ECS 20: Discrete Mathematics for Computer Science

Winter 2021

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Week 1, January 4

A bit about logistics

Discussion:

- Extra examples, homework review, midterm feedback
- Live and recorded
- No discussion on Martin Luther King Jr. Day (Mon Jan 18) and Presidents' Day (Mon Fed 15).
- Check Canvas homepage frequently for update on discussion notes and videos.

Office hours:

- Available every weekday
- Ji: Mon Wed 2:10pm - 3:40pm

General Q&A:

Ask on Piazza, will answer ASAP. Please do not send emails to us unless it's personal and urgent!

What is Discrete Mathematics?

Discrete mathematics is the part of mathematics devoted to the study of **discrete rather than continuous** objects. Here discrete means consisting of *distinct or separated* elements. [1]

[1] KH Rosen (2012) Discrete Mathematics and Its Applications, 7th edition

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Problems solved by discrete maths may include:

1. How many ways are there to choose a valid password on a computer system?
2. What is the probability of winning a lottery?
3. Is there a link between two computers in a network?
4. What is the shortest path between two cities using a transportation system?
5. How can a list of integers be sorted so that the integers are in increasing order?

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How does it relate to Computer Science?

More often, discrete mathematics is used whenever objects are counted, when relationships between **finite** (or countable) sets are studied, and when processes involving a finite number of steps are analyzed.

The digital computer is basically a finite structure, and many of its properties can be understood and interpreted within the framework of finite mathematical systems. [2]More specifically, computers operate in discrete and mostly finite steps (processes/programs/algorithms) and store data in discrete and finite bits (integers, floating points, etc.). [3]

[2]Textbook

[3]Wikipedia

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In class, instructor will focus on mathematical content, and we'll discuss applications that use discrete maths as the quarter goes on.

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[2]Textbook

[3]Wikipedia