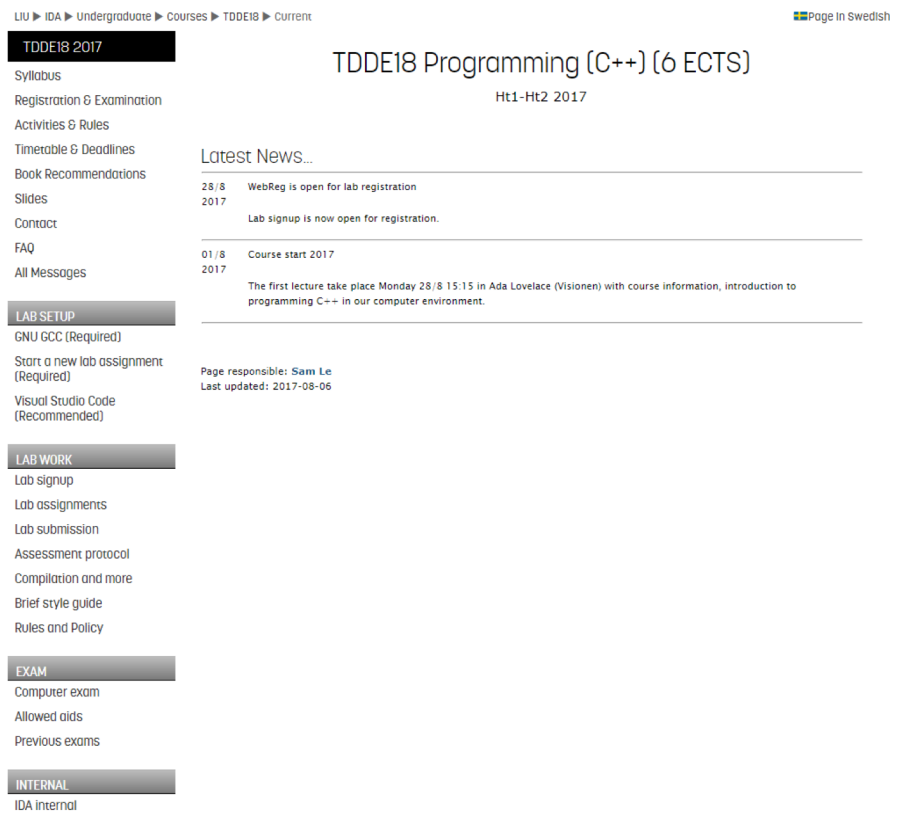
TDDE18 & 726G77

Programming in C++

Course website



All information you need to complete the course exists on the course website

Administration

- Examiner – Klas Arvidsson
- Course leader – Sam Le
- Assistant 1 – Viktor Olsson
- Assistant 2 – Mladen Nikic
- Assistant 3 – Jonas Lind
- Assistant 4 – Fredrik Adolfsson

Example from previous exam – The Quiz

Introduction

Sam and his colleagues had a Christmas party quiz and he thought that it would be awesome to use the data from this quiz as an exam question.

Functional requirements

Create a program that allows the user to enter the file name of the quiz data as a *command line argument*. The program must print out the top 3 participant with the highest total score.

