

CS211FZ ALGORITHMS & DATA STRUCTURES II

LAB 7: Graphs

Objectives

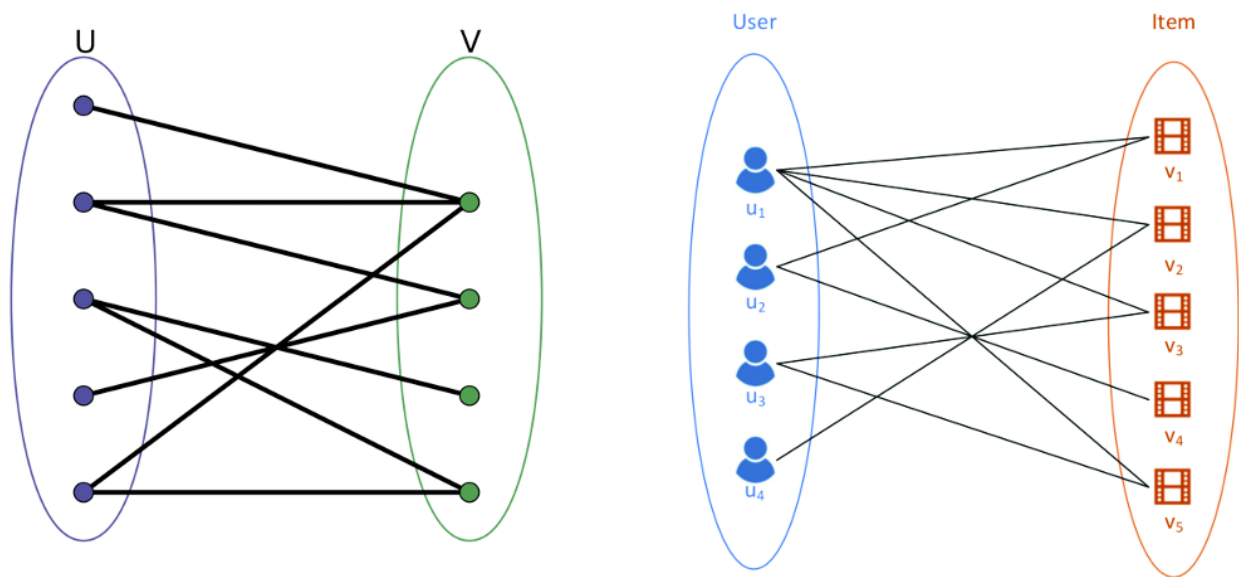
- Use an adjacency matrix for a graph representation.
- Learn Bipartite graphs.
- Reflect on the knowledge learned in the class.

NOTE:

- Do NOT use "package" in your source code.
- You must submit the source code files, i.e., the ".java" files.
- You can use course reference books or class notes during the lab.
- Sharing/copying your work is NOT permitted.

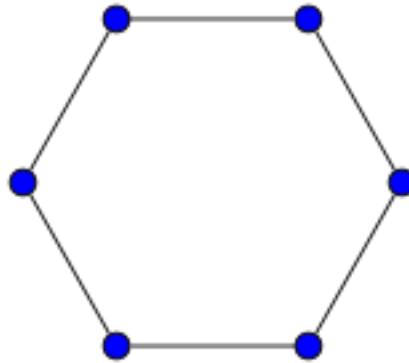
Background information

Bi-partite graphs: a bipartite graph is a graph whose vertices can be divided into two disjoint and independent sets, U and V . Every edge connects a vertex in U to one in V .



Pen and Paper Exercise

Check if the given graph is bipartite. We do not always have the sets of U and V in advance.



Task: Programming Exercise

Problem statement

Design, implement, and analyze an efficient program for determining if an undirected graph G is bipartite (without knowing the sets U and V in advance).

Input Format

Use the following driver program to test your code.

```
public static void main (String[] args)
{
    int G[][] = {{0, 1, 0, 1},
                 {1, 0, 1, 0},
                 {0, 1, 0, 1},
                 {1, 0, 1, 0}};
    Bipartite b = new Bipartite();
    if (b.isBipartite(G))
        System.out.println("Yes");
    else
        System.out.println("No");
}
```