Chapter 12

Development Tools for Microcontroller Applications

Lesson 02

Assembler, Compiler, Library files and Integrated Development Environment

Assembler

- Exploits special features in MCU
- Direct control of stack, IO ports, Registers and RAM

Macros Using Assembler

- Creates software building blocks
- Direct control of stack, IO ports, Registers and RAM

Use of structures Assembler

- Coding using C like expressions, condition statements, loops

- Decision expressions

Dissembler

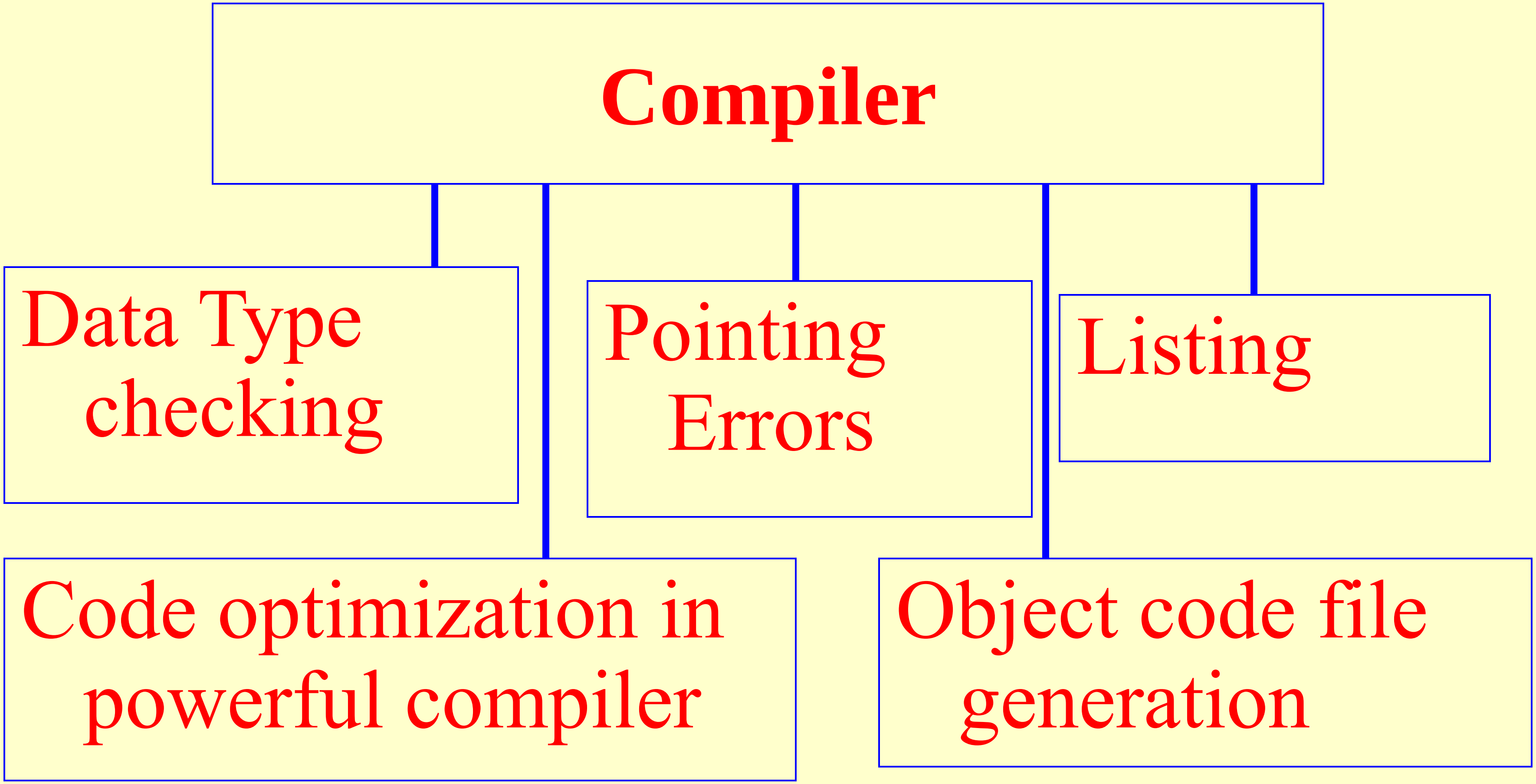
- Object code conversion into Mnemonics
- Easy understanding of previously assembled codes

C Functions

- C Functions
- Data Type declaration
- Macros and Functions coding
- Loops and decision blocks

C Functions

- Formatted output
- Easy including assembly and other source files
- Automatic addresses assignments, memory allocations



