C++ Workshop 1
Basic Code Structures

Panagiotis Petridis

Brought to you by HackSoc

Variable Declarations

var_type var_name = value;

Available types:
- int
- unsigned
- short
- float
- char
- double
- long [long]
- string*

```
int a = 0;
int b = 3;
a += 5;
b = b - a * 3;
```

Arrays

type var_name[] = {value, value,

..., 22, 1};

type var_name[3] = {value, value,
value};

type var_name[constant value];

Indexing

C++ does NOT do *bound
checking*!!!

type var_name[3] = {value,
value, value};

var_name[4] = ??
Segmentation Fault

If-else statements

```
if (condition) {
    // code…
} else if (another_condition) {
    // code…
} else {
    // code…
}
```

```
if (true) {
    // code…
} else if (true || (1 && false) ){
    // code…
} else {
    // code…
}
```

Loops

```
for (statement; condition; statement) {
    // code…
}


while (condition) {
    // code…
}


do {
    // code…
} while (condition);
```

```
for(int i = 0; i < 10; i ++) {

}


while (true) {

}


do {
    // code…
} while (false);
```

Switch statements

```
switch(variable) {
    case value:
        // code…
        break;
    case value:
        // code…
        break;
    default:
        // code…
        break;
}
```

```
switch(error_code) {
    case 200:
        // OK
        break;
    case 404:
        // NOT FOUND
        break;
    default:
        // PANIC
        break;
}
```

Functions

```
type func_name(type p1, type p2, …) {
    return value;
}


void do_stuff (int a, string s) {
    return a + s.size();
}
```

```
int main() {
    // code…
    return 0;
}


void  exit_early() {
    // code will run
    return;
    // code won't run
}
```

Structs

```
struct name {
    type var;

    name() {
        // initialize
    }

    type fun() {
        return value;
    }
};
```

```
struct name {
    type first_name;

    type last_name;

    type full_name() {
        return first_name + last_name;
    }
};
```

Classes (fancy structs)

```
class Animal {
public:
    Animal(type var, …) { … }
    type fun() { … }
    type var; // don't do this
private:
    type fun_fun() { … };
    type var;
    type var;
};
```

```
class Animal { … };


int main() {
    Animal doggo("Ector", "woof");
    doggo.make_sound();
    return 0;
}
```

#include libraries

You can include libraries that exist in your PATH with:

#include <library_name>

To include code from other files you can use:

#include "library_name.cpp"

#include "library_name.h"

#include <iostream>

#include <vector>

#include "my_algorithms.cpp"

#include "my_cool_class.h"

Namespaces

```cpp
using namespace my_namespace;

namespace my_namespace {
  // separated code…
}
```

```cpp
using namespace std;
namespace my_namespace {
    void my_function() { … }
}


my_namespace::my_function();
```

Output to console

```cpp
#include <iostream>

using namespace std;

int main() {
  cout << "Hello World!" << endl;
  return 0;
}
```

I/O stream

```cpp
#include <iostream>

int main() {
    int a = 7;
    std::cout << "Lucky number: " << a
    << std::endl;
    return 0;
}
```

