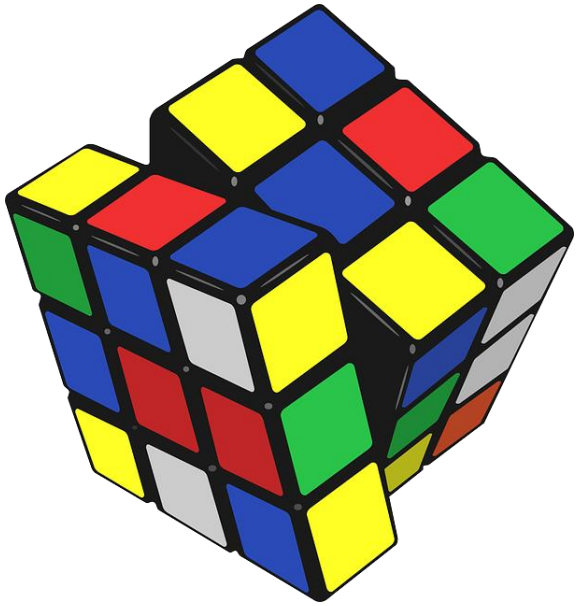


جامعة قطر
QATAR UNIVERSITY

# *Discrete Structures for Computing*

**Session 0**

# Welcome!

**Fall 2022**

August 22nd, 2022

Likely **Coordinator**: Dr Khalid Ahmed Ahmed Abualsaud

# Instructor

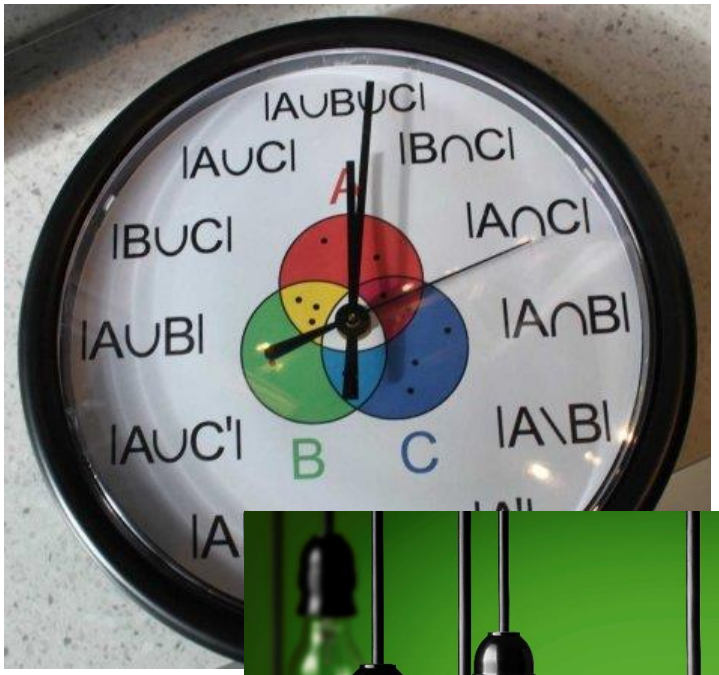
- P. N. Suganthan, Ph.D., *FIEEE*
  - p.n.suganthan@qu.edu.qa
  - Room:  – Building ,
  - Phone:
- Research interests:
  - Machine Learning
  - Evolutionary Computation
  - Artificial Neural Networks

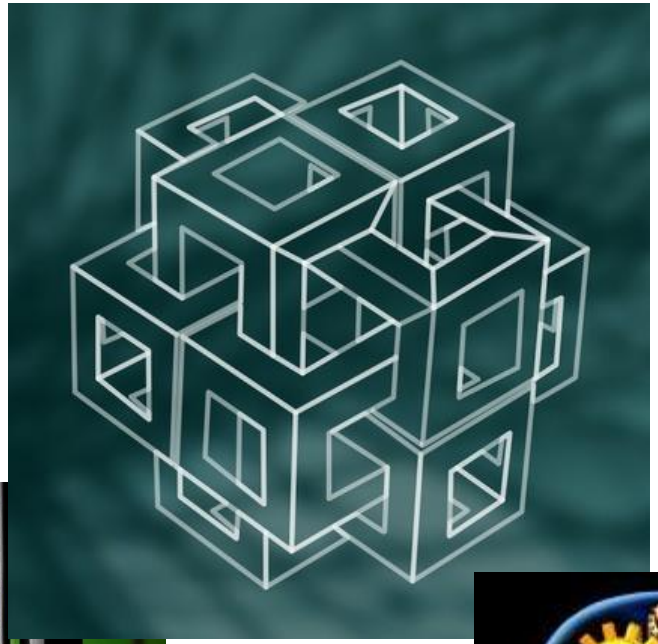
**From: Health and Safety Section - Facilities and General Services Department**
**To: All**
**Subject: Welcome back our students and faculty**

