Practice Questions and Exercises

1. What is the difference between a function declaration and a function definition?
   1. A declaration associates an entity with a type
   2. A definition is a declaration that associates a meaning with an identifier. Definitions contain executable code
2. What is the cause of memory leaks?
   1. A memory leak occurs if an application loses the address of dynamically allocated memory that has not deallocated
3. List the 3 Integral Types in c++.
   1. Bool
   2. Integer
   3. char
4. List the 2 Floating Point Types in c++
   1. Floating point
   2. doubles
5. List the 2 Compound Types in c++
   1. Structs
   2. classes
6. What is the primary difference between Integral Types and Floating Point Types when it comes to their representation in memory?
   1. Integgral types store data exactly in equivalent binary form where Floating Point Types (store data to a specified precision - can store very small and very large values)
7. Explain what is wrong with the following function declarations.
   1. int sum(int, int, int);

int sum(int\*, int\*, int\*);

int sum(int&, int&, int&);

The pass by reference and pass by copy conflict. Both are called with the exact same syntax and the compiler cannot tell the difference.

* 1. void wrote\_to\_file(char\* name, char\* data = nullptr, int size);

The parameter with the default value has to be at the end of the function declaration.

1. Is this code valid? If not, why?
   1. int a = 10;

int b[a];

No, you cannot use a variable when defining the size of a static array. You can only use constant values

* 1. int\* a;

int b = 42;

a = &b;

Yes this is valid code

* 1. double\* d = new double[10];

for (int i = 0; i <= 10; i++)

d[i] = i;

This will cause undefined behaviour because you allocate 10 spaces for the array d, but you try to write to the 11th place in the array.

1. Write a program that is used to calculate the average of a list of numbers (do not use statically allocated arrays). This program must ask the user for the number of inputs the program is to accept. Create a dynamic array of doubles to hold those numbers. Next, using a loop, have the user input those numbers and store them in the array. Write a function to calculate the average. My suggestion would be to have the function return a double, and have two input parameters(one for the array, and one for the size of the array) Use the return value from the function to display the average. Be sure to deallocate any dynamic memory that was allocated. (
2. Write an address book program. Use a struct (or a class) to store the Name, email address, phone number, and street address of a person. Ask the user how many people you wish to put in your address book. Create a dynamic array of this struct (or class) to store this information. Accept input from the user for each of these people, and when complete, display the information back to the user for confirmation.