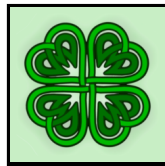


# C

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lucky777

## Reminder

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### First program

```
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[]) {
    printf("Lucky world\n");
    return 0;
}
```

- **#include**

The files we need to run the software. (stdio is required to print text on the screen)

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- **int argc, char \*argv[]**

*(These arguments are optional)*

When we run the software in a terminal (`./test`) we can give it arguments.

These arguments are stocked in the `argv` array, and the number of arguments is stocked in `argc`.

*(The first argument is the name of the file we have run)*

For example : `./test lucky 777`

`argc = 3`

`argv[] = {"test", "lucky", "777"}`

---

- `printf();`  
The function to print text on the standard output (screen).  
(This function requires the library `<stdio.h>`)
- 

- `return 0;`  
(this line is optional)  
In **C**, the main method will return **0** if no problem occurred during the execution.

## Comma truncation

```
double ko;
ko = 5/2;
//ko = 2

double ok;
ok = 5.0/2.0
//ok = 2.5
```

## Global and static

```
#include <stdio.h>

int w;
static int x;

static void test();

int main() {
    int y;
    static int z;
    return 0;
}

static void test() {
    printf("Lucky world!\n");
}
```

- `int w;`
    - `w` is accessible from anywhere.
- 
- `static int x;`
    - `x` is accessible from the current file.
- 
- `int y;`
    - `y` is only accessible inside the function.
-

- `static int z;`
    - `z` is only accessible inside the function, but will keep its value.
- 
- `static void test()`
    - `test()` is only callable by a function inside the current file.

## Switch case

```
unsigned langNumber;
printf("How many languages do you know? : ");
scanf("%d", &langNumber);

switch (langNumber)
{
case 0:
    printf("Wait what?");
    break;
case 1:
    printf("I guess you speak english");
    break;
case 2:
    printf("You are bilingual");
    break;
case 3: //Will
case 4: //Execute
case 5: //This line:
    printf("Wow! Nice");
    break;
default:
    printf("Amazing!!");
    break;
}
```

## Ternary condition

```
if (isOk) {
    result = "ok";
} else {
    result = "error";
}

// Same as:
result = (isOk) ? "ok" : "error";
```

## Prototypes

```
#include <stdio.h>

test();

int main() {
    test();
    return 0;
}

void test() {
    printf("ok");
}
```

- As the `main()` is before the function `test()`, the compiler will think that `test()` doesn't exist.  
So we can add the prototype `test();` at the beginning of the code, to tell gcc that we will use a function called `test()` after.  
*(If we put the `main()` at the end of the code, prototypes are not required)*

## Headers

---

### main.c

```
#include "test.h"

int main() {
    testFunction();
}
```

### test.c

```
#include "test.h"

void testFunction() {
    printf("Lucky world!\n");
}
```

### test.h

```
#ifndef TEST

#define TEST
#include <stdio.h>
void testFunction();
```

```
#endif
```

- **main.c**

We include `test.h`

---

- **test.h**

If **TEST** is not defined yet:

- We define it
- We include `<stdio.h>`
- We call the prototype of `testFunction()`.

(The `#ifndef` stops at `#endif`)

---

- **test.c**

We include `test.h` and write the codes of `testFunction()`.

(`<stdio.h>` has already been included in `test.h`)

Note:

- `< >` is for standard libraries in `/usr/include/` directory (on linux)
- `" "` is for custom headers inside the current directory

## Pointers

---

```
#include <stdlib.h>
#include <stdio.h>

void f(int *i) {
    printf( "%d\n", *i); //2
    (*i)++;              // *i = value at address i
    printf("%d\n", *i); //3
}

void g(int i) {
    printf( "%d\n", i); //3
    (i)++;              // *i = value at address i
    printf("%d\n", i); //4
}

int main() {
    int i = 2;
    f(&i);              // &i = address of i
    g(i);
    printf("%d\n", i);  //3
}
```

- `int i = 2;`

Declaration of a variable `i` with the value `2`.

This variable will have a random address.

---

- `f(&i)`

Calls the function `f()` with the argument `&i`.

- `i` = value of variable `i`
  - `&i` = the address of the variable `i`
- 

- `void f(int *i)`

Function `f()` with parameter of type `pointer`.

A pointer is a variable type that points at an address.

- `i` = address
- `*i` = value at the address `i`

We give the address of `i` as parameter when we call `f(&i)` (and not the value), so when we change the value contained at the address `i` in the function, it will change the value of `i` everywhere else.

But when we call `g(i)`, we give the value of `i` as parameter, so it won't change `i` itself outside the function.