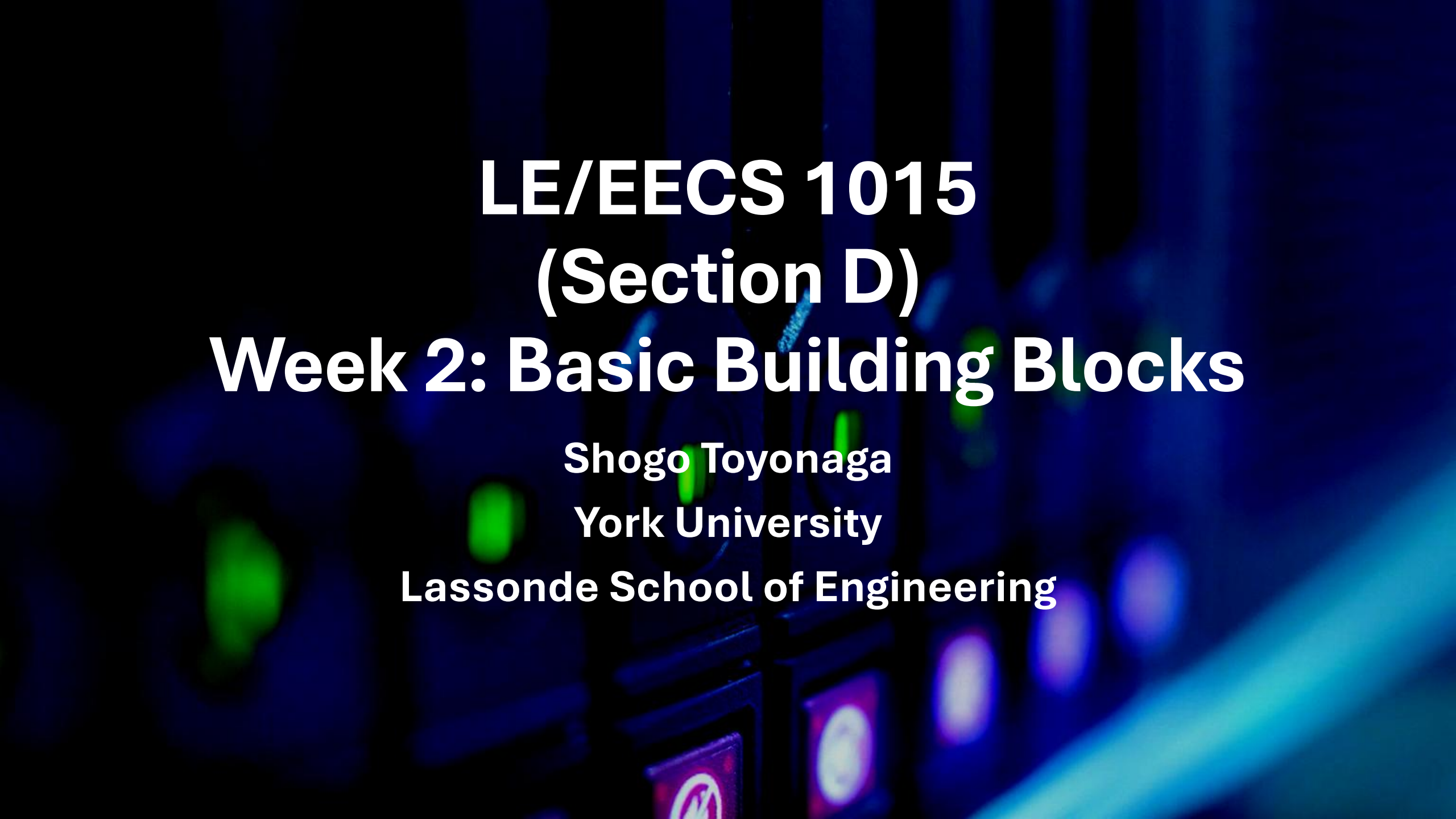

# LE/EECS 1015 (Section D) Week 2: Basic Building Blocks

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# This Week...

1. Literals, Operators, Expressions
    - BEDMAS
2. Variables, Assignment, Memory Model
    - Dynamic Typing
    - PEP-8 Variable Naming Convention
    - Documentation
    - Tracing / Debugging
3. Statements, Built-In Functions
    - Interactive Mode → $dir(\_\_builtins\_\_)$
    - Interactive Mode → $help(function\_name)$
    - https://docs.python.org/3.13/library/index.html

# Goals of Lab 2

1. Write simple Python scripts which follow PEP-8 Variable Naming Conventions

2. Debug code with syntax, runtime, or semantic errors

# Lab 2 – What You Do....

| Task | Points |
|---|---|
| Follow the Steps (Grocery Prices) | 30 |
| Debugging (Count Wheels) | 30 |
| Implementation (Buy Donuts) | 10 |
| Implementation (Grade Calculator) | 10 |
| Implementation (BMI Calculation) | 10 |
| Implementation (Calculate Average) | 10 |

# Lab 2 – Useful Resources

- Make use of the $help(function\_name)$ function in your IDEs Interactive Mode

- Refer to the documentation: https://docs.python.org/3.13/library/index.html

- Master the fundamentals of BEDMAS (Order of Operations) and arithmetic

# Order of Operations (BEDMAS)

| Precedence | Operator | Explanation |
|---|---|---|
| **1 (Highest)** | $()$ | Parentheses |
| **2** | $**$ | Exponentiation |
| **3** | $-n, +n$ | Negative/Positive Argument |
| **4** | $*, /, //, \%$ | Multiplication, Division, Integer (Floor) Division, Modulus |
| **5** | $+, -$ | Addition, Subtraction |
| **6** | $<, \leq, >, \geq, ==, != $ | Less Than, Less Than or Equal, Greater, Greater or Equal, Equal, Not Equal |
| **7** | $not\ (\neg)$ | Bitwise Negation |
| **8** | $and (\wedge)$ | Boolean And |
| **9 (Lowest)** | $or\ (\vee)$ | Boolean Or |

# Important Arithmetic (Lab 2)

1. **Dividend**
    - The number you will be dividing (numerator)
2. **Divisor**
    - What you are dividing by (denominator)
3. **Quotient**
    - The result of integer division
4. **Remainder**
    - The fractional component stripped from integer division

# Important Arithmetic (Lab 2)

1. $Dividend = Divisor \times Quotient + Remainder$
2. $Divisor = \frac{Dividend - Remainder}{Quotient}$
3. $Quotient = \frac{Dividend - Remainder}{Divisor}$
4. $Remainder = Dividend - (Divisor \times Quotient)$

*But, most importantly…*

$$\frac{Dividend}{Divisor} = Quotient + \frac{Remainder}{Divisor}$$

# Debugging

- “Debugging is the process of finding and fixing errors or bugs in the source code of any software”

- Your IDE (e.g., Wing Personal, Pycharm, VSCode) have tools and/or extensions to help you find bugs and squash them.
  - Breakpoints allow you to interrupt the execution of your code at a certain place to view data values and assignments.
  - The stack data allows you to see variable values and assignments at run-time. This can help you see line-by-line where things go wrong.

# Debugging Terminology & Operations

**First, you set the breakpoint….**

**Then:**

- ***Start or continue debugging to next breakpoint or exception (F5)***
- ***Step over current statement (F6)***
- ***Step into current execution point, or start debugging at first line (F7)***
- ***Step out of current function or method (F8)***

# Thank You!

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