We welcome the return of our students and faculty members, and wish them a new successful and fruitful academic year. Hence, in the interest of the health and safety of all, we kindly remind you to adhere to the following health and safety procedures and instructions when on campus:

1. Make sure that your EHTERAZ application code is green.
2. Wearing masks correctly while on campus, especially in classrooms, indoors.
3. Ensure frequent handwashing with soap and water; frequent use of sanitizers.
4. Adhere to social distancing in classrooms, ….. or shaking hands.
5. Adhere to wearing masks and social distancing in the shuttle buses.
6. Avoid direct exposure to sunlight and drink a lot of water.
7. Avoid traffic congestion points on internal roads and adhere to cross at pedestrian crossings.

# Welcome to "Discrete Structures for Computing"



# What is "Discrete Math"?

**Discrete mathematics** is the branch of mathematics dealing with *objects* that can assume only *distinct, separated values*.

**Discrete objects can often be characterized by integers**

**Continuous mathematics** is the branch of mathematics dealing with *objects* that can *vary smoothly* (e.g., calculus).

**Continuous objects require real numbers**

# Why Study Discrete Mathematics?

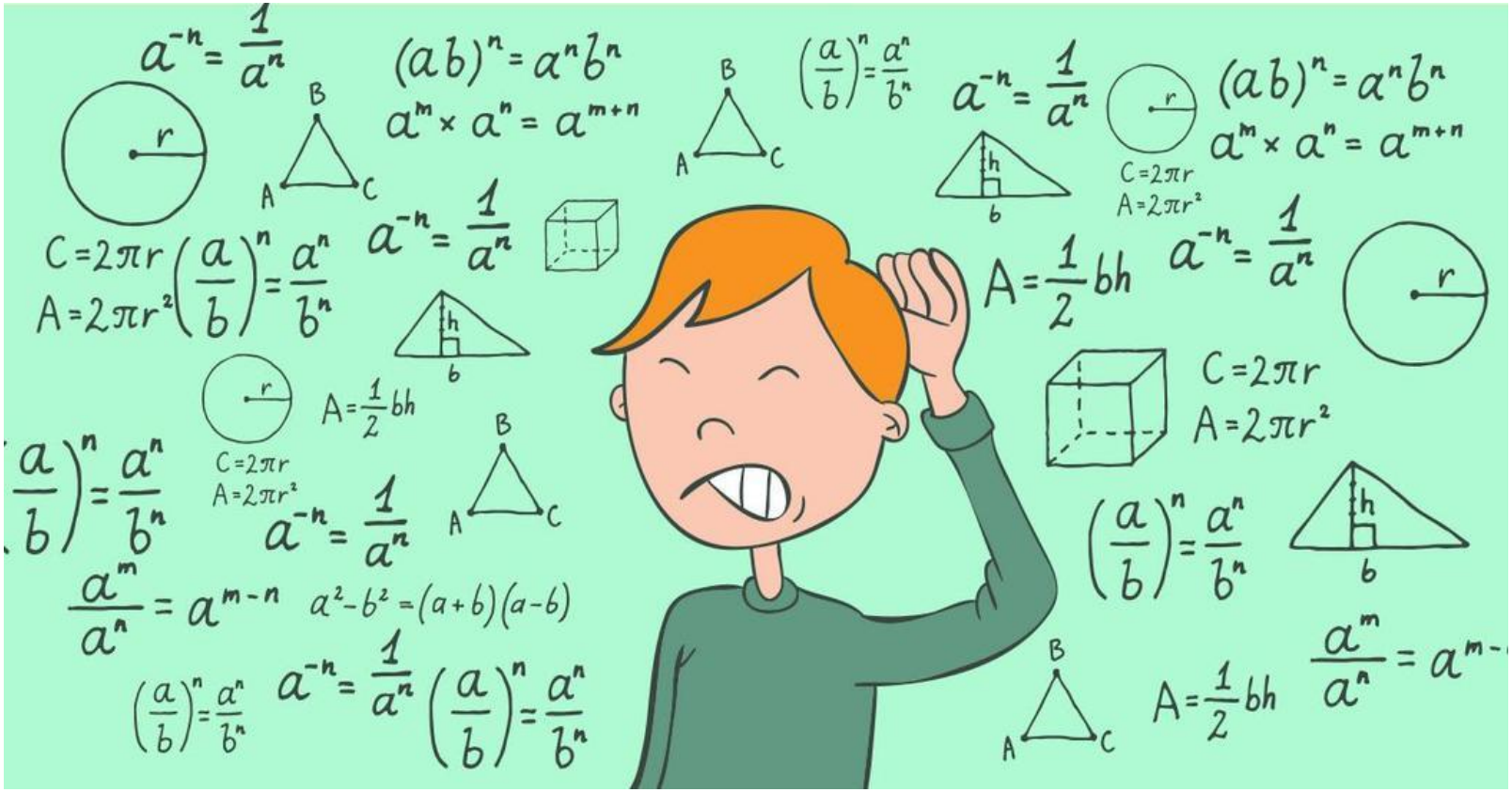
- The basis of all of digital information processing: *Discrete manipulations of discrete structures represented in a computer memory.*
- Discrete concepts are also widely used throughout math, science, engineering, economics, biology, *etc.*, …

