

CSE 21

Lecture 2: Representation of data

TAs and Tutors

- Instructor:
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- TAs:
 - ① Balasundaram Radheshyam (rbalasun@ucsd.edu)
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- Tutors:
 - ① Jayaprakash Sneha (sjayapra@ucsd.edu)
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 - ③ Seto Chapman A. (caseto@ucsd.edu)
 - ④ Thompson Hannah Nehir (hnthomps@ucsd.edu)

Classes

- Discussions: Wed 3PM-3:50PM (CENTR 115)
- Office Hours:
Instructor office hour: by appointment
 - Mon 3PM -5PM (Shibu Lawrence) B240A
 - Tue 11:30AM - 1:30PM (Radheshyam Balasundaram)
 - Thu 1PM - 3PM (Lui Shun Hei)
 - Fri 3PM - 5PM (Thompson Hannah)
 - Sat 12PM - 2PM (Jayaprakash Sneha)

All office hours will be in the Basement Hallway (near the blackboard) of the CSE Building.

Evaluation Process

- Assignments (no marks)
- Quizes
 - Around 6 quizzes.
 - 5% each.
 - Everything will be done on WeBWork.
 - 1st Quiz will be on the **15th Jan.**
- MidTerm 30%.
- Endterm Term 40%.

Books and references

Textbook for the course is

- Mathematics for Algorithms and Systems Analysis, by E.A.Bender and S.G.Williamson

Also one may refer to the following books:

- A short course in Discrete Mathematics, by E.A.Bender and S.G.Williamson
- Lists, Decisions and Graphs, by E.A.Bender and S.G.Williamson

<http://cseweb.ucsd.edu/~gill/BWLectSite/>

- Essentials of Discrete Mathematics, by David Hunter.

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- Functions -

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Say $D = \{x_1, x_2, \dots, x_d\}$

- For each elements in the particular order write down the function value of the element in the same order.

$\{f(x_1), f(x_2), \dots, f(x_d)\}$

Size of the truth-table

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Formal proof using induction.

Induction

To prove a statement, S_n for all n ,

- Prove the statement S_n for base cases (when $n = 0, 1, ..$
- Assuming the statement is true for case $n = k$ prove that the statement is true for $n = k + 1$.

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Sixteen students in a class have voted if they like baseball or football.
- x can be the truth-table of a function from $\{0, 1\}^4$ to $\{0, 1\}$.
- x can also represent a “graph” on 4 vertices.

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- Sets - binary vectors.
- Functions - Truth table.
- Relationship among elements -

Representation of relation among elements

- Vertices - set of elements.

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$$E = \{e_1, \dots, e_m\}$$

$$e_k = ((v_i, v_j))$$

- Given the set of vertices and edges we have a graph

$$G = (V, E)$$

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- If $(u, v) \in E$ implies $(v, u) \in E$ then it is called an undirected graph.
- An weight can be assigned to each edge. In that case it is called an weighted graph.

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- If there is an edge from vertex u to v we say v is a neighbour of u
- For an undirected graph the total number of u such that $(u, v) \in E$ is called degree of v .

Example of a graph

a

Vertices

b

c

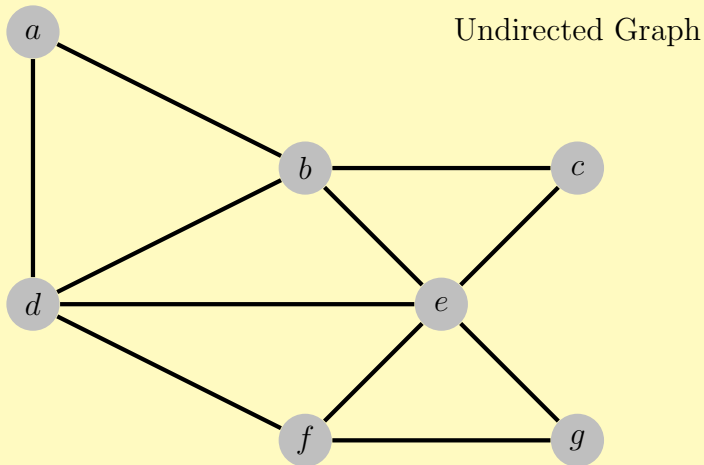
d

e

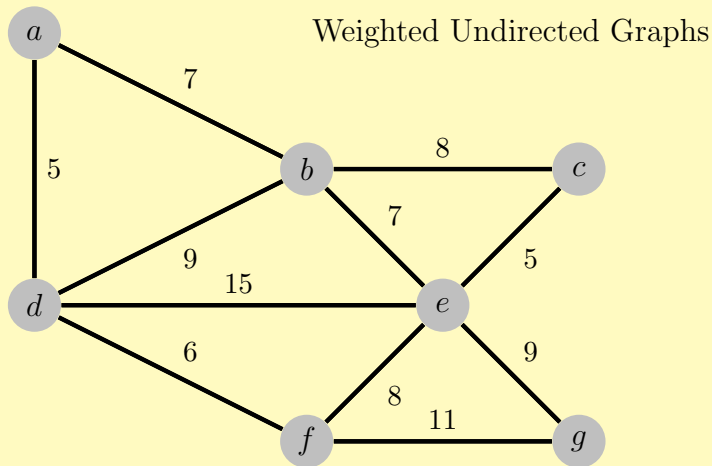
f

g

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