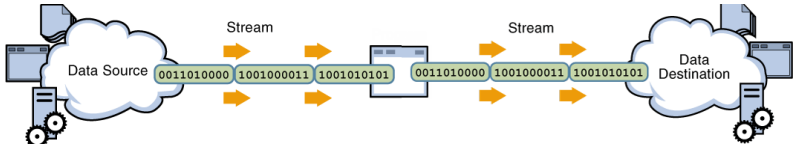
The Standard Streams

At the lowest level, all input and output is a stream of bytes flowing through your program. The bytes may come from a file, your keyboard or even from some remote computer on the network. Your program looks at the stream and changes it, consumes it, or sends it on to output.



Programs that process streams of characters are called **text** filters.

When you run a program, **where** do the input bytes **come from** and where do the **output bytes go to**? What is the data source (in the illustration above), and what is the data destination? Before your program starts, the **operating system** automatically opens three **standard** streams:

- `stdin` (standard input)
- `stdout` (standard output)
- `stderr` (standard error)

In C++, the built-in streams are used to initialize the `cin`, `cout` and `cerr` I/O objects. Java does the same thing, but uses them to initialize the `System.in`, `System.out`, and `System.err` objects. Python uses the streams directly.

The operating system **connects these streams** to your console (screen and keyboard). But, **before** you **run your program**, you may ask the OS to connect each stream to a different endpoint. This is known as **redirection**.