Intro to C++

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McGill Physics Hackathon Preparation Formation

Short History of C++

Created in the early 1980s	Why C++ was created?	Key Idea: Extension of C	STL: Standard Template Library
By Bjarne Stroustrup while he was working at Bell Labs.	To do large-scale system simulations.	Similar syntax as C's but with added features.	A core part of modern C++ Eg. vectors, sets, find
Standardized in 1998 (C++98)	**Major updates with C++11**	**C++ is still very prevalent today**	**Why is C++ still relevant?**
First official international standard, making C++ consistent across compilers	Considered modern C++	Game engines, scientific computing, systems software	Extremely fast and efficient; Fine control over memory and hardware

→

Why use C++?

1

Extremely Fast

2

Very Efficient

3

Good Memory Control

4

Good Hardware Control

→

Why should/would you use C++?

1 Extremely Fast and Efficient

2 Huge ecosystem and libraries

3 Many fun products are based in C++

4 Useful beyond the hackathon

Today's agenda

Overview of basic code

```cpp
1   #include<iostream>
2   using namespace std;
3
4   int main()
5   {
6
7       cout<<"Hello World!"<<endl;
8       return 0;
9
10  }
```

Today's agenda

$\rightarrow$

4 Basic Types

```cpp
void main() {
    int a;

    int a = 5;

    float b = 3.14;

    char c = 'C';

    double d = 2.71828;
}
```

Today's agenda

$\rightarrow$ # What about other types?

```cpp
#include <string>

void main() {
    char str1[] = "Hello, World!";
    std::string str2 = "Hello, C++17!";
}
```

Today's agenda

→ # What about other types?

```cpp
#include <string>
using namespace std;

void main() {
    char str1[] = "Hello, World!";
    string str2 = "Hello, C++17!";
}
```

Today's agenda

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Object-Oriented Programming

```cpp
#include <iostream>

class animal {
    public:
        int age;
        int species;

        void make_sound() {
            std::cout << "Some generic animal sound" << std::endl;
        }
};
```
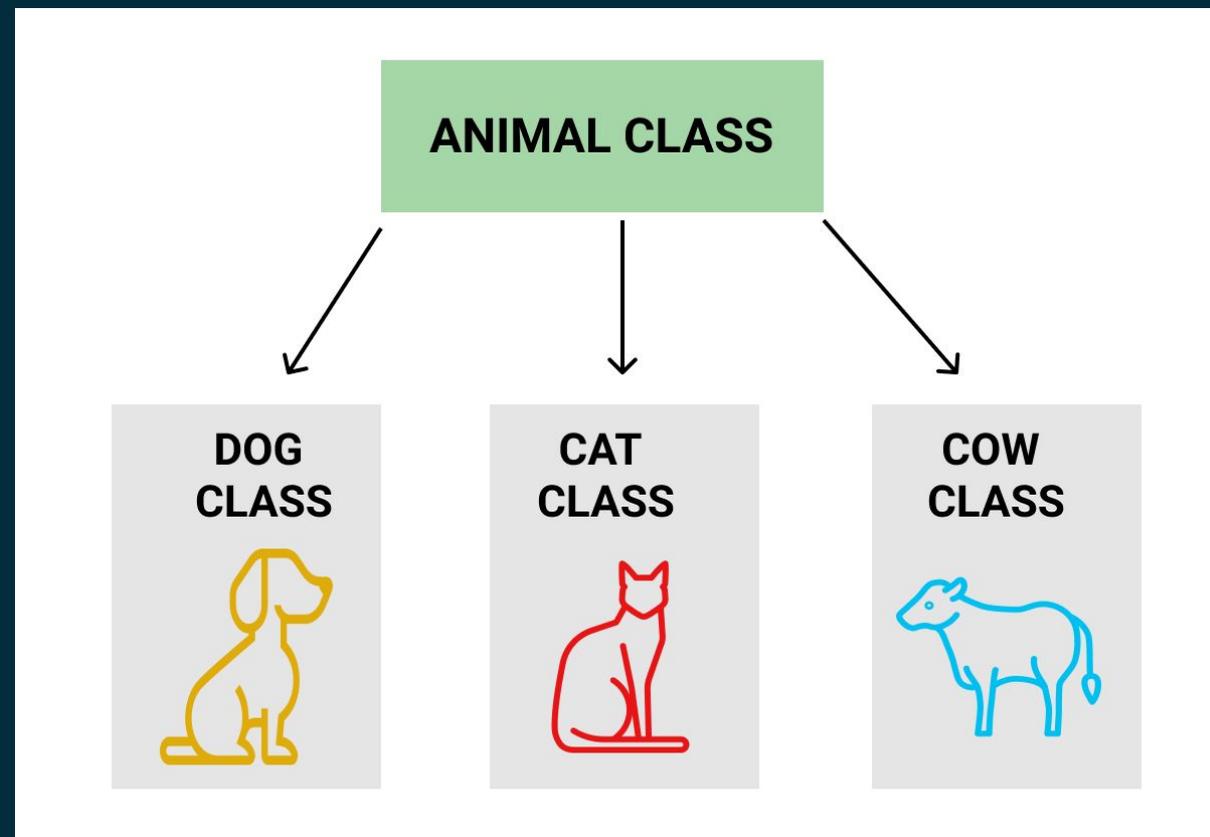
Today's agenda

Class Inheritance

Today's agenda

Class Inheritance

```cpp
class dog : public animal {
    public:
        void make_sound() {
            std::cout << "Woof!" << std::endl;
        }
        void fetch() {
            std::cout << "The dog is fetching the ball!" << std::endl;
        }
};
```

Today's agenda

You're written the code, now what?

C++ is a compiled language and so there are a few steps.

1	2	3	4
Compile you .cpp file	Creates an executable (binary) file	Check the permissions of the new file	Run the executable file

Today's agenda

→

Project Ideas

1

Logic Algorithms and Games

2

Physics simulations

3

Grid Simulations

Today's agenda

→ # Resources

1 W3 Schools: C++ Introduction

2 Learncpp

3 A complete guide to programming in C++

4 Cpp Reference

Thank you

If you have any questions, feel free to contact me!

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