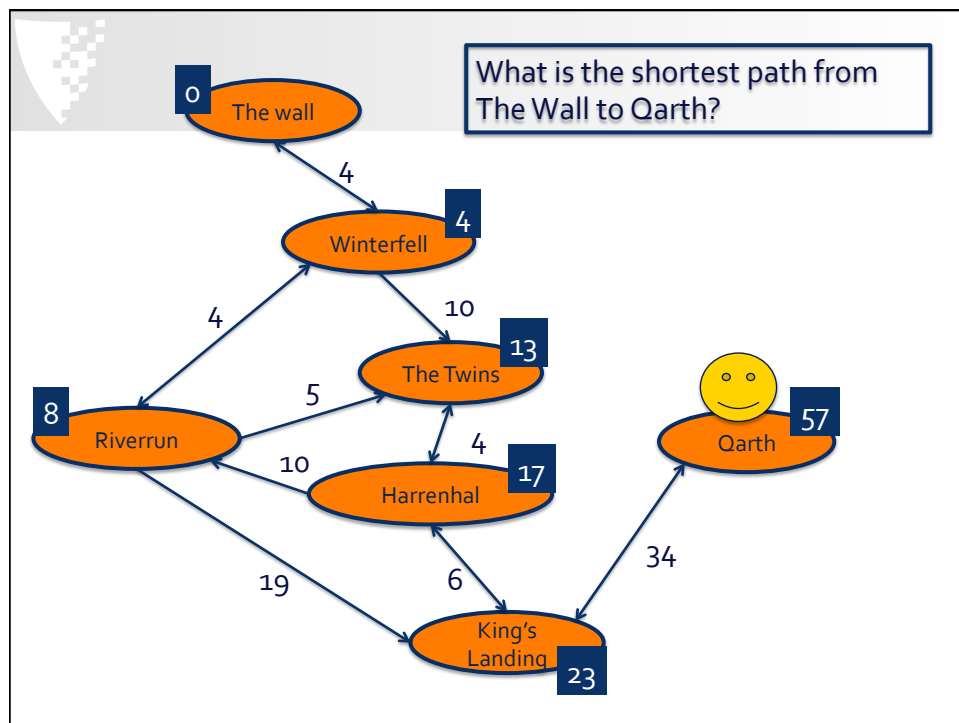
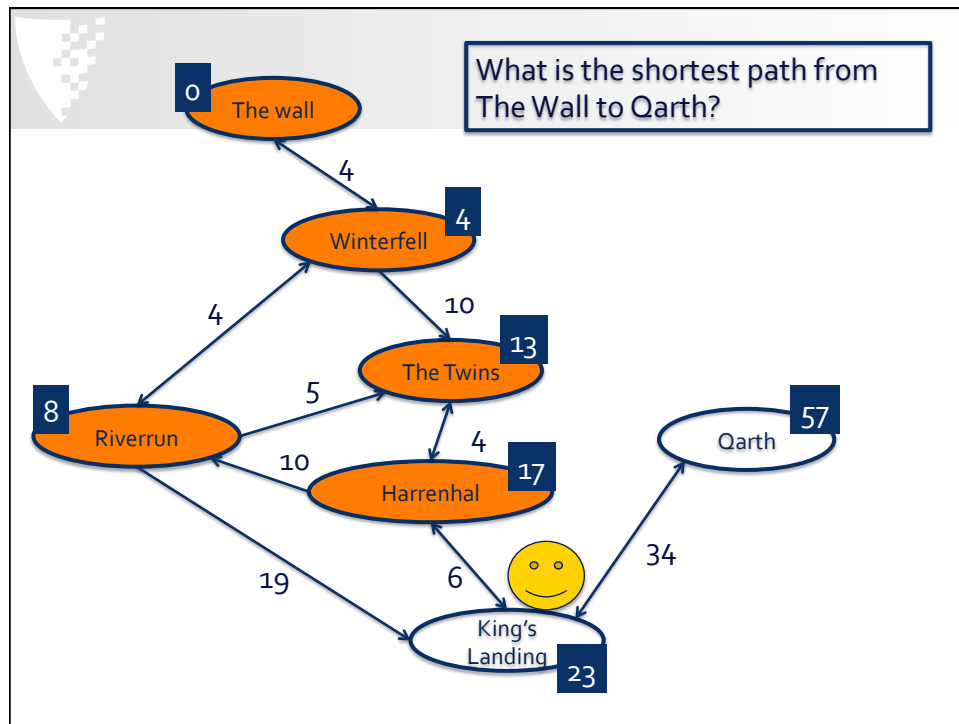


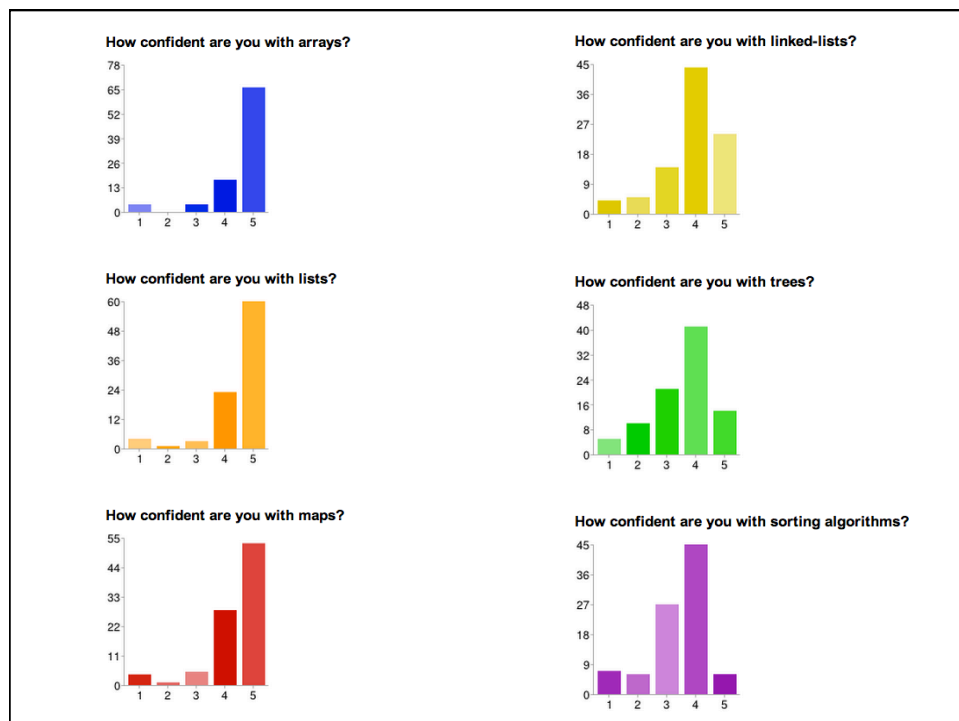