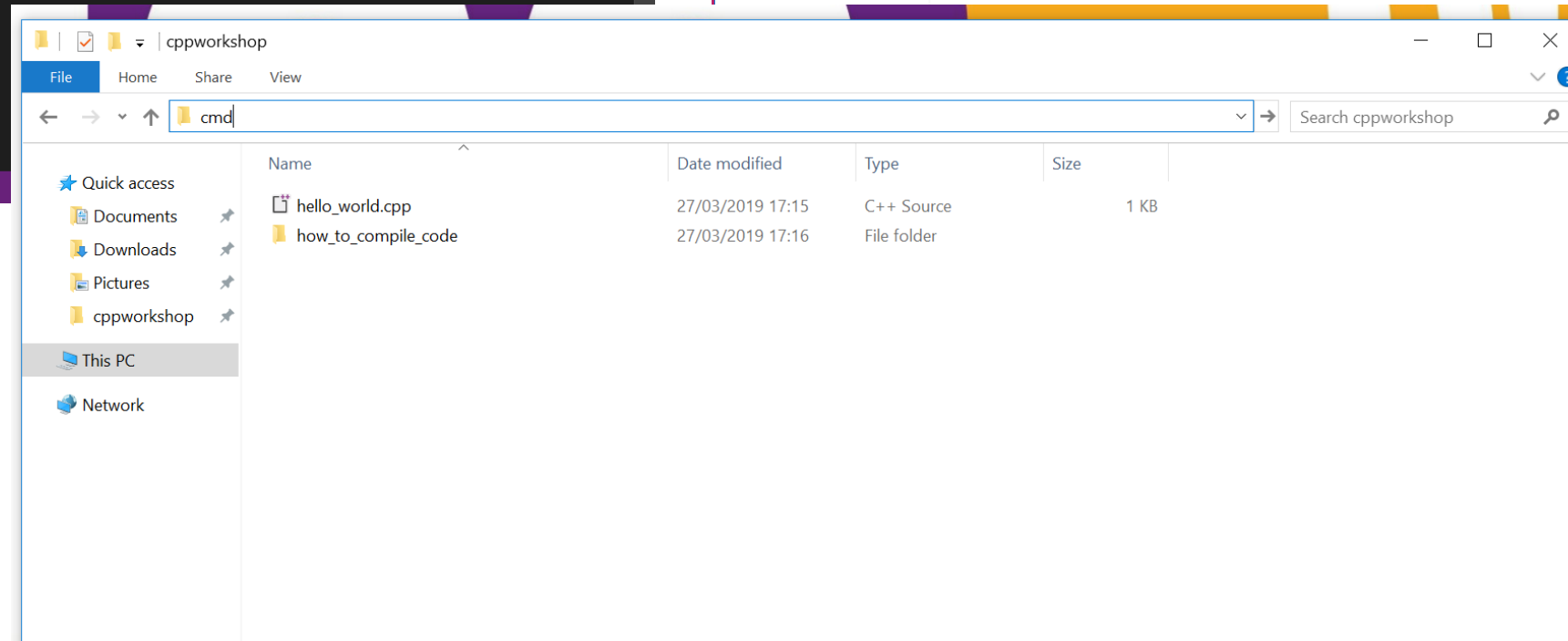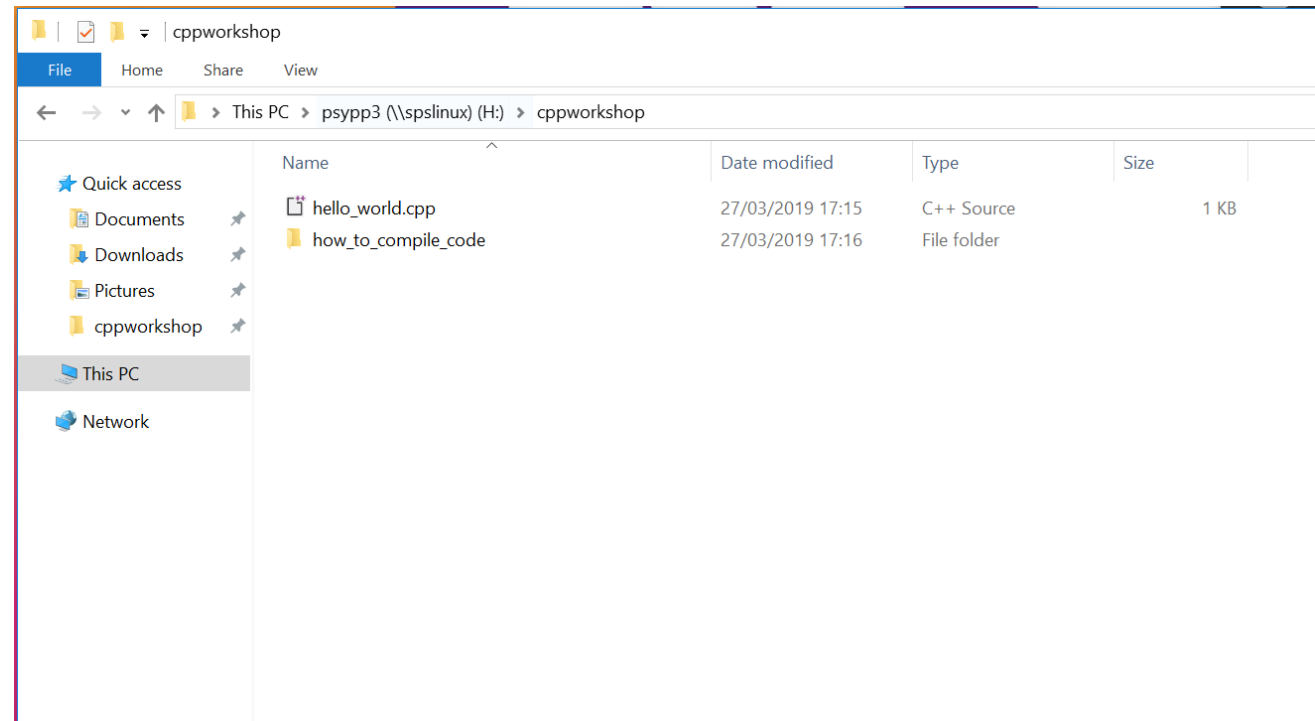# User input

```cpp
#include <iostream>

using namespace std;

int main() {
    string name;
    cin >> name;
    cout << "Hello " << name << endl;
    return 0;
}
```
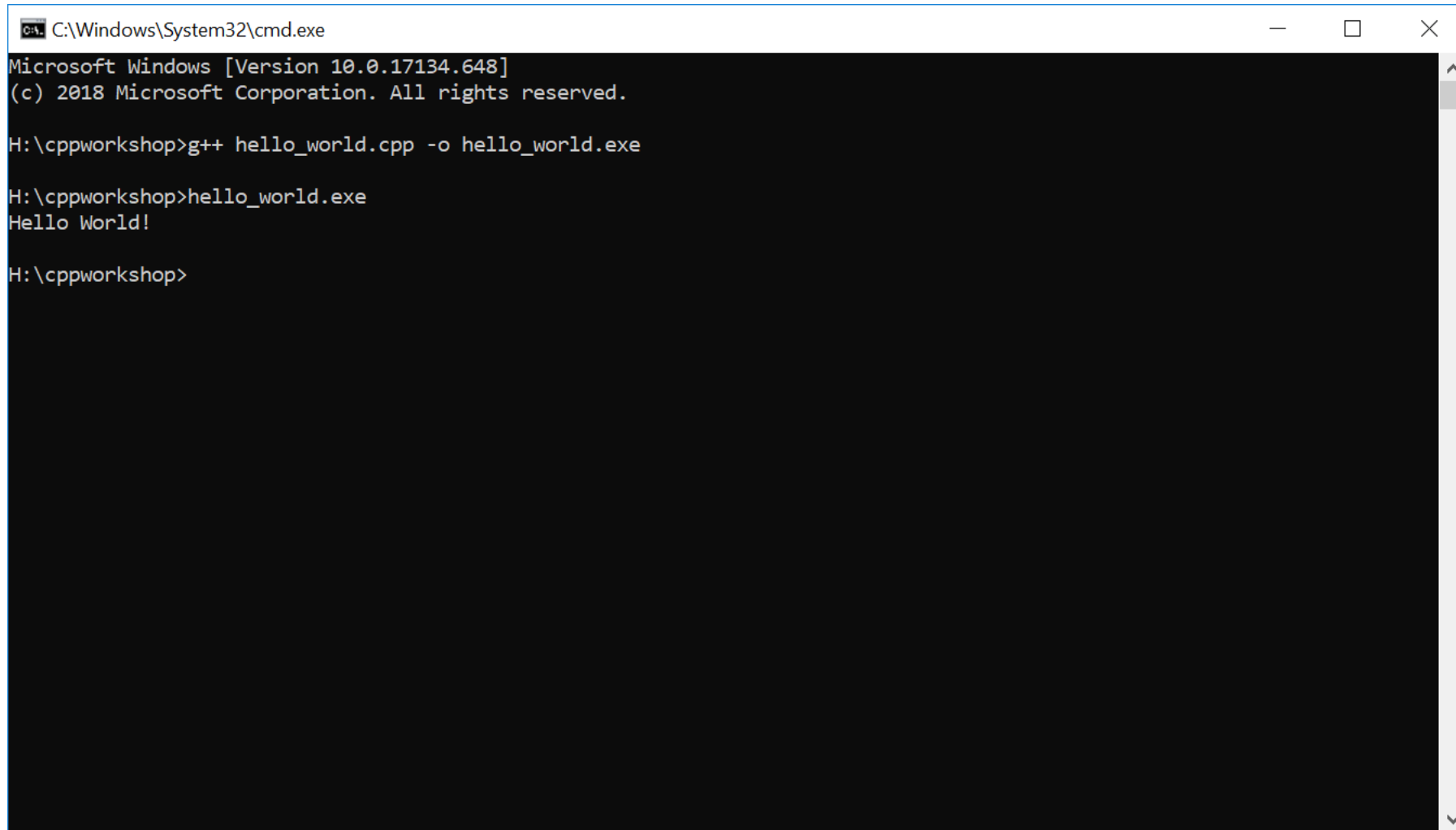
Setup workspace

