National University
of computer and emerging sciences

DISCRETE STRUCTUERS

COURSE INSTRUCTOR: MUHAMMAD SAIF UL ISLAM

Lecture Outline

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- Applications of Discrete Structures

Instructor's Profile

Muhammad Saif ul Islam

Education:

Masters in Data Science - 2019

- FAST-NUCES, PK

Bachelors in Computer Science -2017

- Bahria University, PK

Certifications:

- Data Science Essentials
- Machine Learning
- Python Programming
- R Programming
- SQL Querying
- HTML5/CSS3

Work Experience:

IT Instructor – 5 Months

- IBA-BBSYDP, PK

Python Developer – 7 Months

- Innovative Solutions, PK

Sr. Operations Engineer – 1 Year

- Gfk Etilize, PK

Students' Introduction

Name?

Expectation:

- What do you expect from this course?

Introduction to the Course

Discrete Mathematics

"Discrete Mathematics" is NOT the name of a branch of mathematics, like number theory, algebra, calculus, etc. Rather, it's a description of a set of branches of math that all have in common the feature that they are "**discrete**" rather than "continuous ”

A key reason for the growth in the importance of discrete mathematics is that information is stored and manipulated by computing machines in a discrete fashion.

The kinds of problems solved using discrete mathematics include:

- How many ways are there to choose a valid password on a computer system? (Combinatorics)
- How can I encrypt a message so that no unintended recipient can read it? (Number Theory)
- What is the shortest path between two cities using a transportation system? (Graphs)
- How can it be proved that a sorting algorithm correctly sorts a list? (Proofs)

Course Outline

- Logic and Proofs
- Sets and Functions
- Relations
- Number Theory
- Combinatorics and Recurrence
- Relations
- Graphs
- Trees
- Discrete Probability

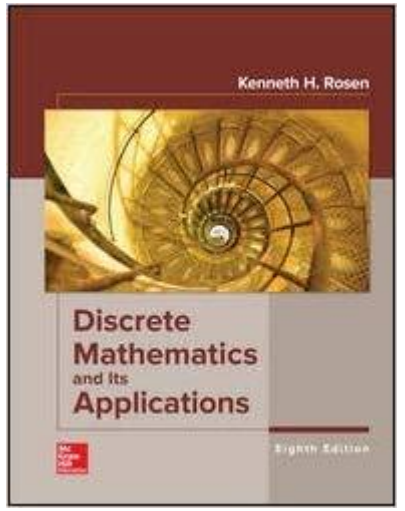
Course plan, Assignments and Quizzes

	Graded Assessment types	Weights (%)
1	Class participation/Presentations	5%
2	Quizzes	5%
3	Assignments	10%
4	Mid 1	15%
5	Mid 2	15%
6	Final	50%
	Total:	100%

Resources

Text Book:

Kenneth H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw Hill Education, 2019, ISBN: 978-1-259-67651-2



Reference Books:

1. Sussana S. Epp, Discrete Mathematics with Applications, Brooks Cole, Cengage Learning, 5th Edition, 2019, ISBN: 978-0-357-03523-8

2. Richard Johnsonbaugh, Discrete Mathematics, Prentice Hall, 8th Edition, 2017, ISBN: 978-0- 321-96468-7

Some Important Guidelines

- Use of Mobile Phones is not allowed
- Please arrive in and leave the class on time.
- Leave the class if you have some urgent call without disturbing others
- **Respect** every classmate
- Don’t Interrupt the Instructor
- Raise your hand for questions

Teaching Methodology & Requirements

- Class meetings will NOT cover everything in the text. You have to solve a number of examples and exercises given in the textbook.
- All written assignments must be given to the instructor on or before the due dates.
- All assignments that are not submitted on time will get a penalty of **50%** of the total marks.
- Please DO NOT EXPECT ANY **RETAKE** after a quiz has been conducted.
- Working together to solve homework problems is encouraged but plagiarism in Assignments will not be tolerated
- A copied work will get you **ZERO** credit/mark.