$ ./a.out quiz_data.txt

1st place: August with 12160 total points

2nd place: Chris-Cross with 11944 total points

3rd place: Eric with 11623 total points

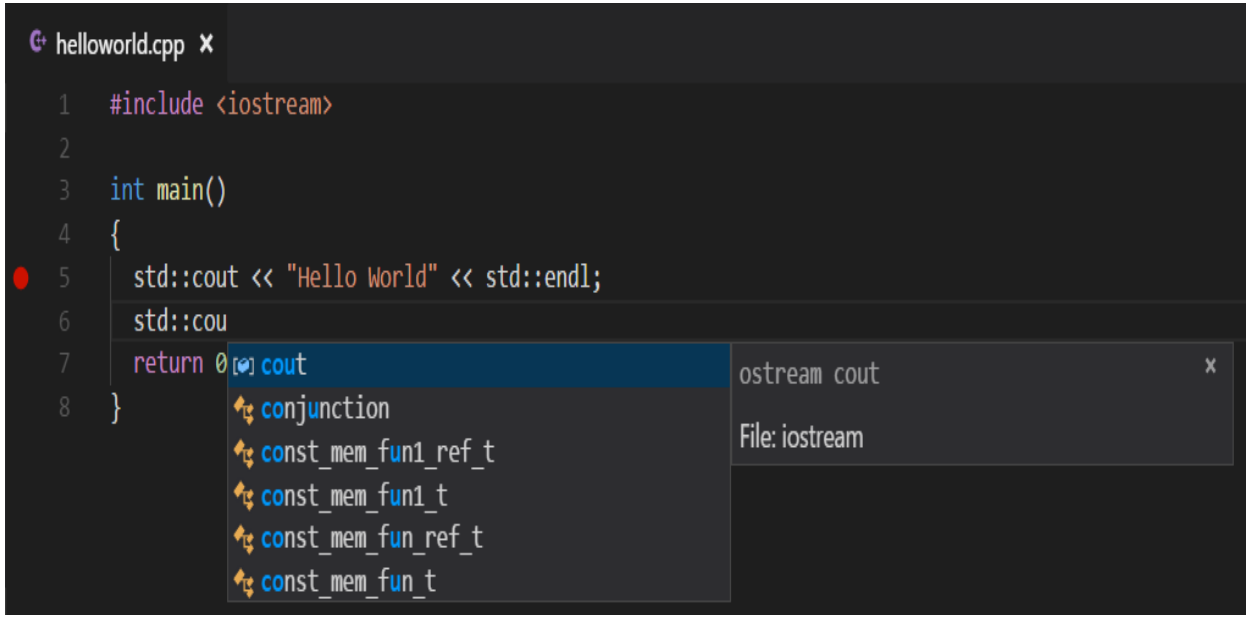
Course layout

- Lectures
- Lessons
- Labs
  - 6 labs
- Exam

Lab soft deadlines

- Bonus time to the exam for higher grade
- 5 extra minute per deadline
- 1 deadline per lab (1 – 6)
- 1 complementary work per lab
- You must demonstrate your work for the assistant.

Visual Studio Code



- IntelliSense
- Debugging
- Built-in Git
- Extensions

https://code.visualstudio.com/

