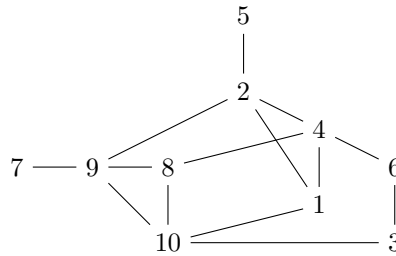# CSCB63 Tutorial 5 — Review of Basic Graph Search Algorithms

1 Adjacency list representation

In CSCA48 you saw that we can represent a graph with an adjacency list. Let's review how this is done. Use the adjacency list below to draw a corresponding graph.
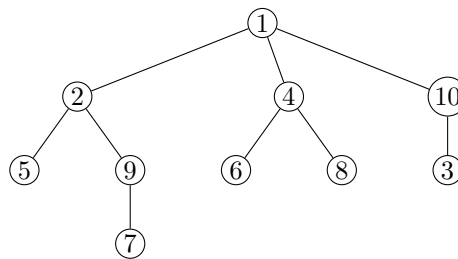
|	
1	2, 4, 10
2	1, 4, 5, 9
3	6, 10
4	1, 2, 6, 8
5	2
6	3, 4
7	9
8	4, 9, 10
9	2, 7, 8, 10
10	1, 3, 8, 9

2 Breadth-First Search

Show the progress of breadth-first search starting with node ①. Try to use the adjacency lists, not the picture. Follow the order of each adjacency list, e.g., ①'s adjacency list is $[2, 4, 10]$, so enqueue ②, then ④, then ⑩, in that order. Build a picture of the breadth-first tree as you go.

visit	enqueue
1	2, 4, 10
2	5, 9
4	6, 8
10	3
5	
9	7
6	
8	
3	
7	

Suppose now the adjacency list of 1 is $[10, 2, 4]$ instead of $[2, 4, 10]$. Show the new progress of breadth-first search, starting with node ①, building the search tree as you go:
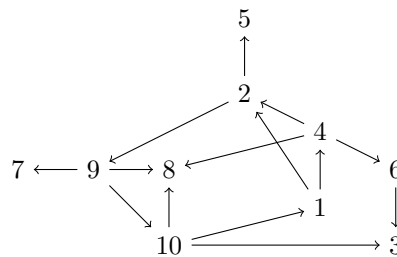
visit	enqueue
1	10, 2, 4
10	3, 8, 9
2	5
4	6
3	
8	
9	7
5	
6	
7	
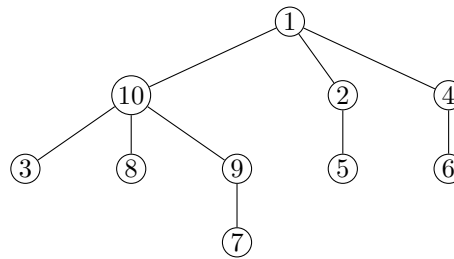
3 Depth-First Search

Let's change our graph a bit: it is now directed, so effectively some edges have been removed. Show the progress of depth-first search starting with node ①. Again, try to use the adjacency lists, not the picture.

1	2, 4
2	5, 9
3	
4	2, 6, 8
5	
6	3
7	
8	
9	7, 8, 10
10	1, 3, 8

visit	push
1	2, 4
2	5, 9
5	
9	7, 8, 10
7	
8	
10	3
3	
4	6
6	