Compiler

Data Type checking

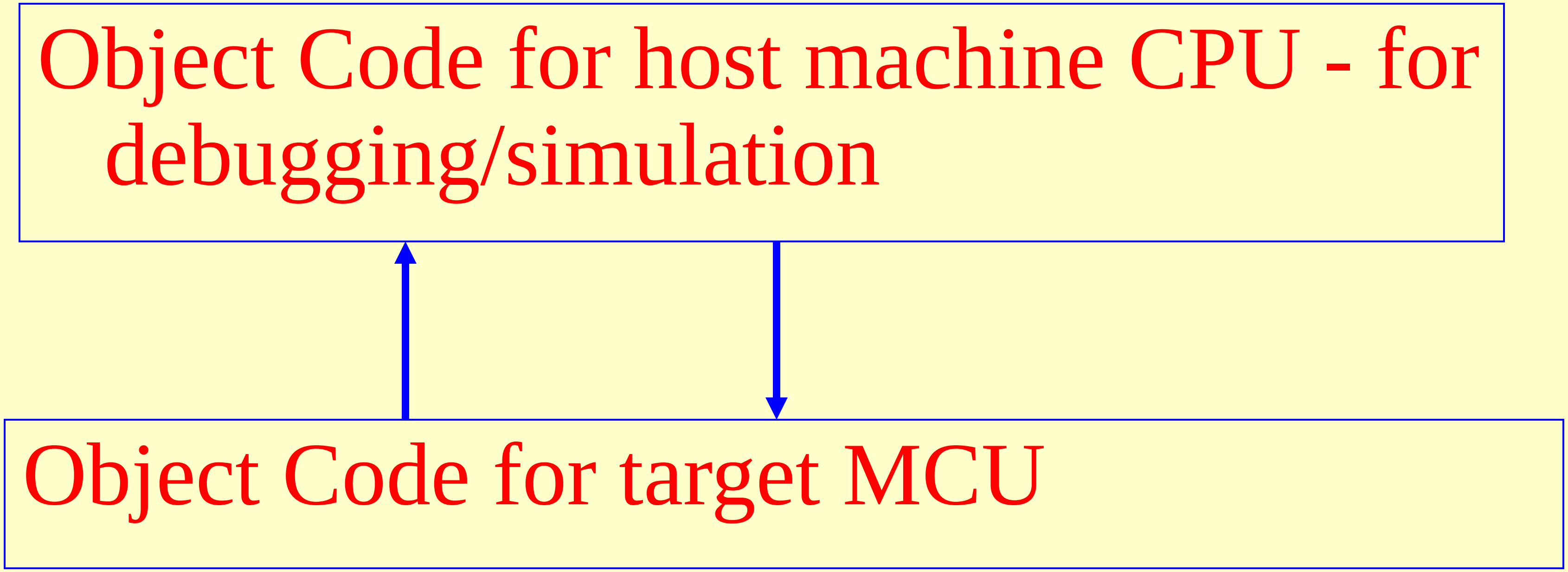
Pointing Errors

Listing

Code optimization in powerful compiler

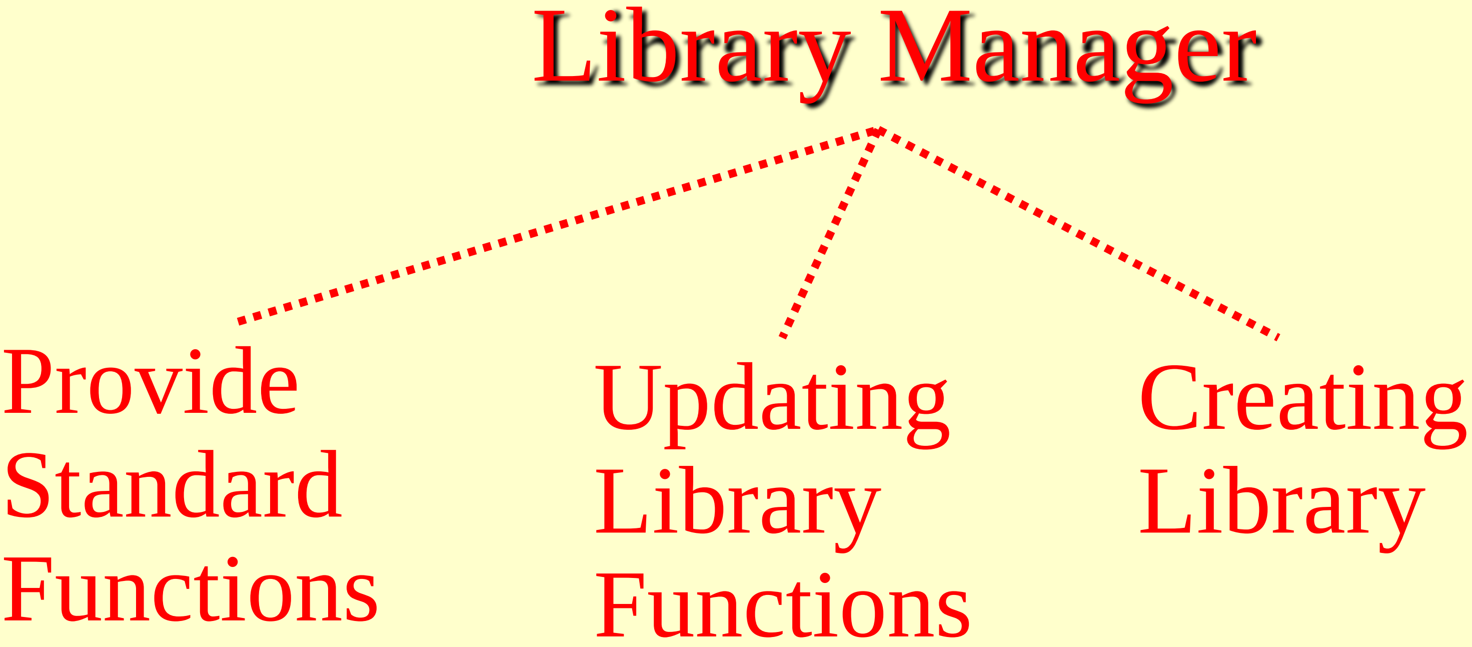
Object code file generation

Cross Compiler



Object Code for host machine CPU - for debugging/simulation

Object Code for target MCU