Git + Sendlab

- Git – Used as a version control system and lab collaboration between you and your lab partner
  - Try git
- Sendlab – Used to submit your most recent code on git

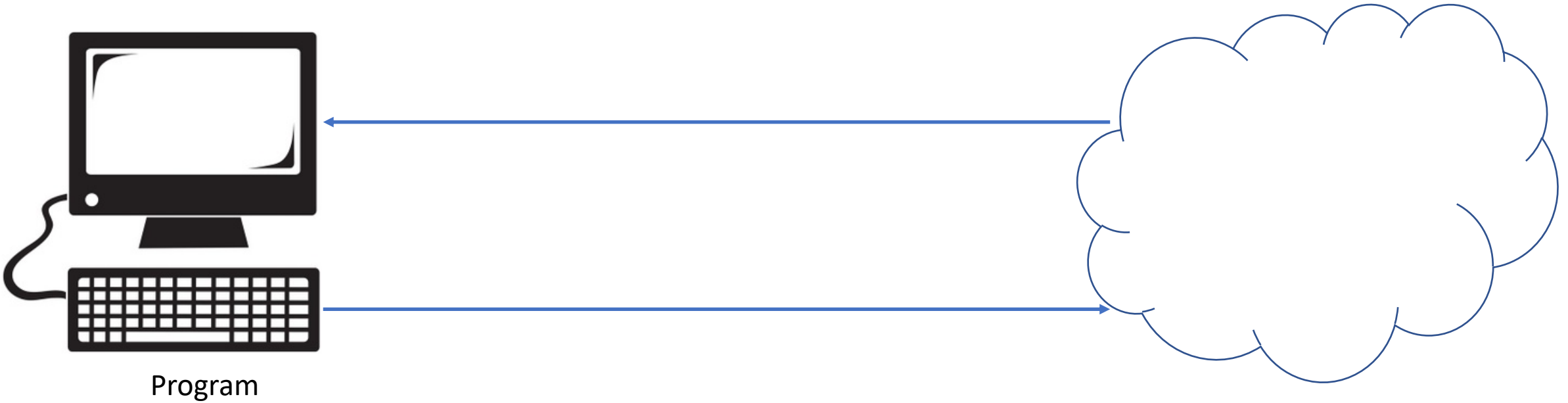
Sendlab

- ~TDDE18/sendlab registration – registrating for lab work
- ~TDDE18/sendlab start – starting a lab
- ~TDDE18/sendlab send – submitting a lab

main is the start button

```
int main() {
}
```

Input and output



Output buffer

Cout

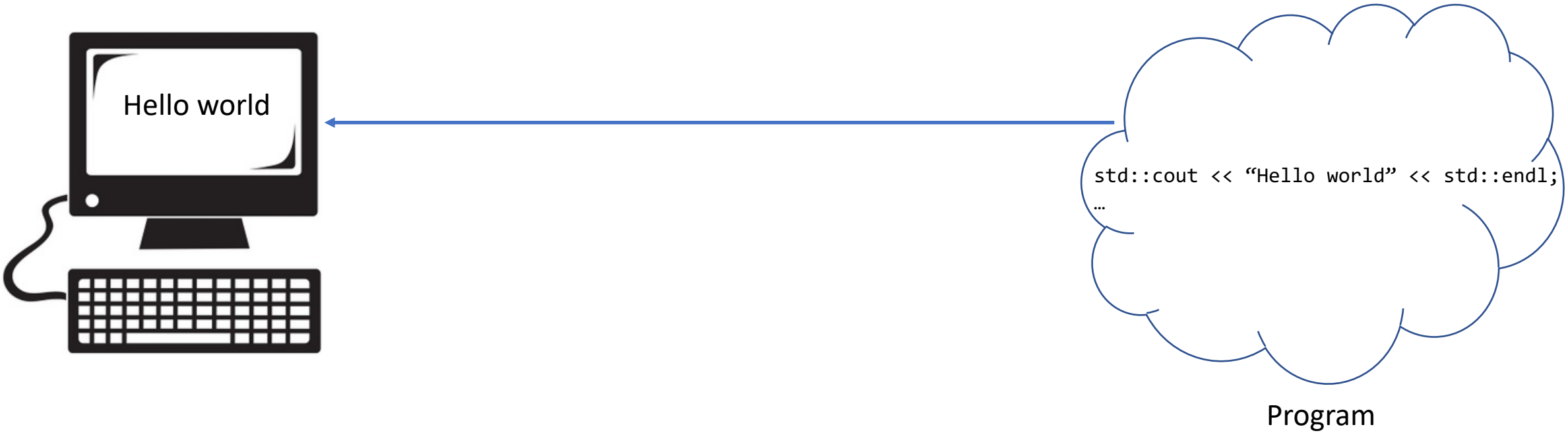
```
int main() {
     std::cout << “Hello world”;
     …
```