For Computing?

- Discrete math is very much "real world" mathematics.
- Discrete math is an excellent tool for improving reasoning and problem-solving abilities.

**Discrete math is the *mathematical language of Computer science?***

# Discrete Math?



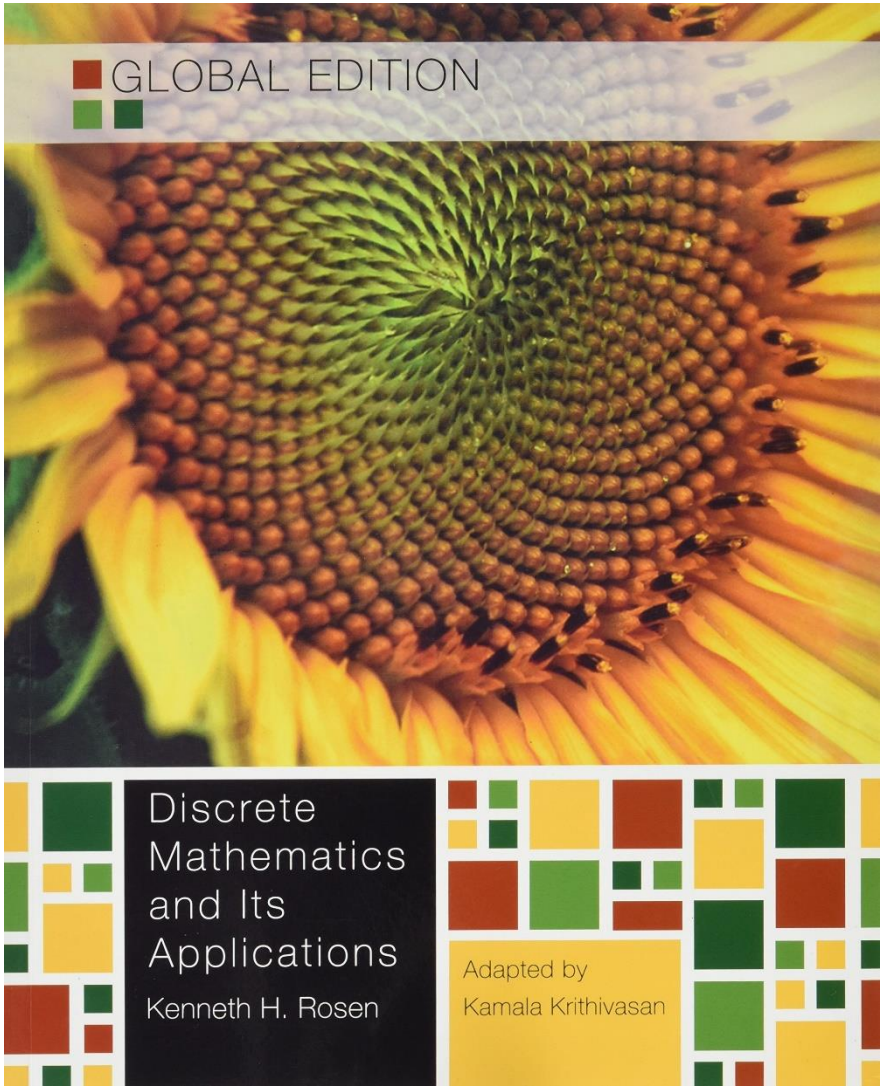

***Is Math Hard?***

# Discrete math is fun


# Text Book

## Discrete Mathematics and Its Applications

**Seventh Edition**



# Schedule of Topics

| Discrete Math Topics | Chapter | Weeks |
|---|---|---|
| Logic and methods of proof | 1 | 3.5 |
| Logic gates, Boolean algebra, and minimization | 12 | 2.5 |
| Numbering systems | 4 | 1 |
| Midterm Exam | | |
| Set theory | 2 | 1 |
| Functions | 2 | 1 |
| Sequences and sums | 2 | 1 |
| Induction | 5 | 2 |
| Relations | 9 | 1 |
| Counting | 6 | 1 |
| **Total** | | **14** |

# Course Learning Outcomes (CLO)

By the end of this course, students should be able to:

1. Apply knowledge of logic and sets.
2. Design simple logic circuits based on sum-of-products or product-of-sums.
3. Apply relations, functions, and numeral systems.
4. Prove logical statements deductively and inductively.

# Applications of discrete mathematics:

- Operating systems
- Programming languages, compilers & interpreters.
- Computer networks
- Computer architecture
- Automata Theory
