



# Streams, strings and nullptr

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# Input and output streams

- Abstraction of a device with two operations
  - Write: append data to the device
  - Read: fetch data from the device
- Three types of streams in C++ (`#include <iostream>`)
  - Input stream: `std::istream`
  - Output stream: `std::ostream`
  - Input/output stream: `std::iostream`
- Usage:
  - `<<` to append data to an input stream
  - `>>` to fetch data from an output stream

# Input and output streams

- The iostream library provides two streams
  - `std::cout` is the standard output
  - `std::cin` is the standard input
  - Both are global variables (objects)

```
#include <iostream>

int main(int argc, char* argv[]) {
    std::cout << "Hello, world!!!" << std::endl;
    return 0;
}
```

`std::endl` represents the end of line

# Strings

- C++ defines a standard type for the strings: `std::string`
  - Behaves like a `const char*`
  - But adds many useful methods
- Prefer using `std::string` than `const char*` in C++

```
int main(int argc, char* argv[]) {  
    std::string s = "Hello, world!!!";  
    std::cout << s << " has " << s.length()  
                << " characters" << std::endl;  
    return 0;  
}
```

# nullptr

- nullptr is a keyword that represents the null pointer

```
void f(monster_t* m) {  
    if(m == nullptr)  
        std::cout << "Error: null pointer" << std::endl;  
}
```