

# ESc 101: FUNDAMENTALS OF COMPUTING

## Lecture 33

Apr 1, 2010

# OUTLINE

## 1 DEFINING GLOBAL VARIABLES FOR MULTIPLE FILES

# GLOBAL VARIABLE

- A global variable is defined outside of any function.
- Its scope is over the entire program from the point it is defined.
- In the recursive function for Fibonacci sequence, we use two global variables:  $F[]$  and  $m$ .

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# THE SIZE VARIABLE

- To fix the size of each number during execution, we need to make the `SIZE` also variable instead of a constant.
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- To get around this, we can define `SIZE` in the header file `numbers.h`.
- However, since the header is included in every file, this gives rise to multiple places where `SIZE` is defined: this is not allowed!
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# THE extern DECLARATION

In one of the files, we define the variable:

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int SIZE = 10;
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# CAN IT BE PUT IN THE HEADER?

- This works, but requires `SIZE` to be defined or declared in every file.
- It is more convenient to put the definition in the header file.
- But then we come back to the problem of multiple definitions.
- We need to define `SIZE` in the header file, and also make sure that this definition is valid in only one of the files.
- In the remaining files, it is just declared using `extern`.

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# THE `ifdef` DIRECTIVE

We solve this by differentiating between files using directives to the compiler:

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#ifdef SOME_CONSTANT
    int SIZE = 10;
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The above tells the compiler to include the variable definition in a file only if the constant `SOME_CONSTANT` is defined in the file.

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# THE `ifndef` DIRECTIVE

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# PUTTING IT TOGETHER IN THE HEADER FILE

```
#ifndef NUMBER_SIZE
    int SIZE = 10;
#endif
#ifdef NUMBER_SIZE
    extern int SIZE;
#endif
```

# DECLARATIONS IN OTHER FILES

- In one of the files, we give  
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