- Advanced algorithms design & data structures
- Relational Database Theory
- Complexity Theory (counting)
- Cryptography
- Error correction codes
- Just about everything!

# Grade Distribution

- 4 Homework (20%): **NO MAKEUP**
- 5 Quizzes (20%): **NO MAKEUP, CONSIDER BEST 4**
- Mid-Term Exams (25%) (Oct. 05, 2022)
- Final Exam (35%)- TBA by QU Calendar
- All 5 quizzes and mid-term are in-person only.
- No makeup irrespective of the reasons

# Key Dates (Key day: Wednesday)

| | HW (will be distributed a week before) (due at start of class) | Quiz | Exam |
|---|---|---|---|
| 1 | 07/09/2022 | 07/09/2022 | Midterm exam: **05/10/2022** |
| 2 | 21/09/2022 | 21/09/2022 | Final exam : **TBA by QU** |
| 3 | 19/10/2022 | 19/10/2022 | //////////////// |
| 4 | 02/11/2022 | 02/11/2022 | //////////////// |
| 5 | //////////////// | 09/11/2022 | //////////////// |

# Schedule (L03) – Male

| Day | Time | Activity | Room |
|---|---|---|---|
| MW | 2:00 - 3:15 PM | Class | BCR Corridor – I210 |
| | | Office Hour* | |

- Other times are available by **appointment**
- Best way to contact me is by email

# PLEASE …

# Class page on Blackboard

Planning to use it extensively!

- Syllabus
- Course content
- Announcements
- Assignments
- Other Resources

# Course Prerequisites

- None!

# Late Policy

- **Late submissions** are not allowed.

