COEN-244 Tutorial #1

INTRO

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Familiar with: **C++, JAVA, and MATLAB**

COEN-244 Overview

What is this class about? -> Object Oriented Programming II

• Uses and applications of OOP

TOPICS:

• Classes and Objects, and its components

• POINTERs EVERYWHERE

• Class Composition, Inheritance, Polymorphism, & Operator Overloading

• Exception Handling, Advanced IO, & Templates

• Intro into Data Structures & Algorithms

Github: Coming Soon!

Setting up your IDE + Hello World

DEMO (**Windows**):

- **MinGW Compiler for C++:** https://sourceforge.net/projects/mingw/
- **Eclipse IDE**:
https://www.eclipse.org/downloads/packages/release/2022-06/r/eclipse-ide-cc-developers

Other options for **Windows** include **Visual Studio** and **CLion**.
MacOS options include **XCode** and **CLion**.

A series of installation guides will be made available on Moodle for IDE and compiler setup later today.

REVIEW

- SETTING UP C++ ENVIRONMENT & C++ SYNTAX

- VARIABLES, DATA TYPES, OPERATORS, EXPRESSIONS, LOOPS, & CONDITIONALS

- INPUT & OUTPUT USAGE

- ARRAYS & THE STRING LIBRARY

- C++ FUNCTIONS

- OBJECT-ORIENTED PROGRAMMING

- DYNAMIC MEMORY & POINTERS

- EXCEPTION HANDLING

C++ Environment

Using IDE vs Text Editor & Compiler Combination

• What is an IDE?

• What is a Text Editor?

• What is a Compiler?

• Which one is BETTER?

C++ Syntax

- What are variables?

- What are some common categories of operators?

- Difference between operators and expressions?

- What are conditional statements?

- What is a difference between 'if statements' and 'switch block'?

- Why loops?

- For loops vs While loops

- While loops vs If statements

- When to use 'continue' and 'break' keywords?

Data-types

- Types of data, their sizes, and use-cases

- How to adjust the size of a datatype?

- The keyword 'long' cannot be used with ……..

- Declaring vs Initialization

- Two ways of initializing char datatype (ASCII)

- What is 'void'?

Input-Output

- Why do we need I/O?

- What are some popular C++ I/O libraries?

- What are the major keywords in using C++ I/O & Streams?

- Common mistakes in outputting?

- Common mistakes in inputting?

- How to read from and write to the command line?

- How to read/write a file?

- What should be checked before reading from a file?

Arrays & Strings

- What are arrays and what do they represent?

- Array declaration and initialization

- How does an array look like?

- INDEXING

- Size vs length of an array

- What is a string and how does it look like?

- How to do trimming using strings?

- Multi-dimensional arrays?

Functions

- Definition of a function in arithmetic, f(x)

- What is a function in programming?

- Characteristics of a function

- Pass-by-Reference vs Pass-by-Value

- When is a function executed?

- Prototypes and Function Overloading

- Recursion (stack calls), Default Values, and Static Variables

OOP

- What is Object Oriented Programming?

- What does this signify in programming practices?

- Object Oriented Programming vs Procedural Programming

- Advantages of OOP

- Classes and Objects

- Attributes, Methods, Constructors, Destructors, and Encapsulation

- Use of objects in functions

Pointers

- Dynamic vs Static memory

- What are pointers?

- What is stored inside a pointer variable and why do we need to give datatype?

- Pointer declaration and initialization

- Deference operator

- NULL and nullptr

- 'new' and 'delete' keywords

- Use of pointers in a Single Linked List example

Exception Handling

- Different types of error

- What is Error Handling and Exception Handling?

- Traditional Error Handling vs Formal Error Handling

- Syntax for Exception Handling

- When to use exception handling?

THANK YOU