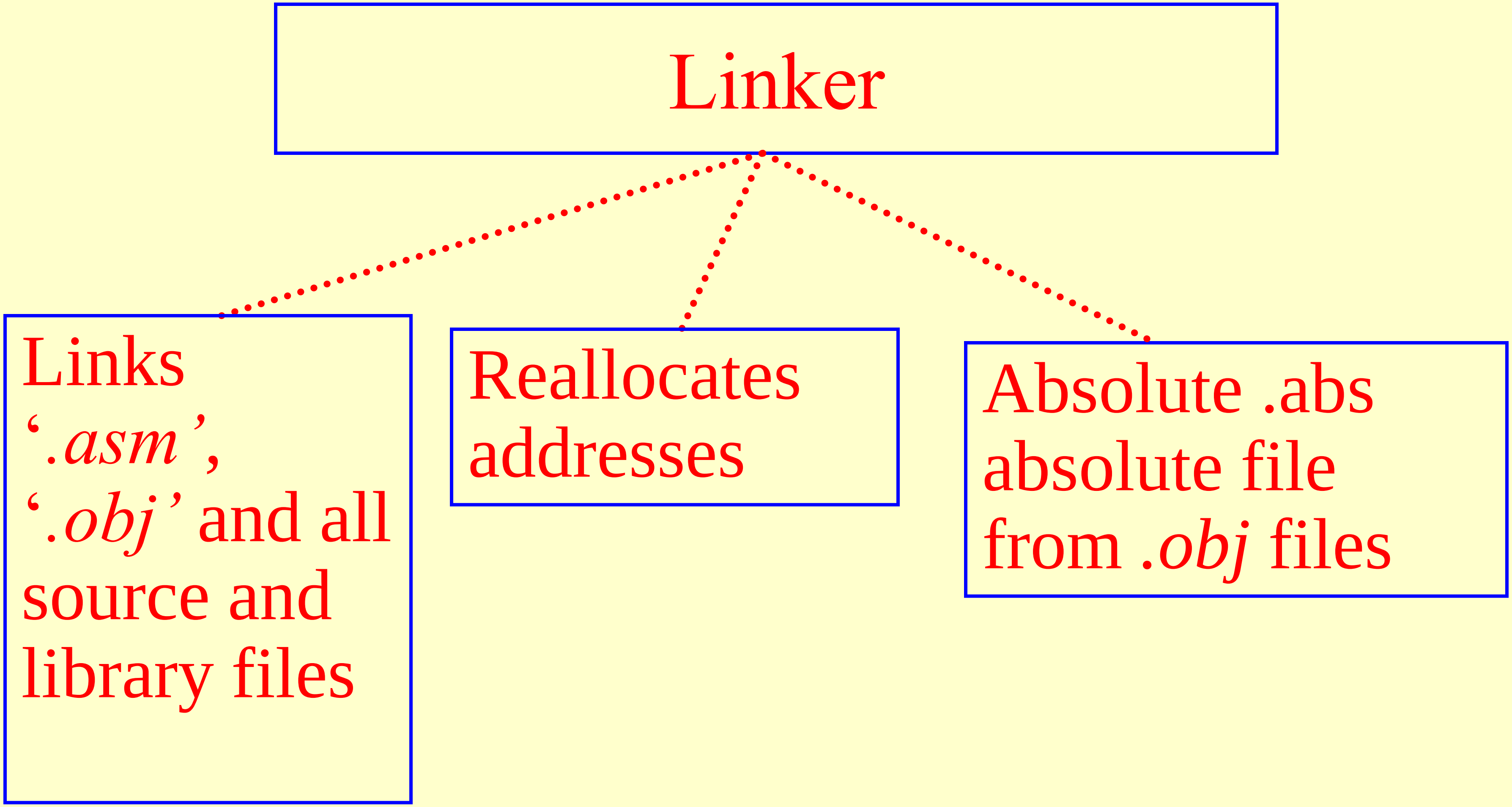
Library Manager

Provide Standard Functions

Updating Library Functions

Creating Library

Absolute File Generation



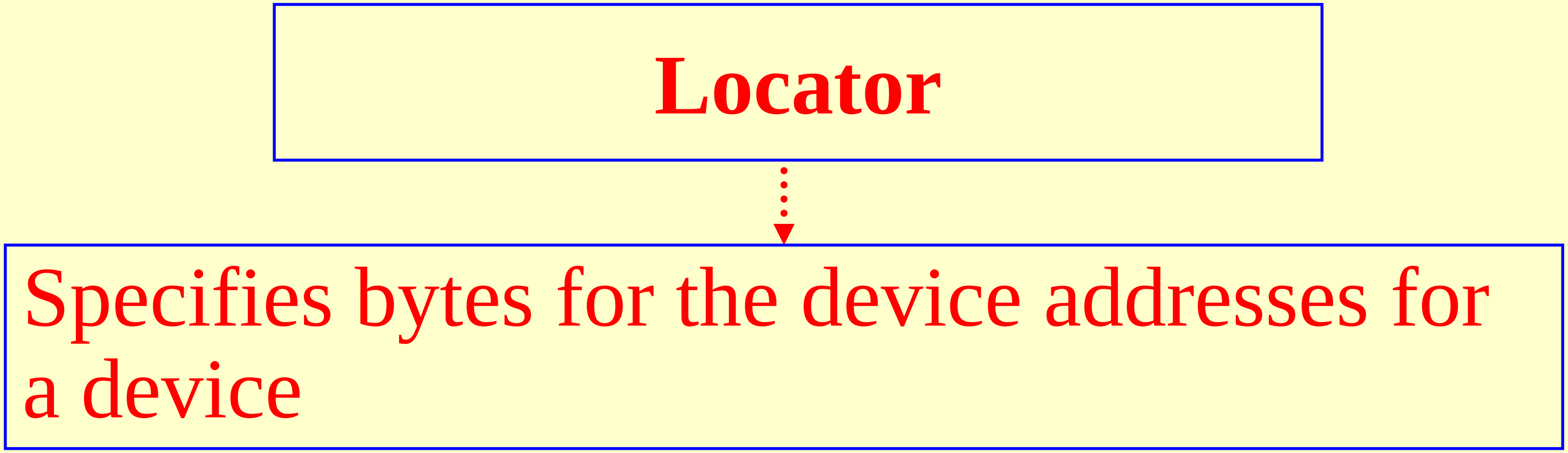
Linker

Links *'.asm'*, *'.obj'* and all source and library files

Reallocates addresses

Absolute .abs absolute file from *.obj* files

