

Prototypes

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Prototypes and forward declarations, 1

A first use of prototypes is forward declaration.

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);  
};
```

Prototypes and 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); }
```

Prototypes for separate compilation

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

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

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

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
```

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
```

Prototypes and header files

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

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

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

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

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

Class prototypes

Header file:

```
class something {  
private:  
    int i;  
public:  
    double dosomething( std::vector<double> v );  
};
```

Implementation file:

```
double something::dosomething( std::vector<double> v ) {  
    // do something with v  
};
```


Review quiz 1

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

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