CS 246 Fall 2019 — Tutorial 5

October 9, 2018

Summary

1 Structures and Classes

A structure is a collection of data and methods.

```
struct Complex{
    int real;
    int i;

    int getReal();
    int getImaginary();
};
```

To access the fields of an object, use `objectName.fieldName` To call methods, use `objectName.method()`.

Exercise: When is it necessary to use `this`?

To access members through a pointer, use `objectName->memberName`

2 Constructors

When working with C, when you wanted to program a structure, you would typically write a separate function to allocate memory for the object and initialize the fields to be logical default values.

In C++, we will instead write constructors. A constructor is a special method which allocates the memory for a class and (potentially) initializes the fields of the object.

Example:

```
struct Complex {
    int real;
```

```
    int i;

    Complex(int real, int i): real{real}, i{i} {}
    //                        |<---- MIL ---->|
};
```

If we do not write a constructor, the compiler usually produces a default constructor and allows C-style struct initialization.

Note: When initializing an object use braces, such as in `Vec vec{1, 2};`.

3 Returning from functions

Objects can be returned from functions just like pointers or `int, char`, and such. Doing so creates a copy of the object, and the stack will automatically delete it when it goes out of scope.

For instance, consider the code for complex numbers and consider this line:

```
Complex c1{1, -2}, c2{3,5};
cout << c1 + c2 << endl;
```

Exercise: Write `operator+` so this code works. What is going on here?

4 Explicit Constructors

In C++, the presence of a one-parameter constructor for a class `T` taking a type `S` allows the compiler to make implicit conversions from `S` to `T`. The `explicit` keyword on a constructor disables this implicit conversion.

Exercise: You have been using these implicit conversions for a while now, even if you haven't recognized it. Can you think of some examples?

Exercise: Can you think of a situation in which explicit would be a good idea?