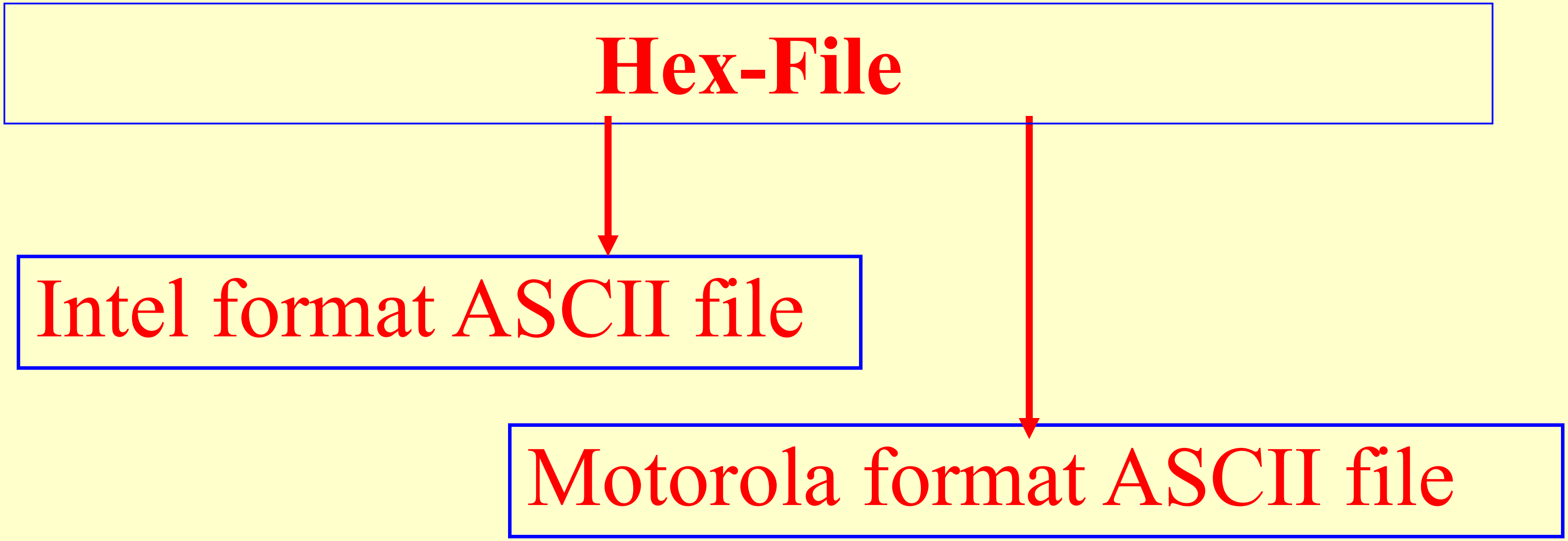
Absolute File Locator



Locator

Specifies bytes for the device addresses for a device

Locator File formats



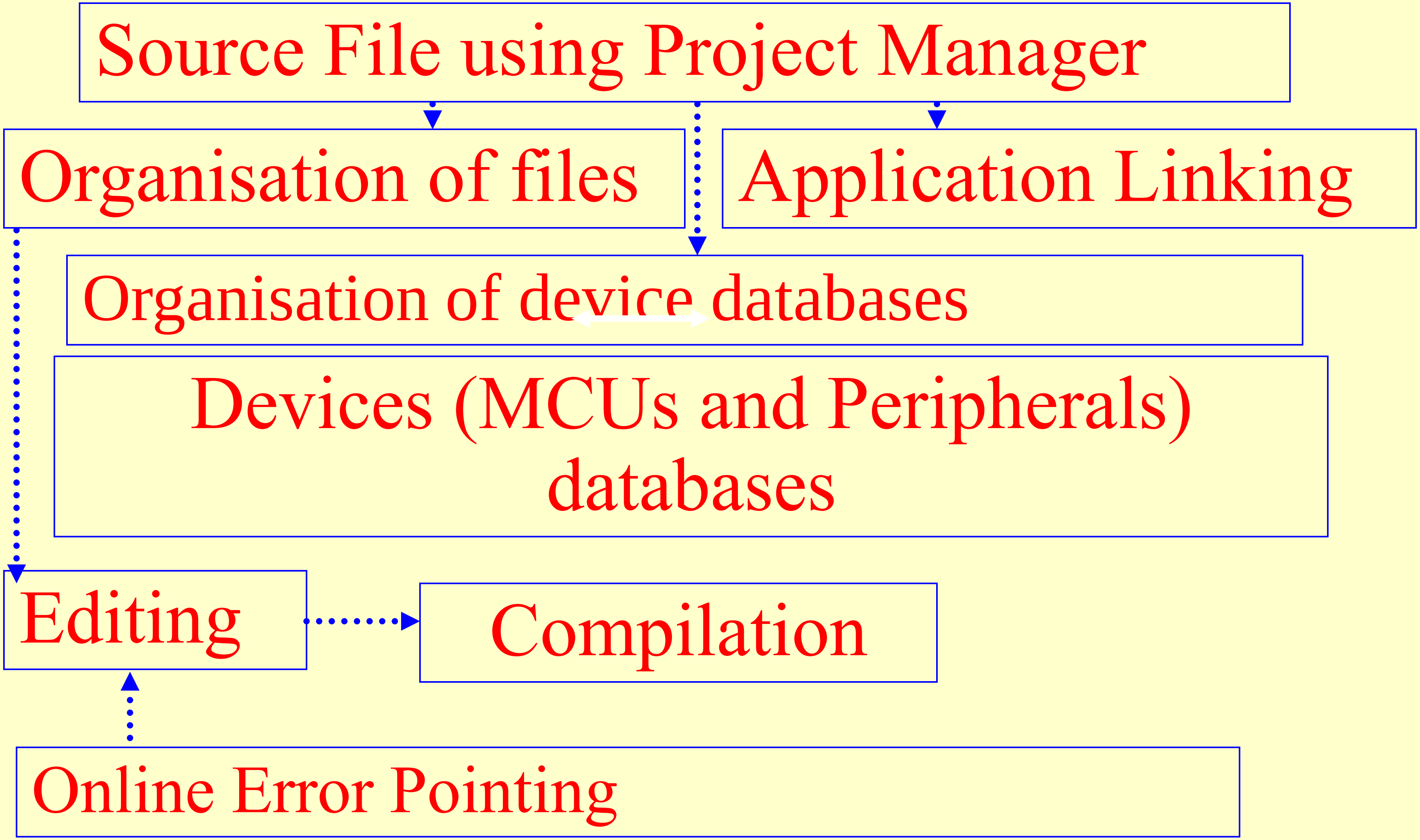
Hex-File

Intel format ASCII file

Motorola format ASCII file

Integrated Development Environment (IDE)