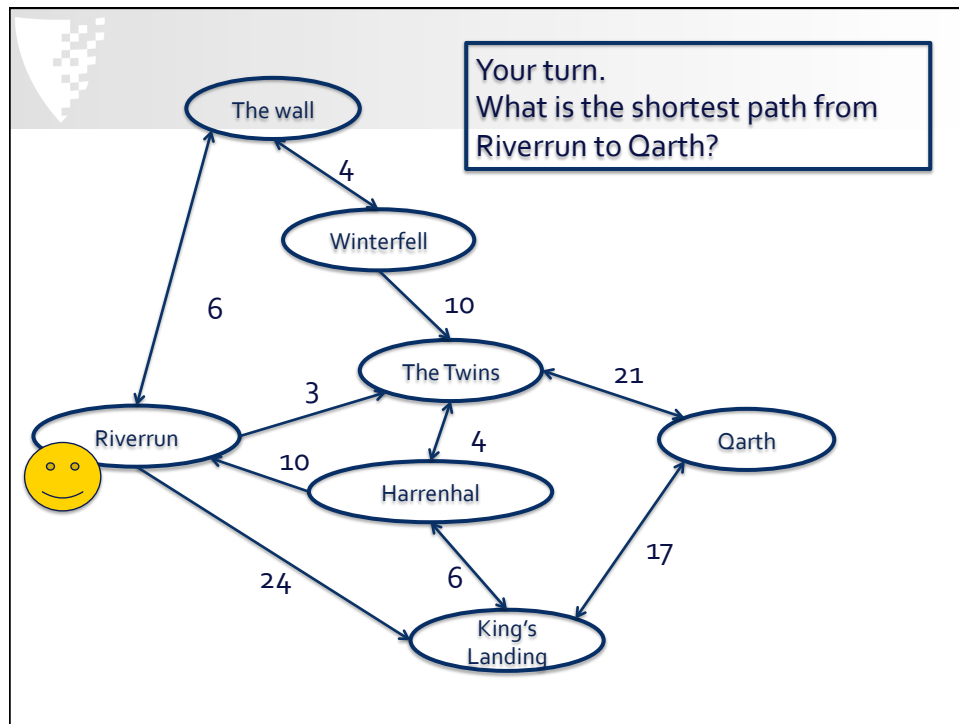


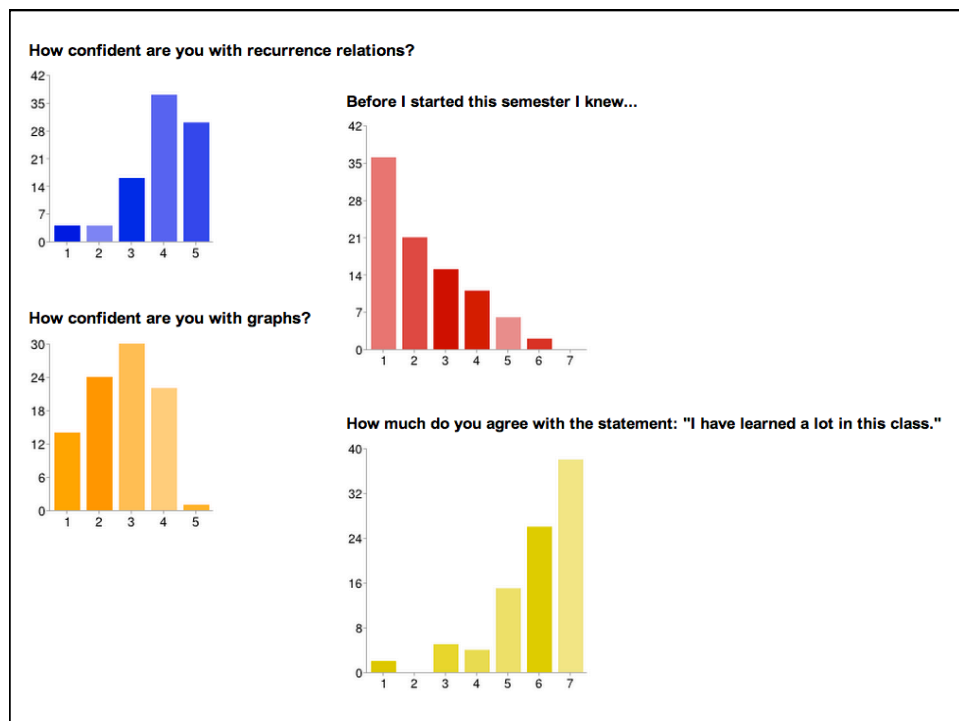
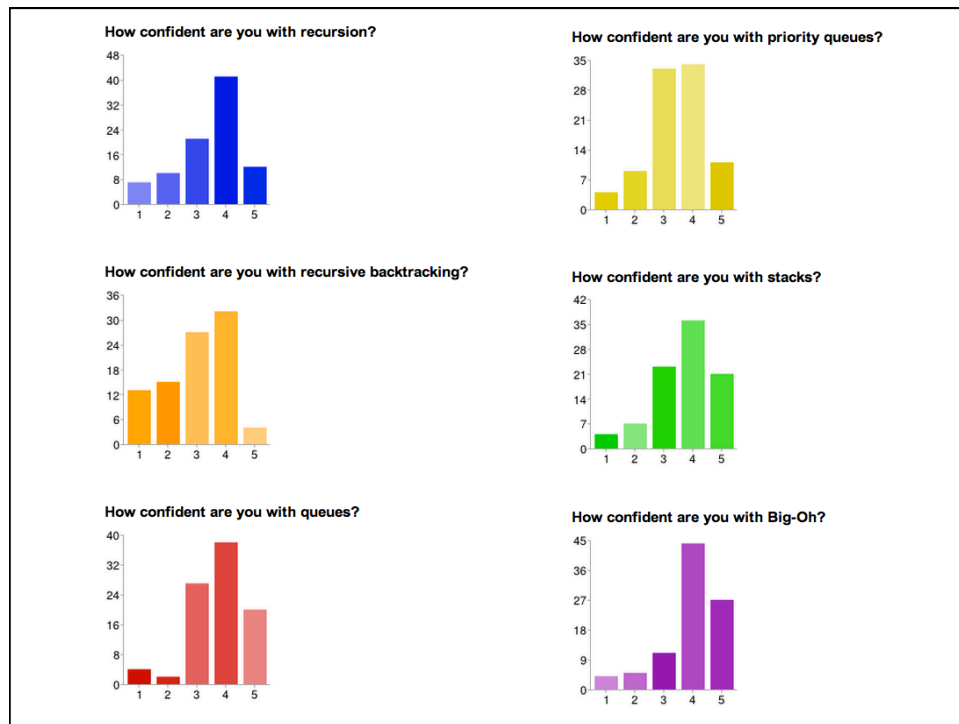
















**Letters to the editor: go to statement considered harmful**

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