

CS 367 - Introduction to Data Structures

Thursday, April 7, 2016

Midterm Exam 2

- Tuesday, April 12, 5:00 pm – 7:00 pm
- Lec 1: room 272 of [Bascom Hall](#)
- Lec 2: room 1351 of [Chemistry Building](#)
- Lec 3: room 6210 of [Social Sciences Building](#)
- UW ID required
- See posted exam information
- exam makeup emails sent
- GET A GOOD NIGHT'S REST MONDAY NIGHT!

Homework 8 due 10 pm tomorrow, April 8th

Program 4 due 10 pm Sunday, April 17th

Last Time

- Red-Black Trees
- insert

Today

- ADTs/Data Structures Revisited (from last time)
- Graphs
- terminology
 - implementation
 - edge representations

Next Time

- Exam mechanics
- Sample questions solution

Graph Terminology



Implementing Graphs

Graph ADT Ops

Graph Class

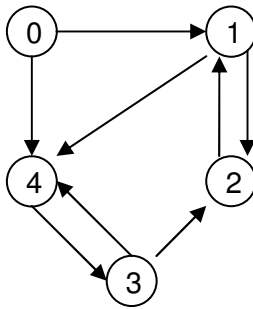
Graphnode Class

Representing Edges

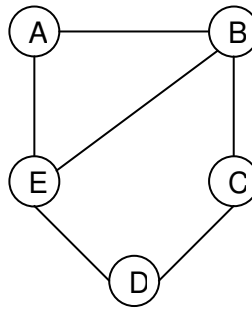
Adjacency Matrix

Given the following graphs:

Graph 1



Graph 2



→ Show the adjacency matrix representation of the edges for each of the graphs:

Graph 1

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 0 | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |

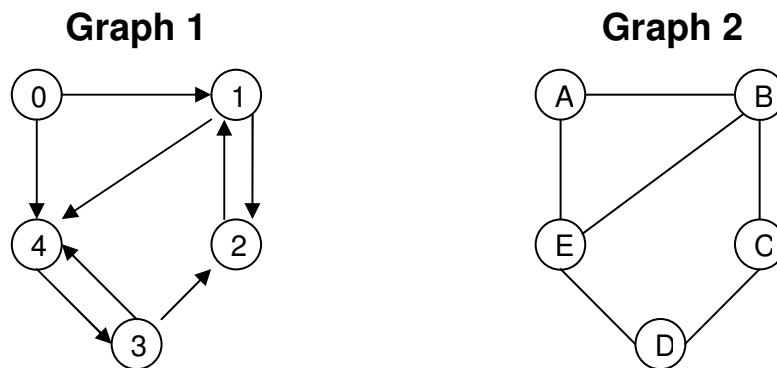
Graph 2

| | A | B | C | D | E |
|---|---|---|---|---|---|
| A | | | | | |
| B | | | | | |
| C | | | | | |
| D | | | | | |
| E | | | | | |

Representing Edges

Adjacency Lists

Given the following graphs:



→ Show an adjacency list representation of the edges for each of the graphs:

| Graph 1 | | Graph 2 | |
|---------|--|---------|--|
| 0: | | A: | |
| 1: | | B: | |
| 2: | | C: | |
| 3: | | D: | |
| 4: | | E: | |

Using Edge Representations

→ Write the code to be added to a `Graph` class that computes the degree of a given node in an undirected graph.

1. Adjacency list:

```
public int degree( Graphnode<T> n) {
```

2. Adjacency matrix:

```
public int degree( Graphnode<T> n) {
```

Comparison of Edge Representations

Ease of Implementation

Space (memory)

AM

AL

Time (complexity of ops)

node's degree?

AM

AL

edge exit between two given nodes?

AM

AL