http://coliru.stacked-crooked.com/

hello_world.cpp

```cpp
1   #include <iostream>
2
3   using namespace std;
4
5   int main(){
6       cout << "Hello World!" << endl;
7       return 0;
8   }
```

⊗ 0 ⚠ 0

cppworkshop

File   Home   Share   View

This PC > psypp3 (\\spslinux) (H:) > cppworkshop

Name	Date modified	Type	Size
hello_world.cpp	27/03/2019 17:15	C++ Source	1 KB
how_to_compile_code	27/03/2019 17:16	File folder	

Quick access
- Documents
- Downloads
- Pictures
- cppworkshop

This PC

Network

cppworkshop

File   Home   Share   View

cmd

Search cppworkshop

Name	Date modified	Type	Size
hello_world.cpp	27/03/2019 17:15	C++ Source	1 KB
how_to_compile_code	27/03/2019 17:16	File folder	

Quick access
- Documents
- Downloads
- Pictures
- cppworkshop

This PC

Network

compile with g++ (c++ on mac)


```
C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.17134.648]
(c) 2018 Microsoft Corporation. All rights reserved.

H:\cppworkshop>g++ hello_world.cpp -o hello_world.exe

H:\cppworkshop>hello_world.exe
Hello World!

H:\cppworkshop>
```

Practice!

https://www.hackerrank.com/

Resources:

https://github.com/PanagiotisPtr/cpp_workshop