

# Prototypes

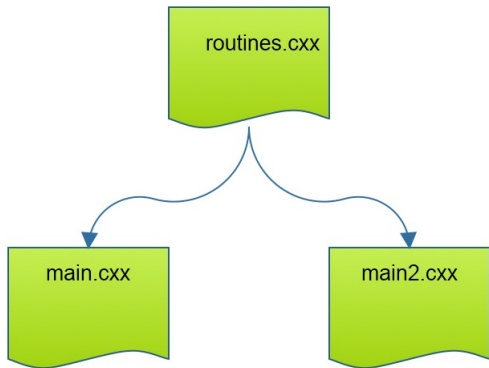
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# 1. Include files

Reuse code by include it in multiple mains.



We will develop a better scenario.

## 2. Forward declarations, 1

A first use of declarations is forward declarations.

Some people like defining functions after the main:

```
int f(int);  
int main() {  
    f(5);  
};  
int f(int i) {  
    return i;  
}
```

versus before:

```
int f(int i) {  
    return i;  
}  
int main() {  
    f(5);  
};
```

### 3. Forward declarations, 2

You also need forward declaration for mutually recursive functions:

```
int f(int);  
int g(int i) { return f(i); }  
int f(int i) { return g(i); }
```

## 4. Declarations for separate compilation

```
// file: def.cpp
int tester(float x) {
    .....
}
```

```
// file : main.cpp
int tester(float);

int main() {
    int t = tester(...);
    return 0;
}
```

## 5. Compiling and linking

Your regular compile line

```
icpc -o yourprogram yourfile.cc
```

actually does two things: compilation, and linking. You can do those separately:

1. First you compile

```
icpc -c yourfile.cc
```

which gives you a file `yourfile.o`, a so-called object file; and

2. Then you use the compiler as linker to give you the executable file:

```
icpc -o yourprogram yourfile.o
```

## 6. Dealing with multiple files

Compile each file separately, then link:

```
icpc -c mainfile.cc
```

```
icpc -c functionfile.cc
```

```
icpc -o yourprogram mainfile.o functionfile.o
```

## 7. Declarations and header files

Using a header file with function declarations.

Header file contains only  
declaration:

```
// file: def.h  
int tester(float);
```

The header file gets included both in the definitions file and the main program:

```
// file: def.cpp  
#include "def.h"  
int tester(float x) {  
    .....  
}
```

```
// file : main.cpp  
#include "def.h"  
  
int main() {  
    int t = tester(...);  
    return 0;  
}
```

What happens if you leave out the `#include "def.h"` in both cases?



## 8. Class declarations

Header file:

```
// proto/header.hpp
class something {
private:
    int i;
public:
    double dosomething( int i, char c );
};
```

Implementation file:

```
// proto/func.cpp
double something::dosomething( int i, char c ) {
    // do something with i,c
};
```

# Review quiz 1

For each of the following answer: is this a valid function definition or function declaration.

- `int foo();`
- `int foo() {};`
- `int foo(int) {};`
- `int foo(int bar) {};`
- `int foo(int) { return 0; };`
- `int foo(int bar) { return 0; };`

## 9. Make

Good idea to learn the Make utility for project management.

(Also Cmake.)