Practice Questions and Exercises

1. List the core concepts of Object orientated programming and define them.
   1. Encapsulation - shields the details of an object's implementation, used for data-hiding
   2. Polymorphism - a single interface provides multiple implementations
   3. Inheritance - one class inherits the structure of another class
2. Compare the features of C with C++

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| C | C++ |
| * General purpose, imperative (no object-orientated features) * Static , weak typing * scanf(), printf() | * General purpose, imperative, object-orientated, generic * Static, strong typing * iostreams |

1. What is the difference between a function declaration and a function definition.
   1. A function declaration is the function prototype. It tells you the return type, the name, and the parameters of the function.
   2. A function definition is the “body” of the function. It contains the executable statements of the function
2. What are the 3 stages of compilation?
   1. Preprocessing
   2. Compiling
   3. Linking
3. Write a program to calculate the BMI (https://en.wikipedia.org/wiki/Body\_mass\_index) of an individual. Use namespaces and the concept of modular programming to organize your code into more manageable sections. Ensure to use include guards and meaningful variable and function names. Do not worry about robust validation, assume all input will be of the correct type and range. Ensure when compiling this program you ensure that it is to the C++ 11 standard.
   1. In a header file called “bmi\_caculator.h” and Create a namespace called “bmi”. Inside of the namespace, declare two function prototypes required to calculate BMI, one to calculate it using kilograms and meters, and one to calculate it in pounds and inches. These functions should return the BMI number.
   2. In another file called “bmi\_caculator.cpp”, create the function definitions for these functions. These definitions also have to be within the “bmi” namespace.
   3. In a file called “bmi.cpp”, write the code in order to ask the user if they want their BMI calculated using pounds and inches, or meters and kilograms. After they chose, then ask for their height and weight, then output their BMI number.
   4. Compile this program in multiple environments. Visual Studio (<https://www.youtube.com/watch?v=hCGUWjgvBF4>), using the Microsoft command line compiler “cl” and the gnu compiler g++ (https://cs.senecac.on.ca/~oop244/pages/content/compi.html)