

## CSCI B505 – Fall 2018

**Programming Assignment 6:** Due online Dec 7 (FRI), 2018, 11:59pm EST.

### What to do:

1. Look up the definition of an undirected bipartite graph. For this homework you will test if a graph whose edges are given to you in a file is bipartite.

$G = (V, E)$  is an undirected graph on  $n$  vertices. The edges will be given in a file; an example of how this file might look is below – the first line is  $n$ , everything else is the edges separated by spaces or CR (carriage return) characters:

```
20
(2,3) (4,1) (20,1) (3,7) (8,5) (1,4) (19,34)
(18,6) (1,3) (16,8)
```

2. Your code should first read the file into an adjacency list data structure of your own construction and then use graph search (**use stack or queue explicitly**) to determine if  $G$  is bipartite. If  $G$  is bipartite, you should return the two lists of vertices comprising the two partitions.
3. When performing step 2, you should write your own code for DFS or BFS. You can use existing libraries for stacks or queues.

**Discussion:** You should explain how you test for bipartiteness, and analyze asymptotic running time. We will give you a few files for testing if your graphs are bipartite.

### What to submit:

1. Your source code
2. A PDF file (encouraged) for your discussion

### Reminders:

- Consult Module 8 for topics such as adjacency lists, DFS, BFS
- Ask questions on Piazza
- Keep an eye out for Piazza/Canvas announcements
- **Start early**