iostream

The most frequently used read/write stream is iostream. We'll look at the implementation shortly.

The stream classes `std::istream` and `std::ostream` are often used for the reading and writing of data. Use of `std::istream` classes requires the `<istream>` header; use of `std::ostream` classes requires the `<ostream>` header. We can have both with the header `<iostream>`. `std::istream` is a typedef for the class `basic_istream` and the character type `char` whereas `std::ostream` is a typedef for the class `basic_ostream`:

```
typedef basic_istream<char> istream;
typedef basic_ostream<char> ostream;
```

C++ has four predefined stream objects for convenience when dealing with the keyboard and the monitor.

Stream object	C pendant	Device	Buffered
`std::cin`	`stdin`	keyboard	yes
`std::cout`	`stdout`	monitor	yes
`std::cerr`	`stderr`	monitor	no
`std::clog`		monitor	yes

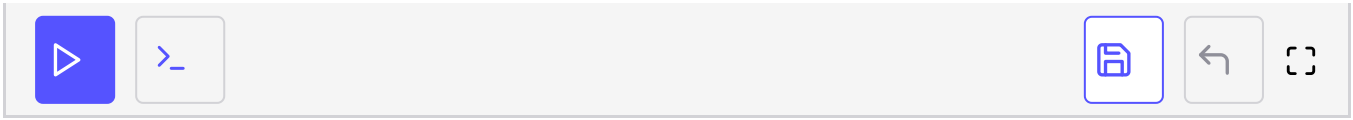
The four predefined stream objects

> **ℹ The stream objects are also available for wchar_t**
> The four stream objects for `wchar_t` `std::wcin`, `std::wcout`, `std::wcerr`,

and `std::wclog` are by far not as heavily used as their `char` pendants. Therefore, we treat them with only marginal concern.

The stream objects are sufficient to write a program that reads from the command line and returns the sum.

```
#include <iostream>

int main(){

  std::cout << std::endl;
  std::cout << "Type in your numbers(Quit with an arbitrary character): " << std::endl;

  int sum{0};
  int val;

  while ( std::cin >> val ) sum += val;

  std::cout << "Sum: " << sum << std::endl << std::endl;

}
```



The stream objects

The small program above uses the stream operators `<<` and `>>` and the stream manipulator `std::endl`.

The insert operator `<<` pushes characters onto the output stream `std::cout`; the extract operator `>>` pulls the characters from the input stream `std::cin`. We can build chains of insert or extract operators because both operators return a reference to themselves.

`std::endl` is a stream manipulator because it puts a '`\n`' character onto `std::cout` and flushes the output buffer.

Here are the most frequently used stream manipulators.

Manipulator	Stream type	Description
`std::endl`	output	Inserts a new-line character and flushes the stream

		the stream.
`std::flush`	output	Flushes the stream.
`std::ws`	input	Discards leading whitespace.

The most frequently used stream manipulators

In the next lesson, we'll discuss other functions we can use to perform input/output operations other than `cin` and `cout`.