Output buffer

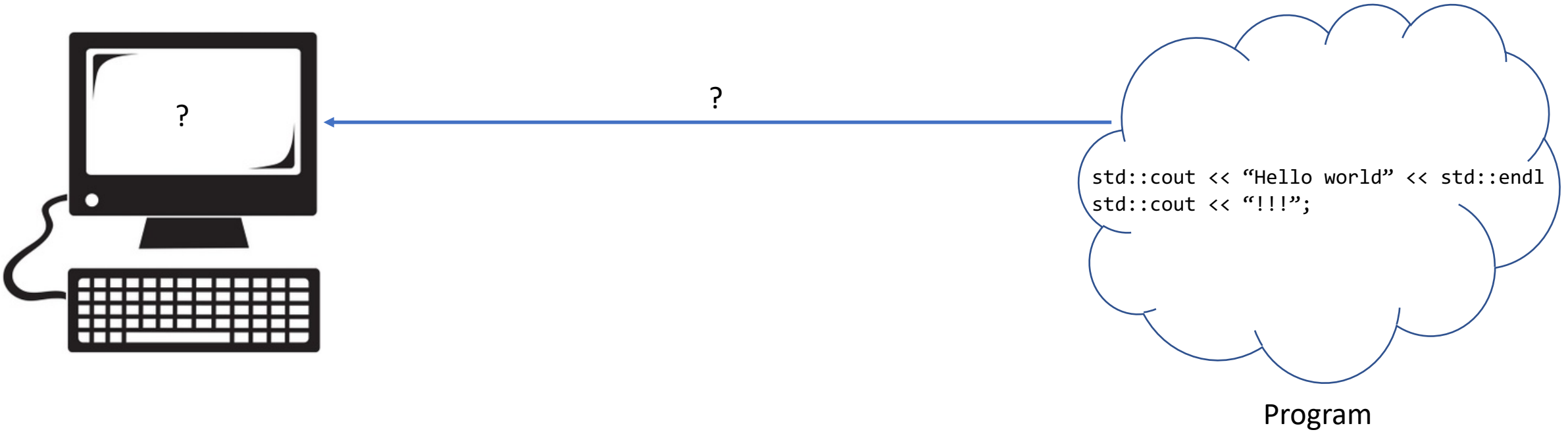
Flush buffer

- When the program exits
- Use something to flush
  - endl
  - flush

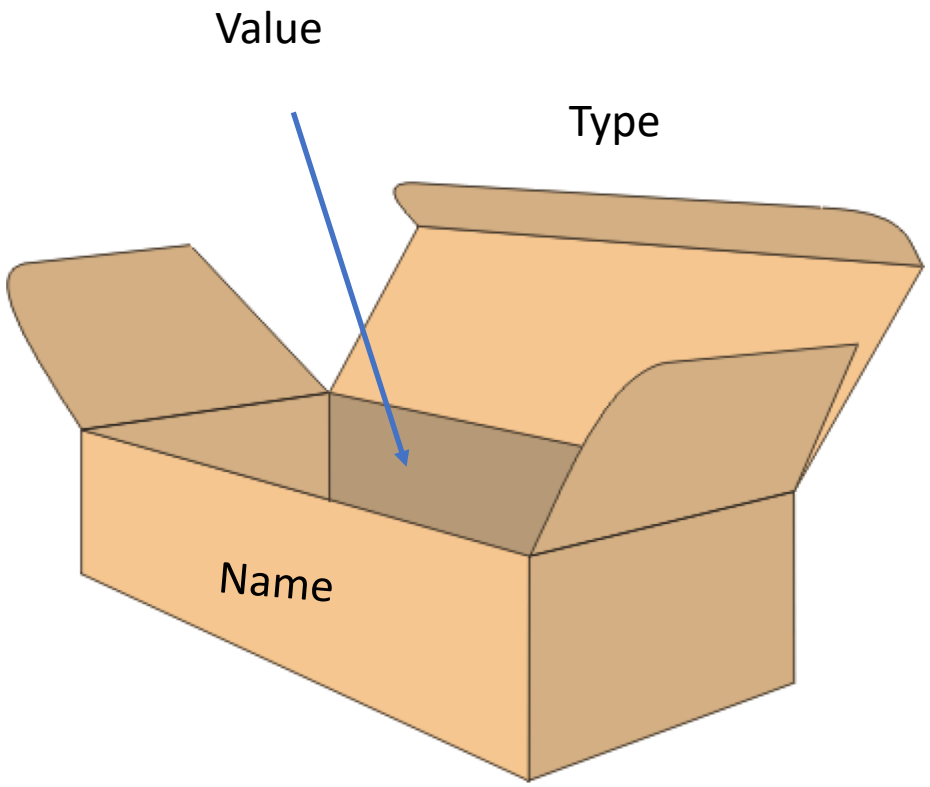
Flush buffer



Flush buffer



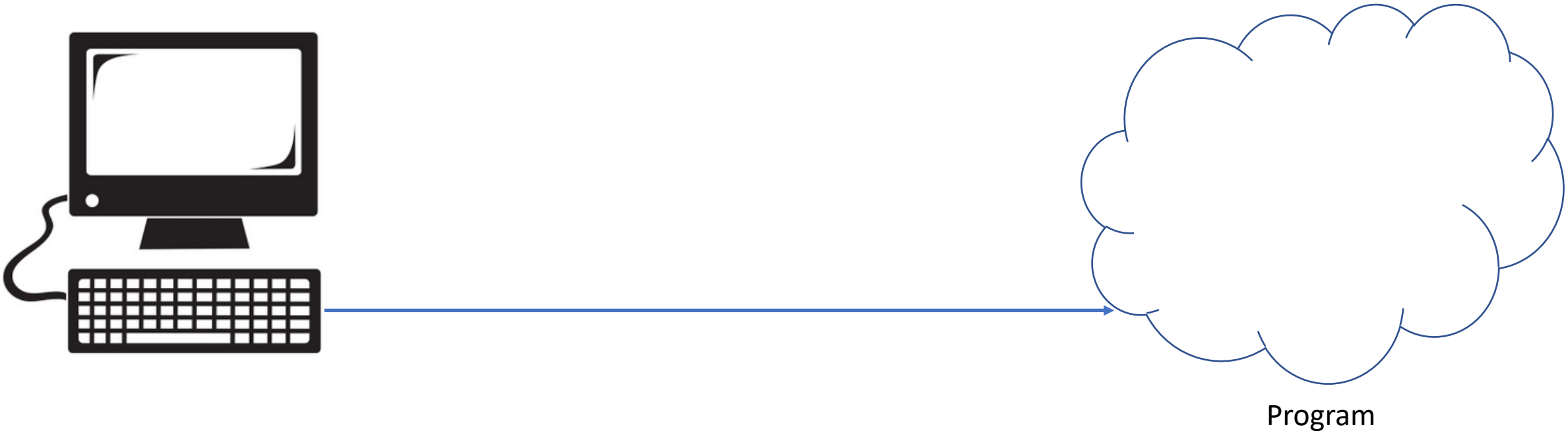
Variables



Example:

- `int x{3}`
- `double y{3.14}`
- `char z{'s'}`

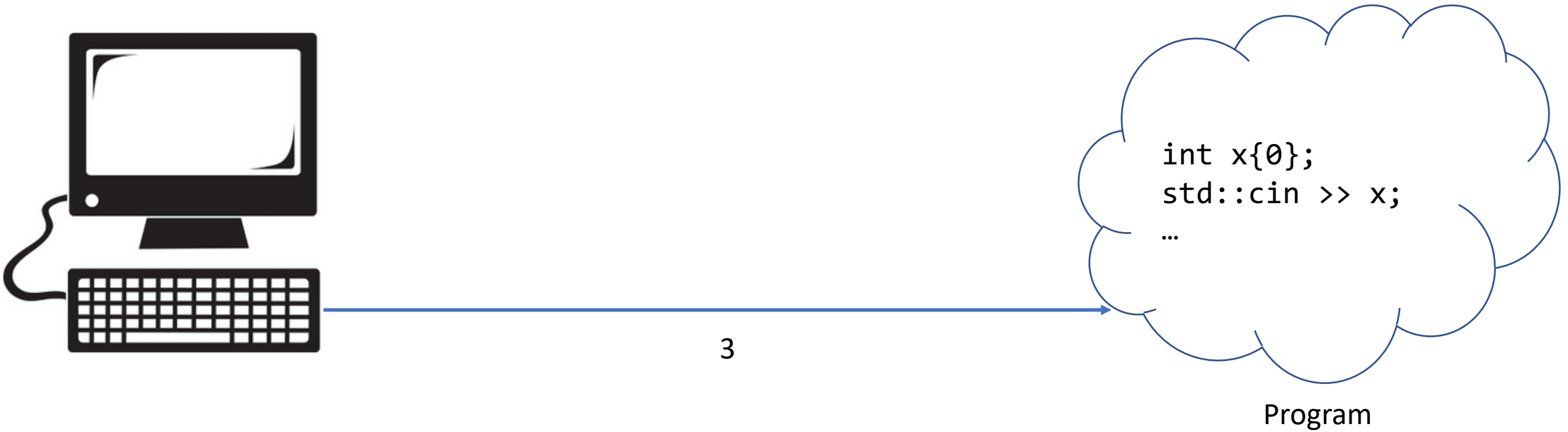
Input buffer



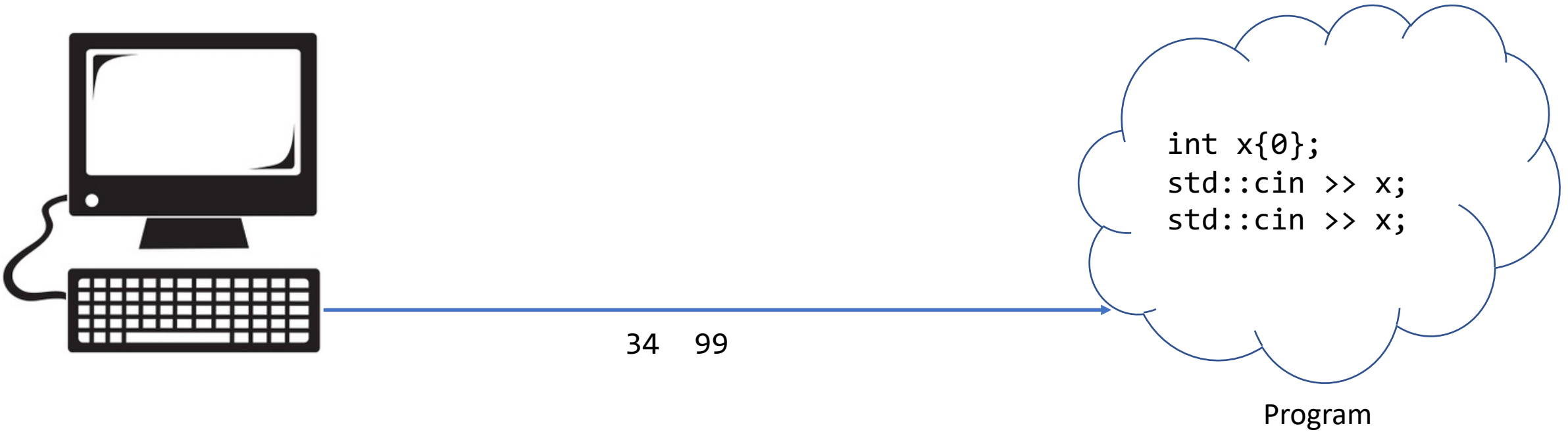
Cin

```
int main() {
     int x{};
     cin >> x;
     …
```