IDE- A Single Focal point of development



Source File using Project Manager

Organisation of files

Application Linking

Organisation of device databases

Devices (MCUs and Peripherals) databases

Editing

Compilation

Online Error Pointing

Integrated Development Environment

- Editor, Device Selection,Tools Configuration, Project Make facility
- Macro-Assembler
- C Compiler for Code development in C
- Library Manager for linking library
- Linker of Executable file
- Locator for Creation of Hex Files

A project

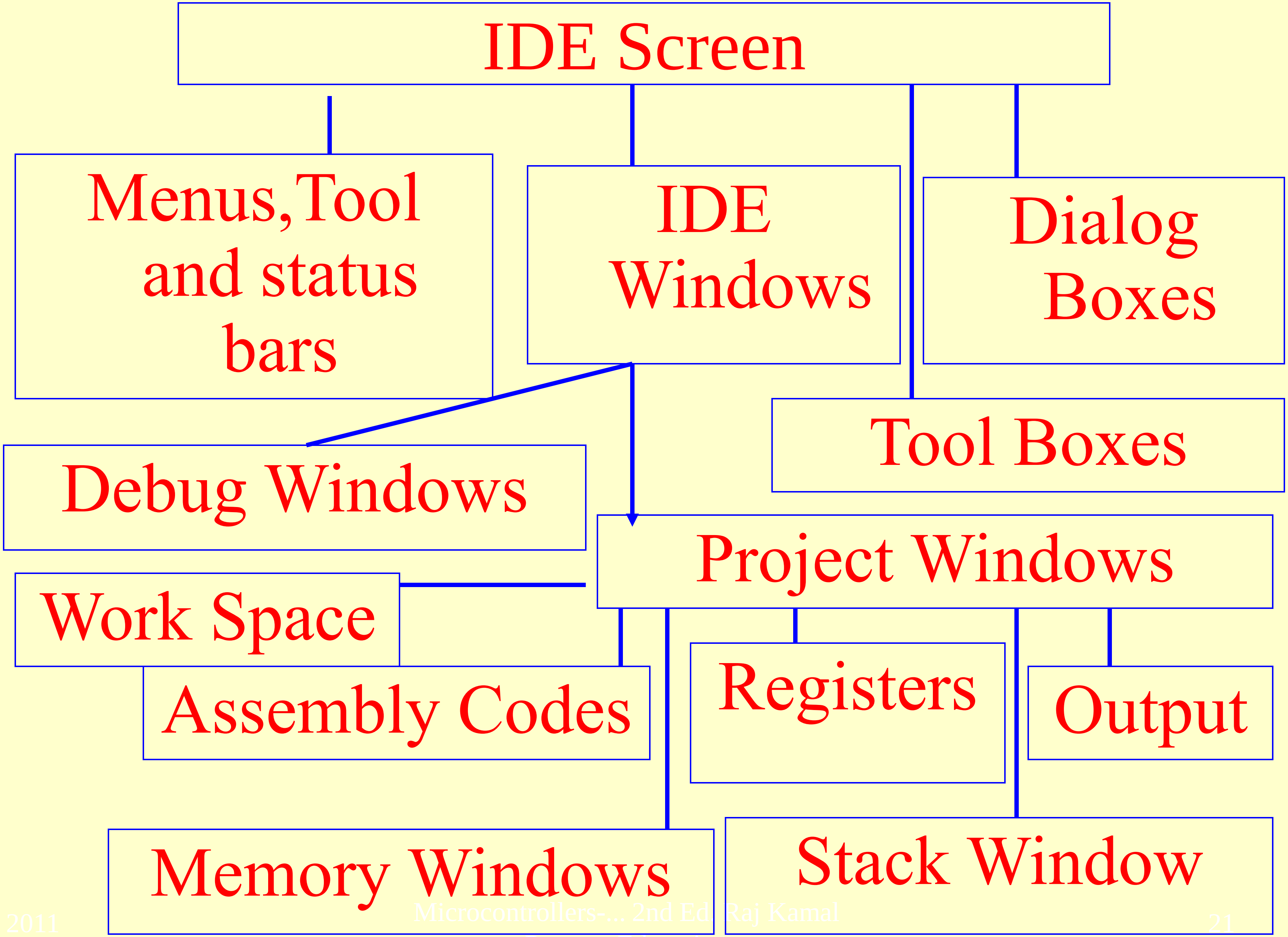
- Defines a targeted application
- Project Management Tools

