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**How to think in code**Date and Time: September 18th, 2024

Location: EDUC 133 (Education building, 3700 MacTavish Street) ~ hybrid

**Workshop Lead: Thomas Zheng**  
**Facilitator:**   
**Registration link:**   
**Approximate duration: 2 hours**

**Prerequisites:**

1. Basic mathematical knowledge (number properties, algebra, and equations).
2. A computer with the ability to access the internet, running a current version of Windows, Mac OS X, or Linux.
3. Create an account on https://brilliant.org for the hands-on parts (the free version is sufficient)

**Summary: (2-3 sentences summarizing the workshop)**

This workshop will introduce the world of programming to complete beginners. The goal of this workshop is to act as an introduction to people who have never taken a coding class, have zero to minimal experience writing code, and who are interested in learning!

**Learning Outcomes: (List 3-5 learning outcomes participants will learn upon completion of this workshop)**

1. Brief introduction to the hardware of a computer: how a computer works – explaining components such as RAM, CPU, and GPU, and how programs connect you to the computer.
2. Basics of a program: Students will learn what a program is, how to write pseudocode, and what an algorithm is.
3. Understanding loops: Students will get hands on experience creating loops with Brilliant.com using pseudo-code blocks.
4. Coding fundamentals: Students will learn the basics of variables, Boolean logic, conditional statements, and data structures. Given time, we will dip our toes into Python using <https://codehs.com/ide> which has an online IDE.

**Content**

1. **Module 1: Overview of Computers (30 minutes)**
   1. What is a computer?
      1. What is a CPU?
      2. What is RAM?
      3. Why does a program need both?
   2. How does a program communicate with a computer?
   3. Basics of a program
      1. How to write pseudo-code and what an algorithm is.
2. **Module 2: Loops and Hands-on testing (30 mins)**
   1. Introduction to “for loops”
   2. Use Brilliant.org’s 1.1 Thinking in Code first 6 modules
3. **Break (5 minutes) – if necessary**
4. **Module 3: Variables (45 minutes)**
   1. Discussion of what a basic variable is
      1. The different types of variables: strings, integers, booleans
   2. Boolean logic – logic gates
      1. AND, OR, NOT, and more
   3. Conditional statements
      1. Introduction to while loops
   4. More advanced Concepts
      1. Discussion on Lists, Arrays, and Indexing
      2. Talk about the importance of commenting!
      3. Using <https://codehs.com/ide> to give a concrete example using Python.
5. **Conclusion and Q&A (10 minutes)**
   1. Recap of the workshop
   2. Open discussion and resolution of any queries
   3. Guidance on further learning resources