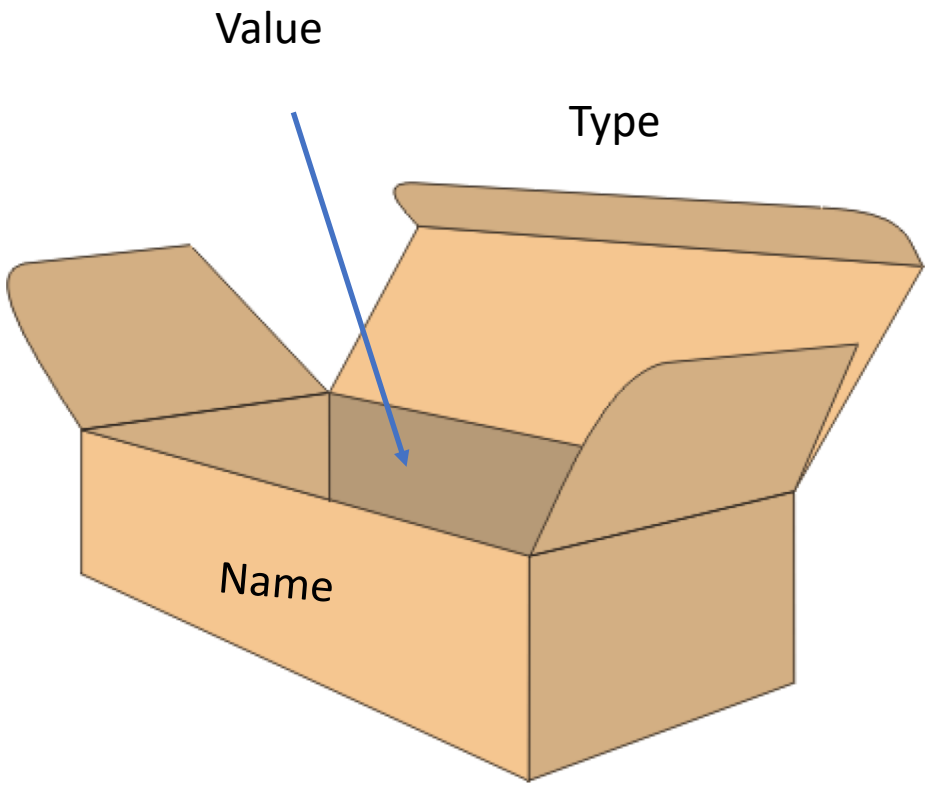
Input buffer



Input buffer



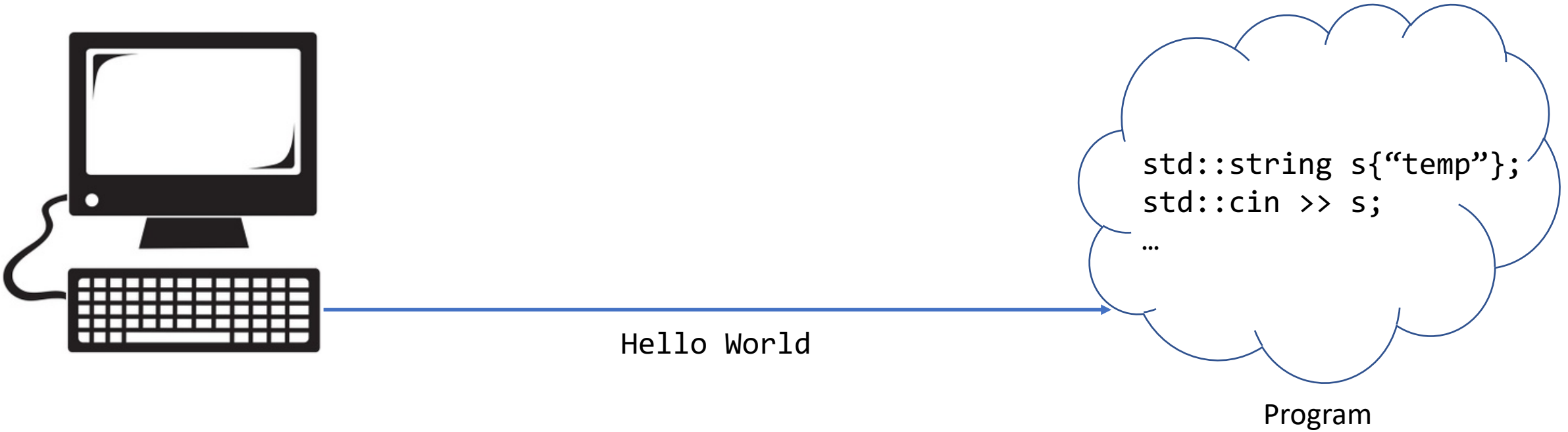
String



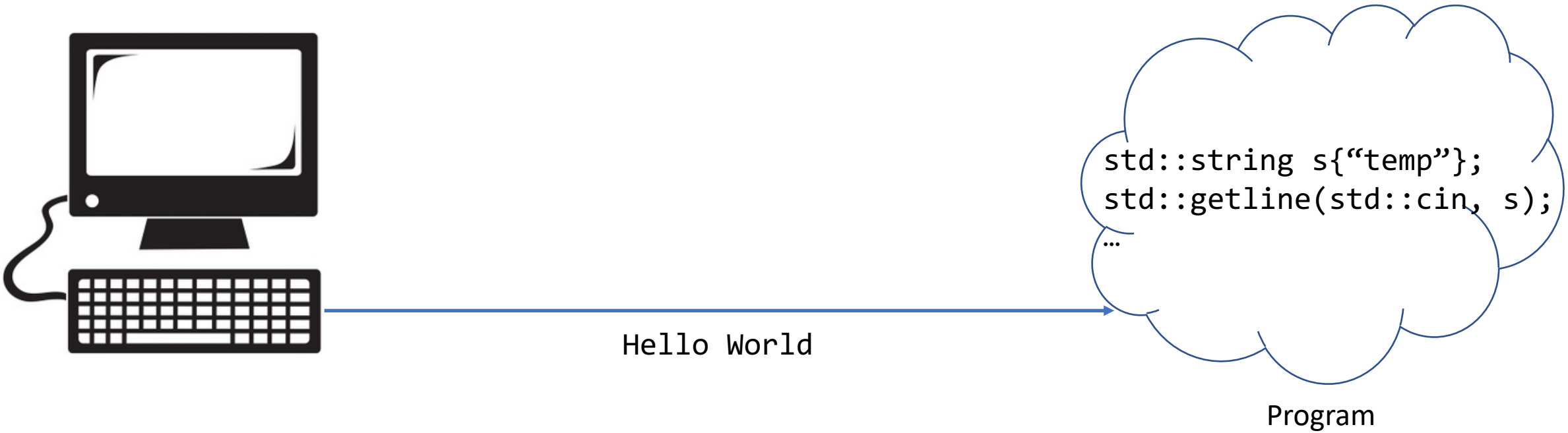

```
string s{“hello”}

s.size()
s.front()
```