Project Management Tools -

- Make facility
- Online help at each stage
- Dialog Boxes for interactions with developer
- Windows on screen

Windows Screen -

- File, Edit, View, Project, Peripherals, Version control and Help- Menus and Commands
- Tool bar
- Status bar



IDE Screen

Menus,Tool and status bars

IDE Windows

Dialog Boxes

Tool Boxes

Debug Windows

Project Windows

Work Space

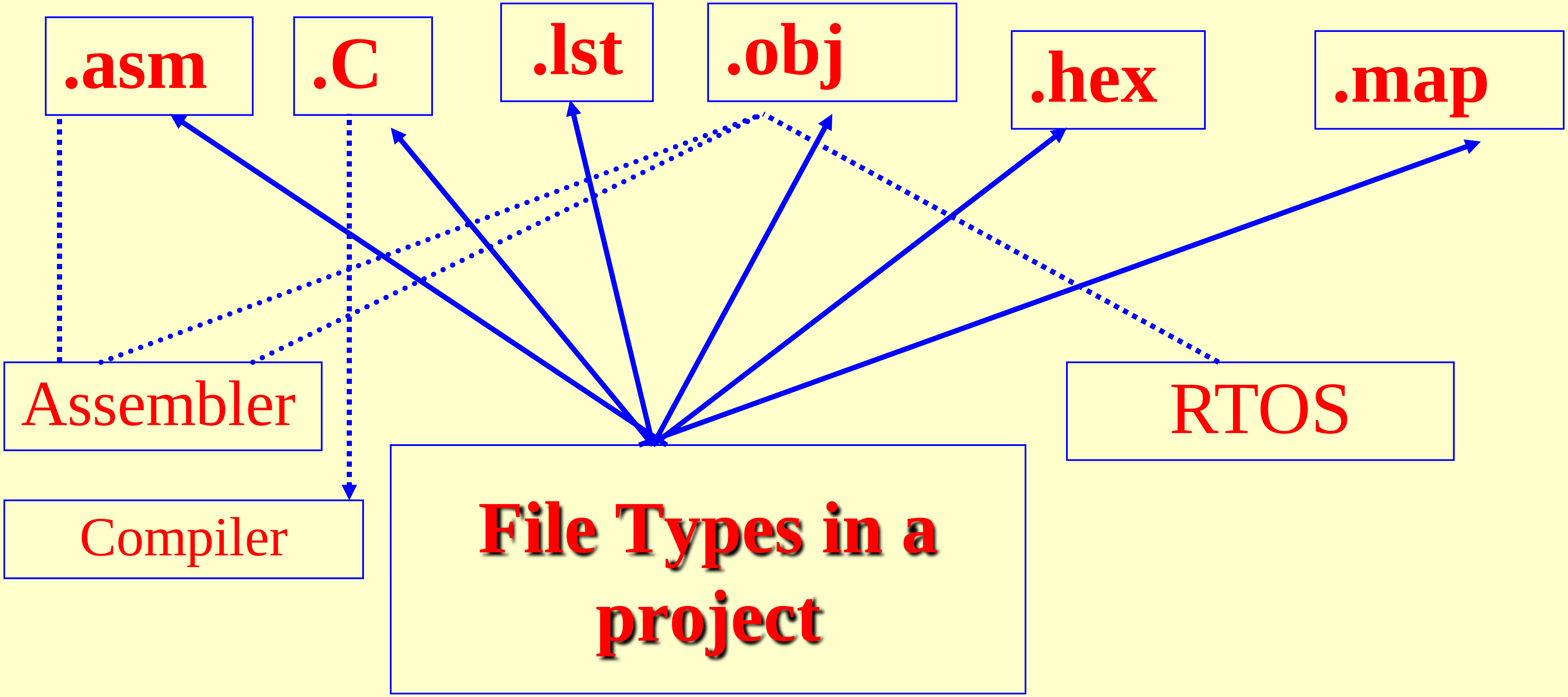
Assembly Codes

Registers

Output

Memory Windows

Stack Window



File Types in a project

.asm

.C

.lst

.obj

