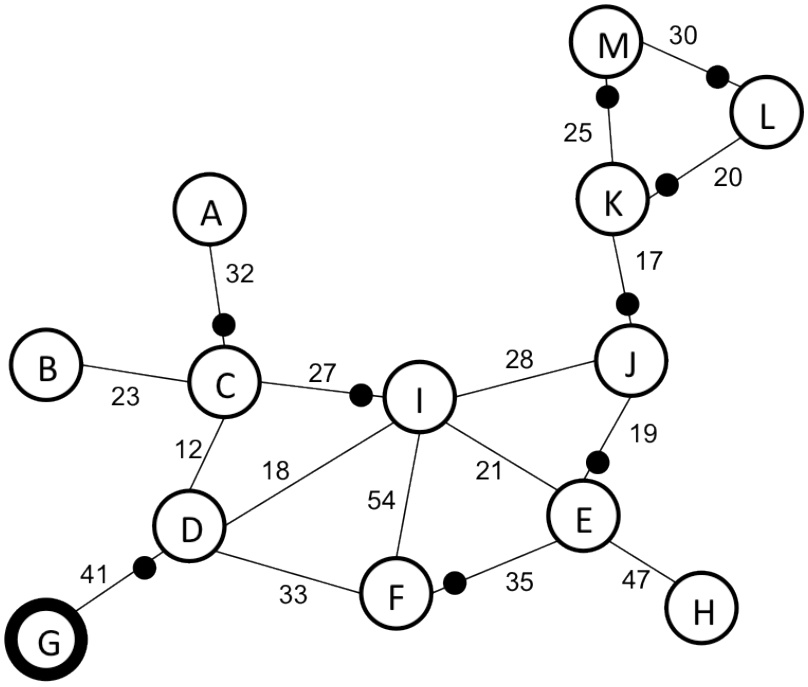
## CS 3600 – Introduction to AI

## Practice Search Problem

Consider the search space diagrammed below. Action costs are given next to each arc. Use "E" as the initial state and "G" as the goal state. The successor function for a node starts with the arc with the black dot next to it first, and the generates successors in a counter-clockwise fashion. For example, Successors(E) = {J, I, F, H} and Successors(J) = {K, I, E}.




1. What order will nodes be visited using the **breadth-first** algorithm? Ignore action costs. Give the open list and closed list after each iteration. List the visit order and the final solution.

2. What order will nodes be visited using the **depth-first** algorithm? Ignore action costs. Give the open list and closed list after each iteration. List the visit order and the final solution.

3. What order will nodes be visited using the **uniform cost search** algorithm? Give the open list and closed list after each iteration. List the visit order and the final solution.

4. What order will nodes be visited using the best-first algorithm? Use the heuristic function given below. Give the open list and closed list after each iteration. List the visit order and the final solution.

| | | | |
|---|---|---|---|
| h(A) = 65 | h(D) = 41 | h(H) = 100 | h(K) = 50 |
| h(B) = 25 | h(E) = 85 | h(I) = 55 | h(L) = 100 |
| h(C) = 50 | h(F) = 30 | h(J) = 110 | h(M) = 95 |