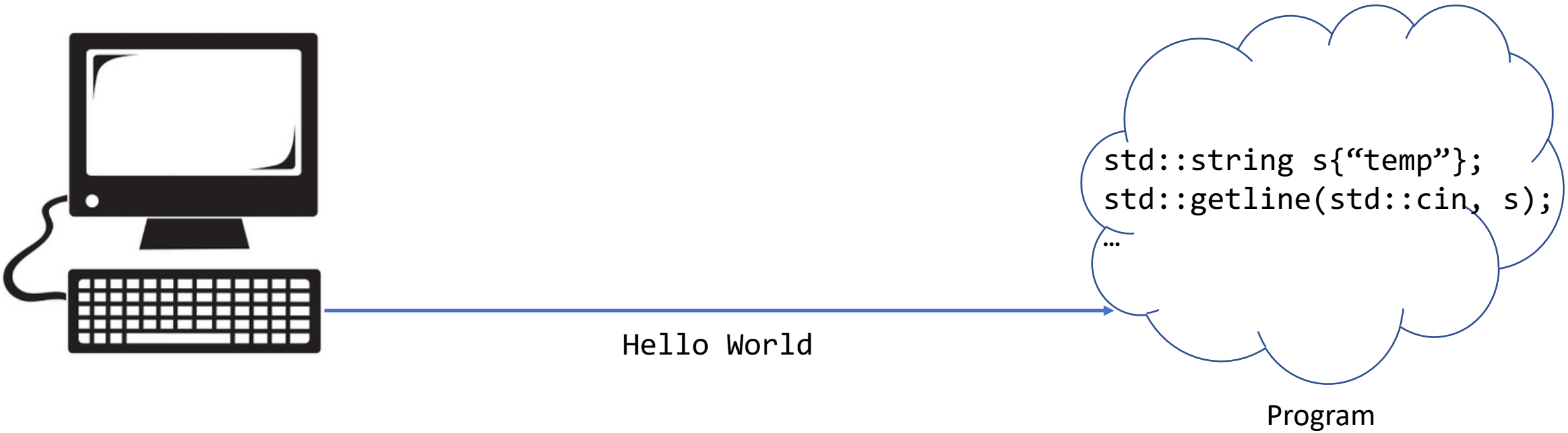
Input buffer



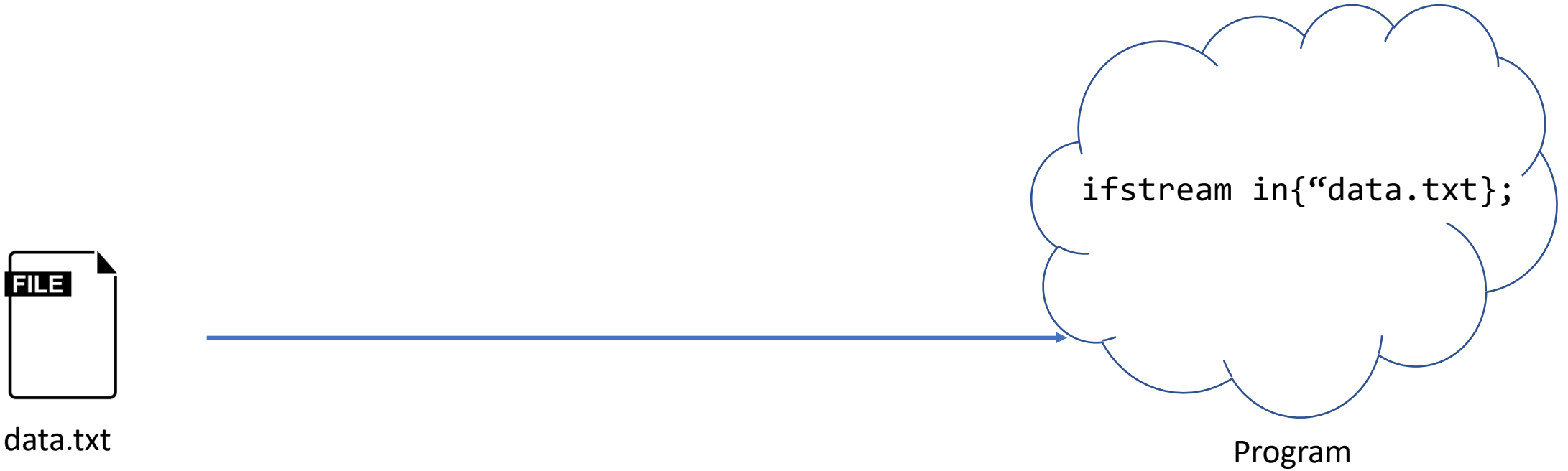
Getline



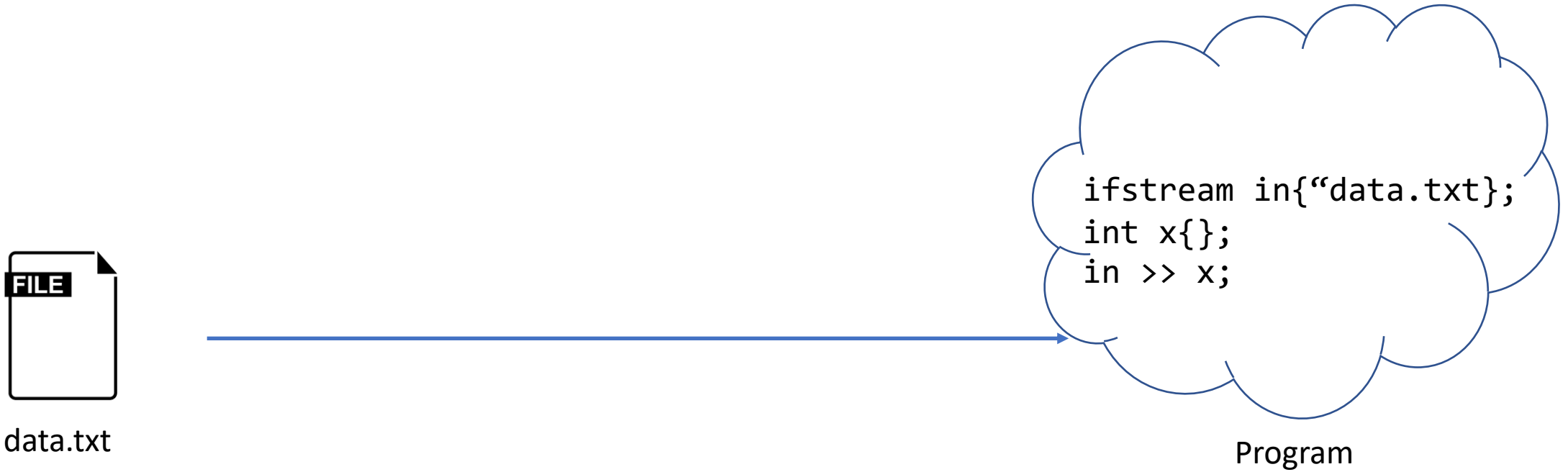
Getline



Reading from files



Reading from files



Includes

- iostream
  - cin
  - cout
- iomanip
  - setw
  - setfill

```
#include <iostream>

int main() {
	std::cout >> “Hello world” >> std::endl;
}
```

Namespace

```
#include <iostream>
using namespace std;

int main() {
        cout >> “Hello world” >> endl;
}
```