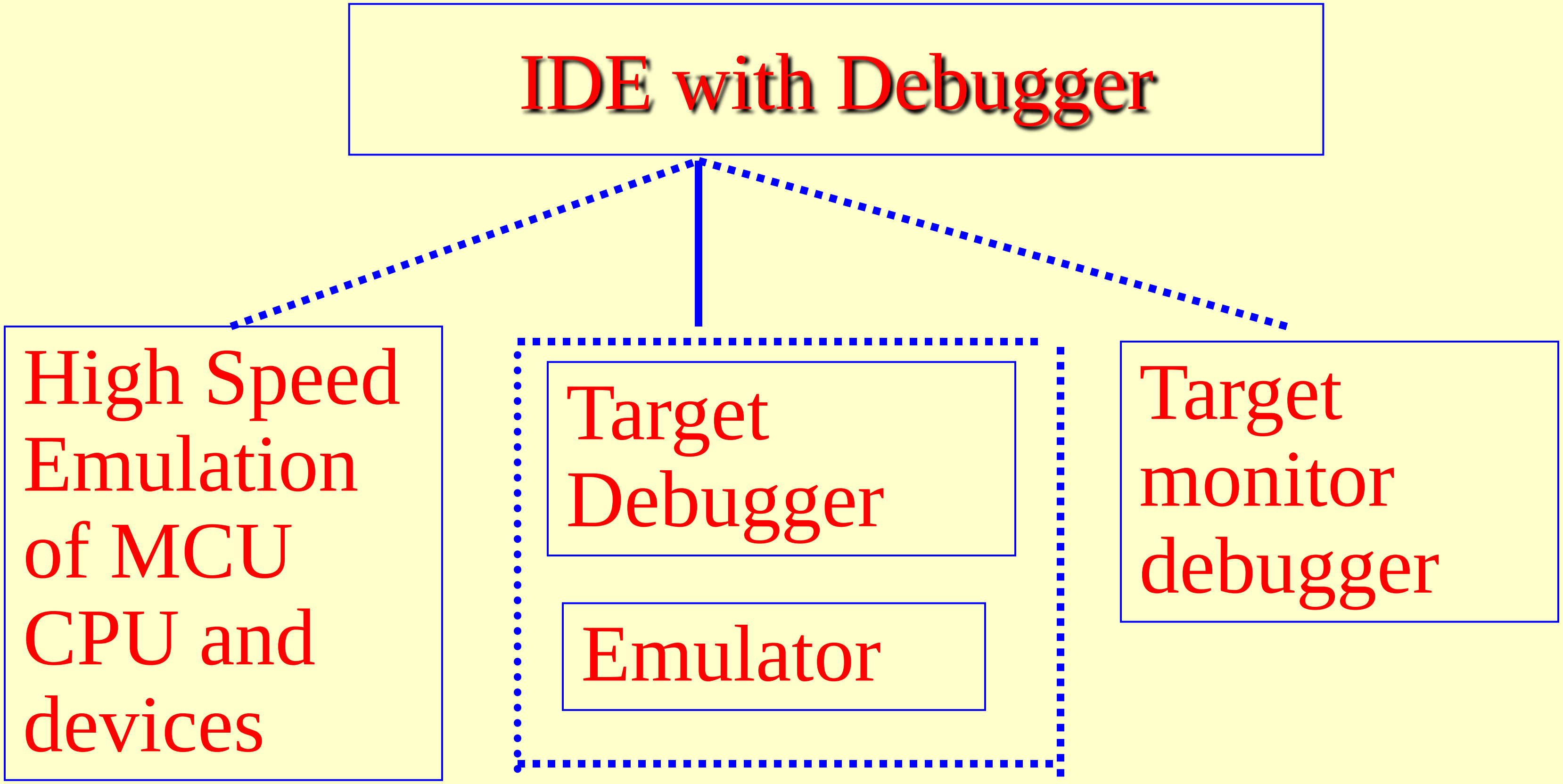
.hex

.map

Assembler

Compiler

RTOS



IDE with Debugger

High Speed Emulation of MCU CPU and devices

Target Debugger

Emulator

Target monitor debugger

Summary

We learnt

IDE

- Integrated Environment
- Project management
- RTOS - Code Development for Multitasking, Task Scheduling ad Synchronisation
- Debugging Support

We learnt

IDE Software Development Tools

- Assembler
- Library Manager
- Linker
- Locator

End of Lesson 02 on

Assembler, Compiler, Library files and Integrated Development Environment