April 10, 2016

Crux
Lecture - 22

Data Structures
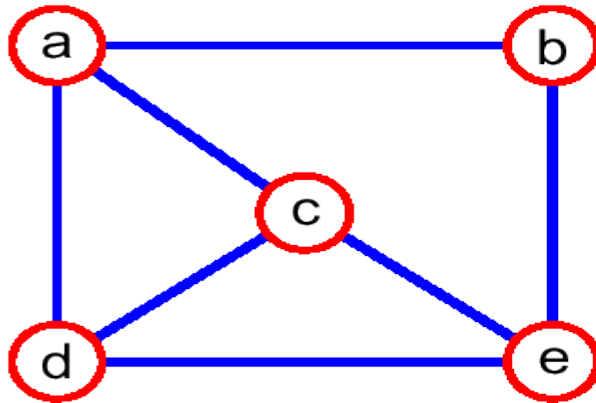
Graphs

Nidhi Agarwal

CODING BLOCKS

Graphs

Graphs

$V = \{a,b,c,d,e\}$

$E = \{(a,b),(a,c),(a,d),$
$(b,e),(c,d),(c,e),$
$(d,e)\}$

Terminology

- Adjacent Vertices
- Degree
- Path
- Connected Graph
- Subgraph
- Connected Components
- Tree
- Forest
- Spanning Tree

CODING
BLOCKS

Number of edges

- Complete Graph
- Tree
- Connected Graph

How to implement Graph?

- Edge List
- Adjacency lists
- Adjacency matrix

CODING
BLOCKS

Searching in a Graph

CODING
BLOCKS

How to Search through a Graph?

- Depth First Search
- Breadth First Search

CODING
BLOCKS

Problems

- Implement isConnected for our graph
- Return all the connected components of the graph
- Check if a graph is Bipartite or not

CODING
BLOCKS

Some more Graph variations

- Directed Graphs
- Weighted Graphs

CODING
BLOCKS

BT - Five card trick

Two information theoreticians, A and B, perform a trick with a shuffled deck of cards, jokers removed. A asks a member of the audience to select five cards at random from the deck. The audience member passes the five cards to A, who examines them, and hands one back. A then arranges the remaining four cards in some way and places them face down, in a neat pile. B, who has not witnessed these proceedings, then enters the room, looks at the four cards, and determines the missing fifth card, held by the audience member. How is this trick done?

Note: The only communication between A and B is via the arrangement of the four cards. There is no encoded speech or hand signals or ESP, no bent or marked cards, no clue in the orientation of the pile of four cards...

CODING BLOCKS

CRUX

Thank You !! ☺

Nidhi Agarwal
nidhi@codingblocks.com