Conditional statements: if/else if/else

```
if (some logical statement) {
     do this
}
else if (some other logical statement) {
     do this instead
}
else {
     when all else fails do this
}
```

Comparison and Logical operators

- `a == b`
- `a != b`
- `a < b`
- `a <= b`
- `a > b`
- `a >= b`

`a = 1, b = 2`

- `a == b and c != b`
- `a == b or a == c`
- `!a`
- `&&` is equivalent to `and`
- `||` is equivalent to `or`

`c = 3, d = 4`

Code example

```
int a{2};
int b{2};
if (a < b) {
     cout << “This will not be executed” << endl;
}
```

Code example

```
int a{2};
int b{2};
if (a > b and a == b) {
     cout << “This will not be executed” << endl;
}
```

loops

- for loops
- while loops
- do-while loops

- Which one to use depends on purpose and readability

For loops

- You know exactly how many times you want to loop

```
for (initializing; conditional statement; incrementing) {
      body
}
```

Code example

```
for (int i{0}; i < 5; ++i) {
     cout << i << “ “;
}
```

While loops

- When you do not know how many times it will run

```
while (conditional statement) {
     body
}
```

Code example

```
int a{};
cin >> a;

while (a < 10) {
     cin >> a;
}
```

Do-While loop

- Run the body at least once

```
do {
        body
} while (conditional statement);
```

Code example

```
do {
     cout << “Enter a number between 0 and 10: “;
     cin >> integer;
} while (integer < 0 and integer > 10);
```

Arithmetic operators

`+, -, *, /, %`

`Example:`

- `1 + 3`
- `a – b`
- `c * d`
- `10.0 / 3`
- `3 % 2`

Arithmetic operators

```
+=, -=, /=, *=
++, --

Example:
a += 4; => a = a + 4
b++ => b = b + 1;
--a => a = a – 1;
```

```
int a{0};
int b{1};

int c{a++}; // What is c?
c = --b; // What is c?
```

Type casting

Problem:

```
3 / 2 = 1
```

but

```
3 / 2.0 = 1.5
```

Example:

```
int a{3};
int b{2};

cout << a / b << endl;
```

output: 1

Type casting

static_cast<*new type*>(*input*) *// will return a value of the new type*

Example:

- `static_cast<int>('a'); // 65 due to ascii table`
- `static_cast<double>(1); // float value 1.0`

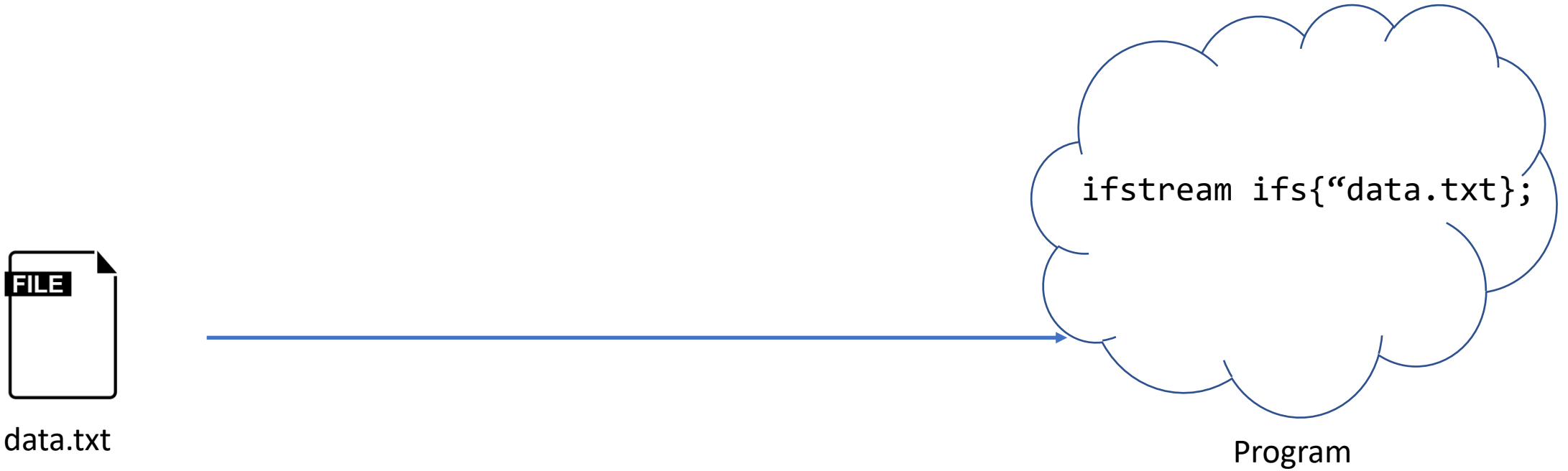
- dont use c-cast eg: (double)a

Commenting

```
// line comment


/*
   multiline
   comment
*/
```

Reading until end of input



Reading until end of input

```
ifstream ifs{”data.txt”};
string s{};

while (...) {
    ...
}
```

Reading until end of input

```
ifstream ifs{”data.txt”};
string s{};

while (/* As long that it can read from ifs to s*/) {
    ...
}
```

Reading until end of input

```
ifstream ifs{”data.txt”};
string s{};

while (in >> s) {
    ...
}
```

Lab 1

- Tuesday at 17.15
- All groups
- This lab session goal is to get everyone started.
  - Visual studio code
  - Sendlab
  - Git