Consulting Hours

Contact at:

Email: muhammad.saif@nu.edu.pk

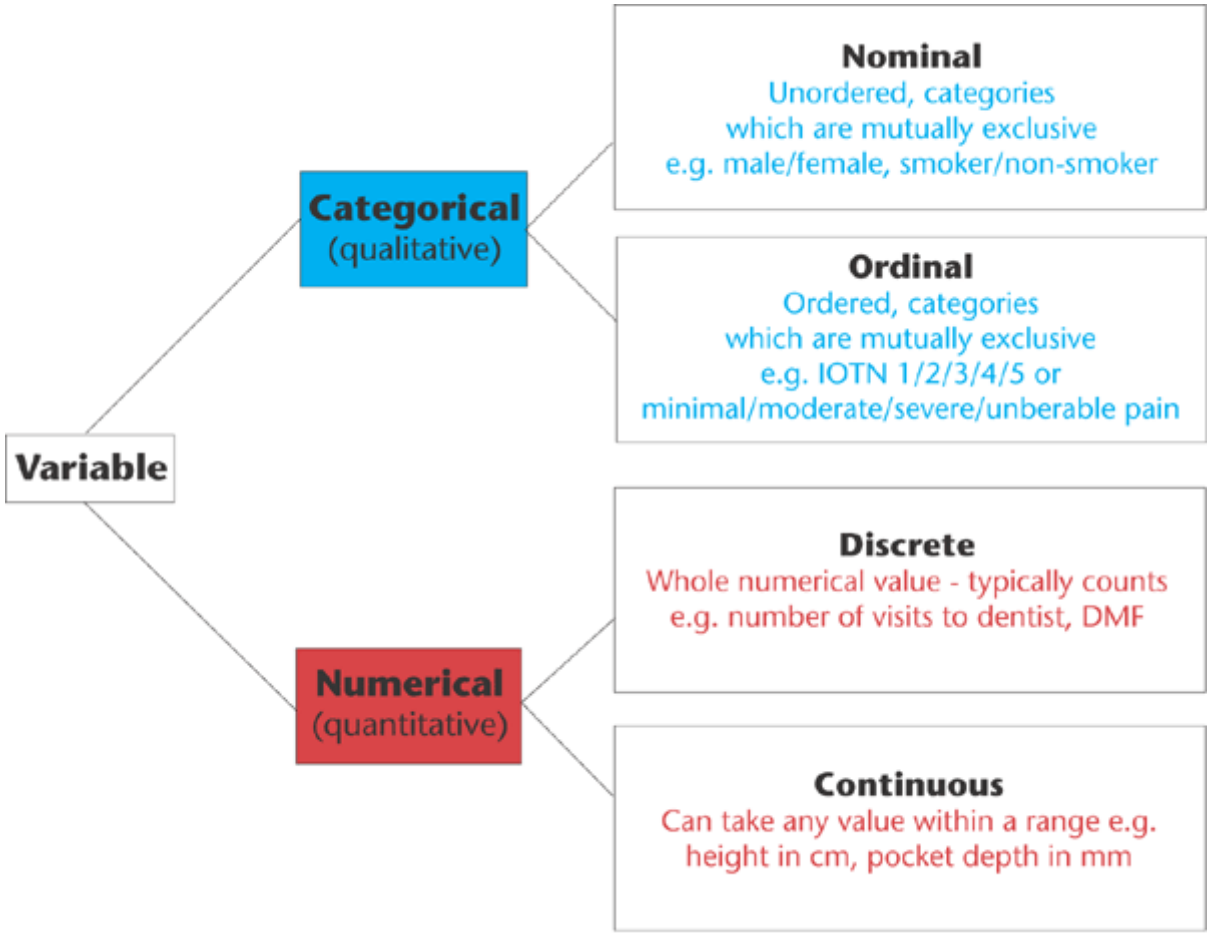
OR

Visit my Office:

Thursday: **Anytime** as per availability

Friday: **Anytime** as per availability

Types of Data (Arial View)



Discrete Vs Continuous

Discrete Data can only take certain values.

Example: the number of students in a class (you can't have half a student).

Continuous Data is data that can take any value (within a range)

Examples:

A person's height: could be any value (within the range of human heights), not just certain fixed heights

Time in a race: you could even measure it to fractions of a second

Read More ➡

Applications

- **Computers themselves:** Works on binary bits 0's and 1's
- **Scheduling problems:** Flight/Bus scheduling, Meeting/Appointment
- **Networks**: Internet, Web, Social Media Networks, Road/Railway Networks
- **Cryptography:** Encryption and decryption
- **Computer graphics:** Game Development
- **Delivery Route Problems:** Shortest path, TSP, Google Maps

Read more ➡

Thank you!!!

Understanding Math by reading slides is similar to Learning to swim by watching TV.

So, DO PRACTICE IT!