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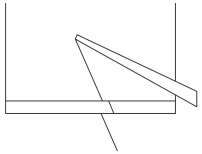
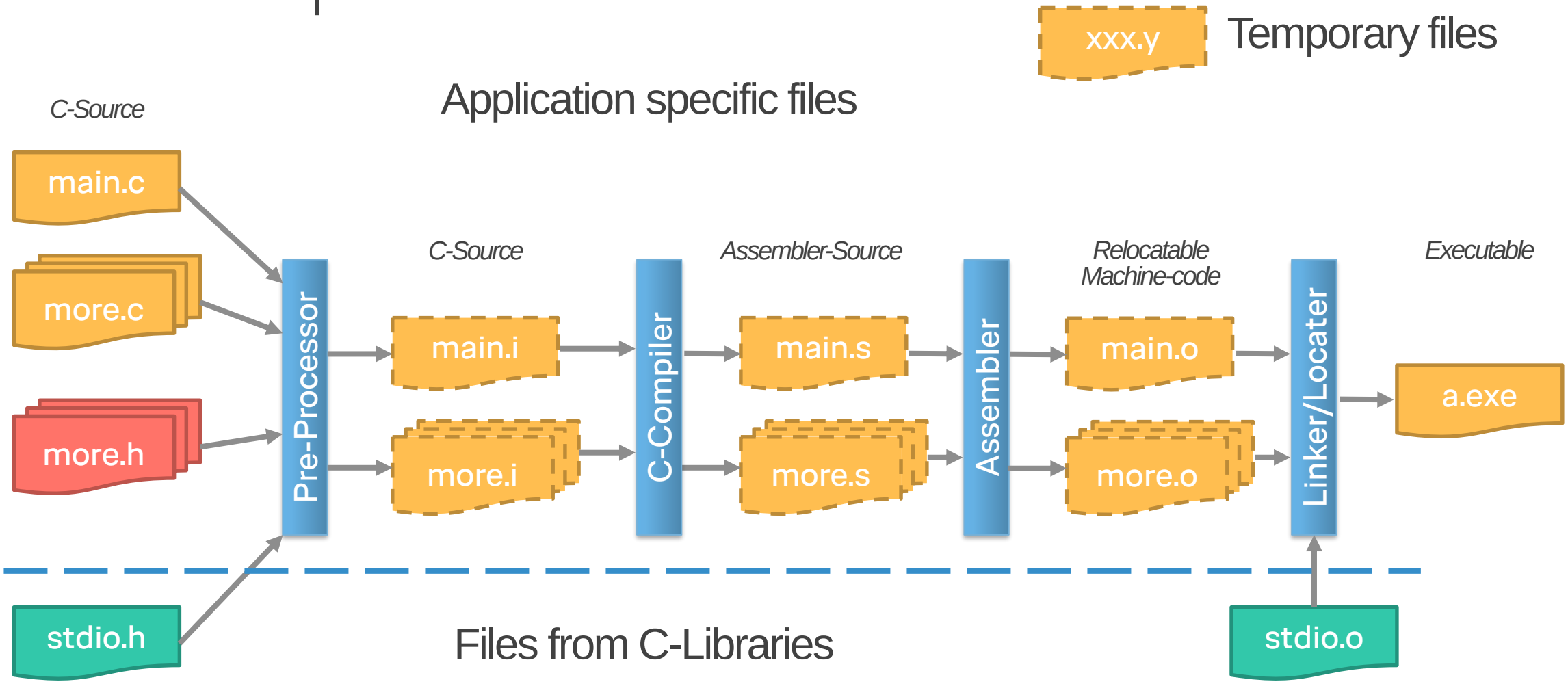


C Program Structure

ESW1

The Compilation Process



Source Files

- Always use lower case letters in file names, use underscore '_' as word delimiter or camelCase

- Header files (*.h)
  - Definition of functions and global variables
  - Can be compared to Java's interfaces

- C Source files (*.c) – also called modules
  - Declaration of functions (methods in Java) and variables in module scope or global scope

Header Files

E.g. of file *buffer.h*

In new versions of C-compilers it is ok to just write:

```
#pragma once
```

As the first line in the file

```
#ifndef BUFFER_H_
#define BUFFER_H_

#include <stdint.h>

// Max size 255
#define BUFFER_SIZE 16

typedef struct buffer_struct {
        uint8_t storage[BUFFER_SIZE];
        uint8_t in_i;
        uint8_t out_i;
        uint8_t no_in_buffer;
} buffer_struct_t;

void buffer_init(buffer_struct_t* buffer);
uint8_t buffer_get_item(buffer_struct_t* buffer, uint8_t* item);
uint8_t buffer_put_item(buffer_struct_t* buffer, uint8_t item);
uint8_t buffer_is_empty(buffer_struct_t* buffer);
uint8_t buffer_no_of_items(buffer_struct_t* buffer);
void buffer_clear(buffer_struct_t* buffer);

#endif /* BUFFER_H_ */
```

Standard in all Header files

Header Files

- Can be compared to Java interfaces
- How to include in C-source files:
  - Files the compiler has an include path to (-I) e.g. Library-files (files outside current project)
    - #include <stdio.h>
  - Header files locally in project
    - #include "addition.h"
    - #include "subtraction.h"
    - #include "multiplication.h"

C-Source Files

E.g. of file *buffer.c*

```
#include "buffer.h"

void buffer_init(buffer_struct_t* buffer) {
        buffer->in_i = 0;
        buffer->out_i = 0;
        buffer->no_in_buffer = 0;
}

...
```

Input/Output to console

Input from the keyboard (stdio.h)

```
int getchar()
int scanf( const char* format, ... );  // Formatted input from stdin
```

Output to screen (stdio.h)

```
putchar(int c) // Single character
int puts( const char* str )  // Zero terminated c-string
int printf( const char* format, ... ) // Parameters like printf in Java
```

Lets shift to Visual Studio

- Visual Studio makes your life easier
- See *Visual Studio for C - Installation Guide A2017.pdf* for an example of making a C-program project.
- Do *exercise 1.3 (ESW1 Session 1 – Exercises,* as a Visual Studio project

Exercise Session 2

- Do *ESW1 Session 2 – Exercises*
  - can be found in ItsLearning