1. [3pts] Give an adjacency-list representation for a complete binary tree on 7 vertices. Give an equivalent adjacency-matrix representation. Assume that vertices are numbered from 1 to 7 as in a binary min heap.

2. [3pts] The transpose of a directed graph $G=(V,E)$ is the graph $G^T=(V,E^T)$, where $G^T$ is $G$ with all its edges reversed. Describe efficient algorithm for computing $G^T$ from $G$ for adjacency-matrix representations of $G$. Analyze the running time of your algorithm.

3. [3pts] Show the $d$ and $\pi$ values that result from running breadth-first search on the following undirected graph, using vertex U as the source.

4. [3pts] Show how depth-first search works on the following graph. Assume that the for loop of lines 6-10 of the DFS procedure considers the vertices in alphabetical order, and assume that each adjacency list is ordered alphabetically. Show the discovery and finishing times for each vertex, and show the classification of each edge.
5. write a nonrecursive algorithm for generating $2^n$ bit strings of length $n$ that implements bit strings as arrays and does not use binary additions.

6. Turn in instructions. Turn in soft copy of 5 through turnin system, and hard copy for 1-4 to my mailbox or office. If you have soft copy for 1-5, you can also turn all of them to turnin system.