Strings, Classes & Pointers

COSC1076
Semester 1 2019
Week 02

Additional Notes

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Advanced Pointers - Casting

- Pointer types can be cast to pointers to another type
  - The underlying memory will is ***re-interpreted*** as the new type
- For example:

```
float testFloat = 20;
float* ptrF = &testFloat;
int* ptrI = (int*) ptrF;
std::cout << ptrI << " " << ptrF << std::endl;
std::cout << * ptrI << " " << *ptrF << std::endl;
```

- Of course, just because this is possible, doesn't mean it is a good idea

Advanced Pointers - void*

- The most generic form of a pointer is the type

```
void*
```

- Any pointer can be cast to the type `void*`
  - This was in the past useful for writing “generic” functions that didn’t care about the type of the pointer
  - Generic functions are done with templates (to be seen later in the course)
- Any `void*` pointer can be cast into another type
  - But that doesn’t mean the dereferenced pointer will be correctly interpreted

Advanced Pointers - Pointer Arithmetic

- Pointers (and memory addresses) are hexadecimal values (ie numbers).
- This means that pointers work with arithmetic operations
  - Pointer arithmetic is sensitive to the type of the pointer and increments the address by the correct amount relative to the type of the dereferenced value

```
int a = 1;
int b = 2;
int c = 3;
int* p = &b;
cout << *p << endl;
cout << *(p+1) << endl;
cout << *(p-1) << endl;
```

- In general, pointer arithmetic is not directly used.
  - BUT! It does appear when working with arrays - as we will see next week.

Using Multiple Files

- C/C++ has two types of files
  - Code files (cpp)
  - Header files (h or hpp)
- Header files have *declarations*
- Code files have *definitions*
  - Definitions in header files are included in the code file

```
#include "header.h"
```

    - For local header files, use double-quotes
    - Use *relative-path* to the header file from the code file

Using Multiple Files

- For reference, STL library includes which look like:

```
#include <iostream>
```

  - Use angle-brackets
  - Tells the compiler to look for the file called `iostream` in the library locations

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