

gcc & Friends

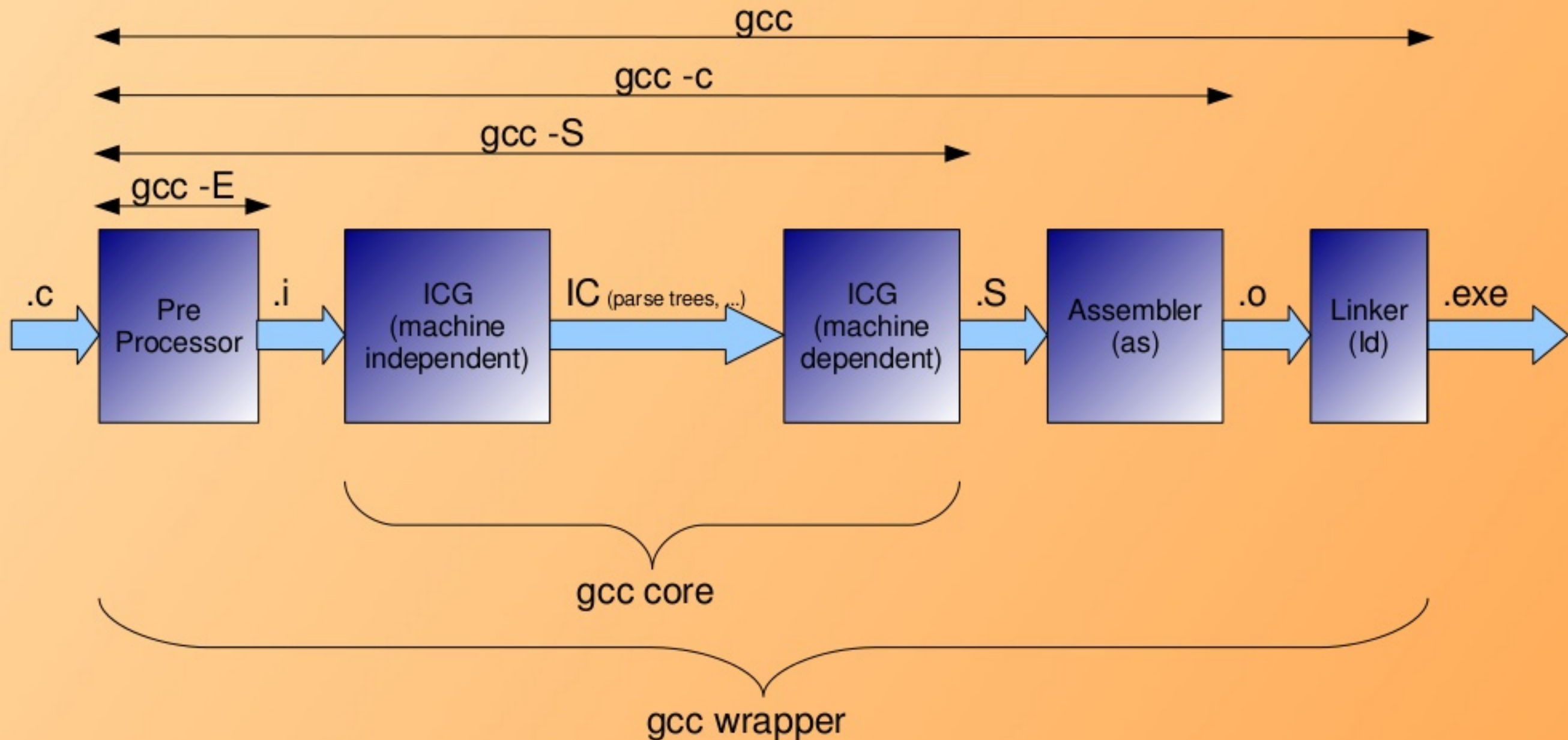
What to Expect?

- ★ What is 'gcc'?
- ★ Internals of 'gcc'
- ★ How to use 'gcc'?
- ★ Friends of 'gcc'

What is 'gcc'?

- ★ **GNU C Compiler**
- ★ Open Source Compiler for C & C++
 - ▶ Along with standard headers & libraries
- ★ Rather a collection of tools
 - ▶ Corresponding to various compiler stages
- ★ Various other compilers built using it
 - ▶ Cross Compilers for different architectures

'gcc': Internals Decoded



Using GNU C Compiler

- ★ `gcc file.c` → Creates the executable `a.out`
- ★ `gcc file.c -o file`
- ★ `gcc -E file.c` → Pre-process only
- ★ `gcc -S file.c` → Generate assembly code
- ★ `gcc -c file.c` → Create object code
- ★ `gcc -I<hdrs_path> file.c`
- ★ `gcc -L<libs_path> file.c -l<lib>`
- ★ `gcc -D<define> file.c`
- ★ `gcc -On file.c`, $n = 0, 1, 2, 3$, `s`, `fast`, `g`
- ★ `gcc -M file.c`
- ★ `gcc -MM file.c`
- ★ `gcc -T <linker_script> file.c`
- ★ `gcc -Wl,<linker_option> file.c`
- ★ ... (including many architecture specific flags)

Default Compiler Defines

★ Trick to find out (#gcc #define)

- ▶ `gcc -E -dM -xc /dev/null | sort`

★ Also

- ▶ `gcc -E -dM -xc++ /dev/null | sort`
- ▶ `gcc -E -dM -xc++ -std=c++0x /dev/null | sort`

Standard Paths

- ★ Standard Headers Path: `/usr/include/`
- ★ Standard Libraries Path: `/usr/lib/`
- ★ Library Prefix: `lib`
- ★ Standard Headers
 - ▶ `stdio.h`, `strings.h`, `math.h`, ...
- ★ Standard Libraries
 - ▶ `libc`, `libm`, ...
- ★ Where is the code of `printf`?

Friends of 'gcc'

- ★ Preprocessor: `cpp`
- ★ Assembler: `as`
- ★ Linker: `ld`
- ★ Name Lister: `nm`
- ★ Disassembler: `objdump`
- ★ Archiver: `ar`
- ★ Print strings from files: `strings`
- ★ ...

What all have we learnt?

- ★ gcc: GNU C Compiler
 - ▶ Standard Headers & Libraries
 - ▶ Collection of tools
- ★ Usage of 'gcc'
- ★ Friends of 'gcc'

Any Queries?

Advanced Topics

- ★ Shared library vs Archive
 - ▶ Linking, Library Function Call, ...
- ★ Defining your own headers
- ★ Creating a shared library
- ★ Creating an archive