The State of the Stream

Are there tools we can use in C++ which allow us to check the current condition of the stream? Flags answer this question.

Flags represent the state of the stream `stream`. The methods for dealing with these flags need the header `<iostream>`.

Flag	Query of the flag	Description
`std::ios::goodbit`	`stream.good()`	No bit set
`std::ios::eofbit`	`stream.eof()`	end-of-file bit set
`std::ios::failbit`	`stream.fail()`	Error
`std::ios::badbit`	`stream.bad()`	Undefined behaviour

State of a stream

Here are examples for conditions causing the different states of a stream:

`std::ios::eofbit`:

- Reading beyond the last valid character.

`std::ios::failbit`:

- False formatted reading.
- Reading beyond the last valid character.
- Opening of a file went wrong.

`std::ios::badbit`:

- The size of the stream buffer cannot be adjusted.
- The code conversion of the stream buffer went wrong.
- A part of the stream threw an exception.

`stream.fail()`:

- returns whether `std::ios::failbit` or `std::ios::badbit` is set.

The state of a stream can be read and set in the following ways:

`stream.clear()`:
Initializes the flags and sets the stream in the `goodbit` state.

`stream.clear(sta)`:
Initializes the flags and sets the stream `sta` state.

`stream.rdstate()`:
Returns the current state.

`stream.setstate(fla)`:
Sets the additional flag `fla`.

Operations on a stream only work if the stream is in the `goodbit` state. If the stream is in the `badbit` state, when cannot set it to the `goodbit` state.

```
#include <ios>
#include <iostream>

int main(){

  std::cout << std::boolalpha << std::endl;

  std::cout <<  "In failbit-state: " << std::cin.fail() << std::endl;

  std::cout << std::endl;

  int myInt;
  while (std::cin >> myInt){
    std::cout << "Output: " << myInt << std::endl;
    std::cout <<  "In failbit-state: " << std::cin.fail() << std::endl;
    std::cout << std::endl;
  }

  std::cout <<  "In failbit-state: " << std::endl;
  std::cin.clear();
  std::cout <<  "In failbit-state: " << std::cin.fail() << std::endl;

  std::cout << std::endl;

}
```

State of a stream

The input of the character `a` causes the stream `std::cin` to be in `std::ios::failbit` state. Therefore `a` and `std::cin.fail()` cannot be displayed. First, we have to initialize the stream `std::cin`.

In the next lesson, we’ll learn how we can set our own preferences for the input and output operators.