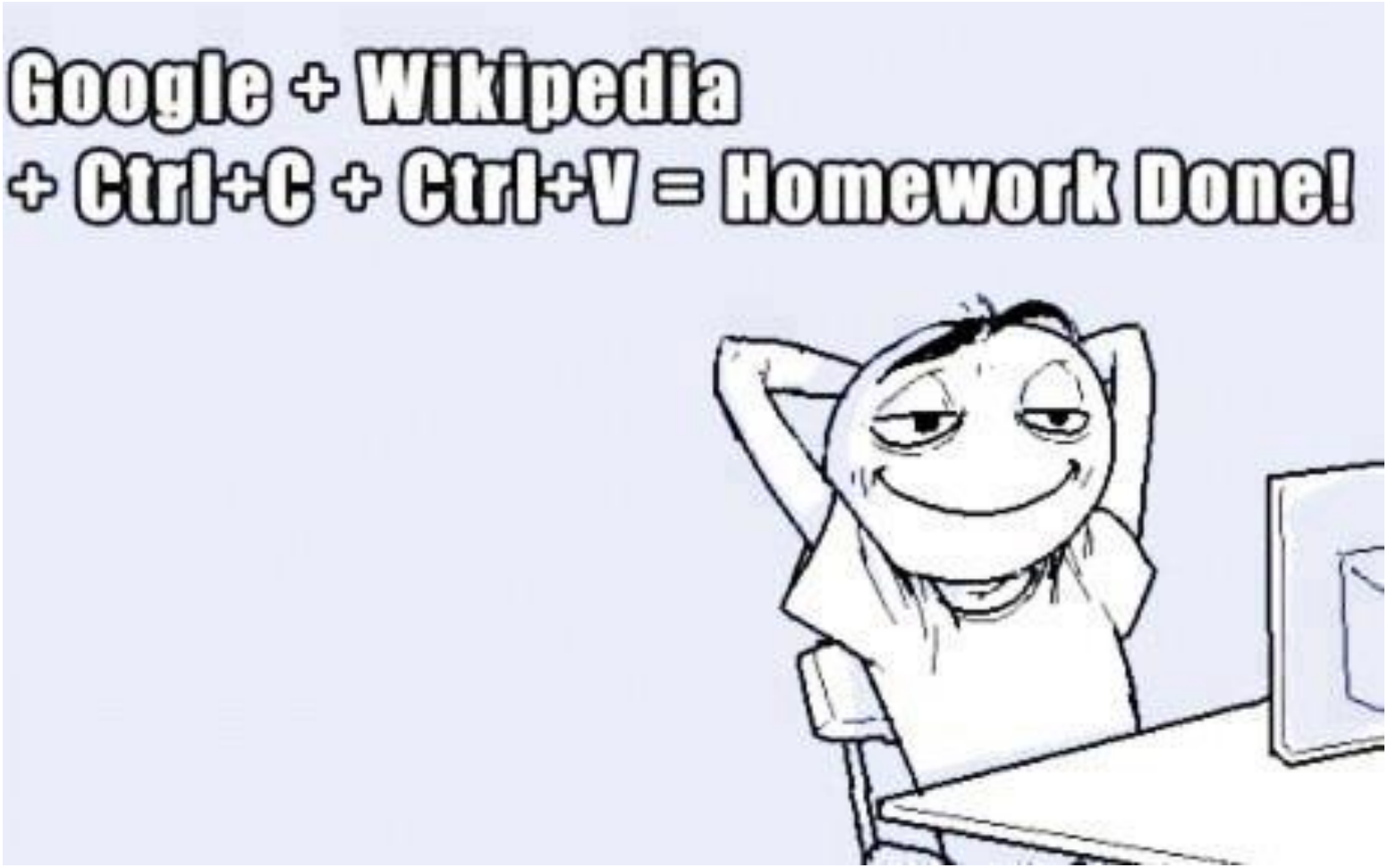
# While in class!

- Phones, etc.
  - Vibrate or off
  - Do not use it during class
    - no texting, no tweeting, no updating your status, …
- Computers
  - Only take notes or give presentations
  - Only look up stuff related to class ***when asked to***
  - **Nothing else**
- Other devices
  - Same basic idea

# Attendance Policy

- Attendance will be taken during each lecture.
- **If you miss the class, you are responsible for all material covered and all announcements made in class.**
- If your absence exceeds 25% of the classes, you will get FB.

# External Sources ??



# Honesty

- Copying from each other OR from external sources **IS CHEATING**
- If happened in **one** problem or part, you will get **ZERO** in the **entire** homework or project!
- **Both cheater & cheated-from and even repeated plagiarism will get ZERO!**
- Assignments for **individuals not teams!**
- Encouraged to discuss homework issues with each other but ***must be your own***

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**To avoid words, like UNFAIR, DISAPPOINTED, etc., you can study regularly and remember the dates/deadlines of HWs, quizzes, mid-term, etc.**

**!!!!**


Ready?