Embedded Software development Process and Tools:

Lesson-1

Introduction to Embedded Software Development Process and Tools

Chapter-13L01: "Embedded Systems - Architecture, Programming and Design" , Raj Kamal, Publs.: McGraw-Hill, Inc.
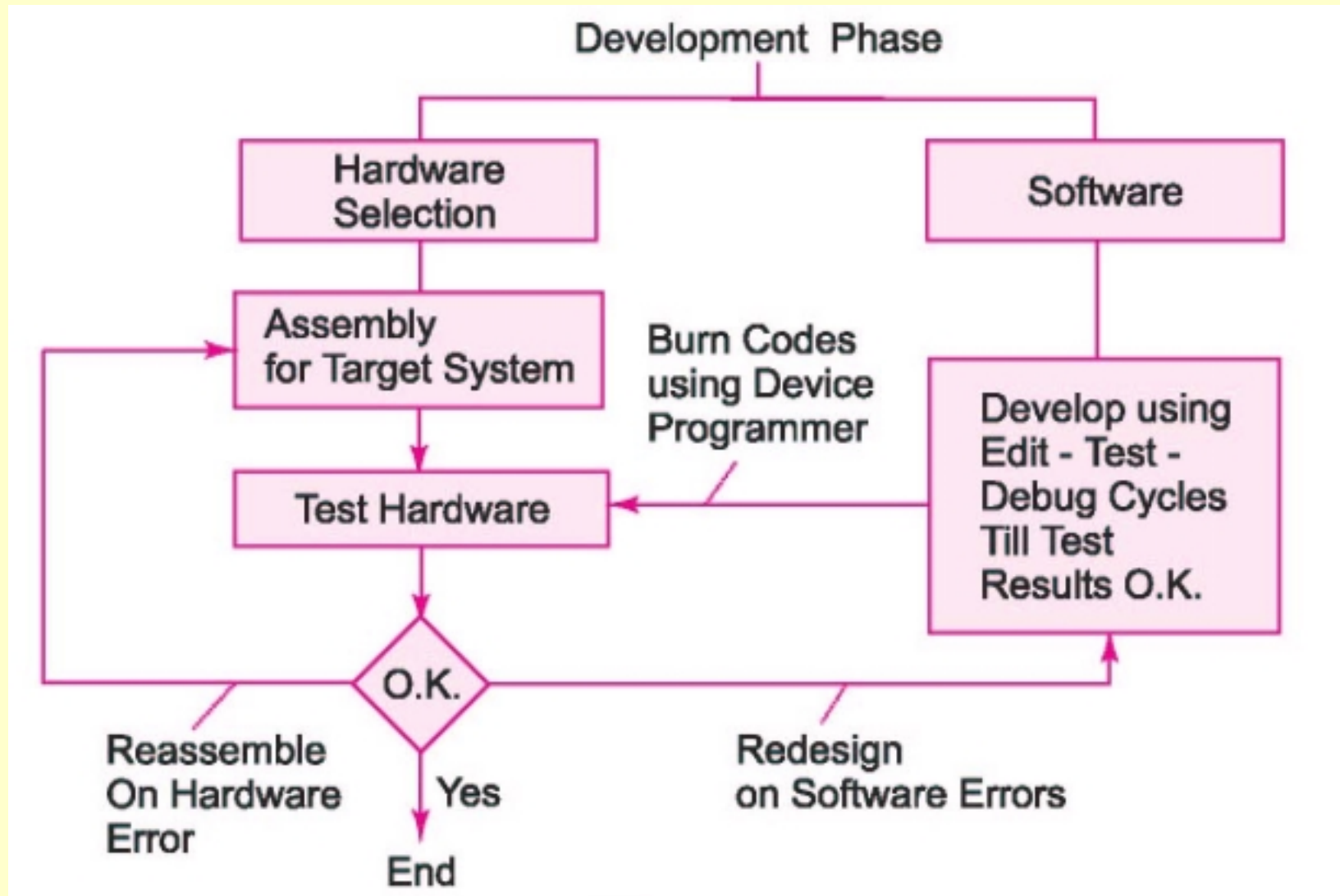
1. Development Process and Hardware—Software

Development Process

- Consists of cycles of editing-testing-debugging.

- Processor and hardware part once chosen remains fixed, the application software codes have to be perfected by a number of runs and tests.
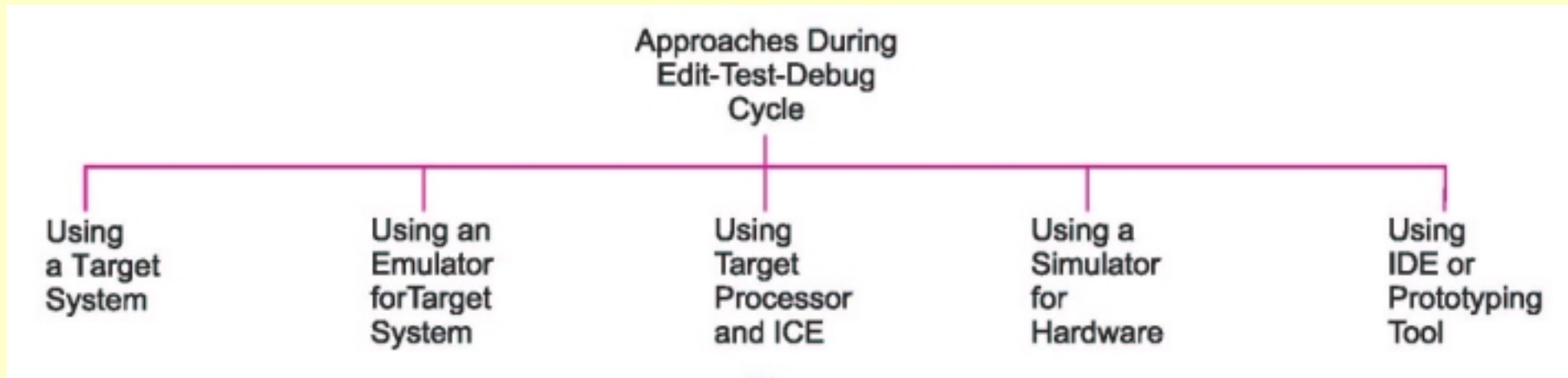
Cost of developing a final targeted system

- While the cost of the processor is quite small, the cost of developing a final targeted system is quite high

- Needs a larger time frame than the hardware circuit design

Development process of an embedded system

Development Phase

Hardware Selection

Software

Assembly for Target System

Burn Codes using Device Programmer

Develop using Edit - Test - Debug Cycles Till Test Results O.K.

Test Hardware

O.K.

Reassemble On Hardware Error

Yes

Redesign on Software Errors

End

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Edit-Test-Debug Cycle implementation phase of the development process

Approaches During
Edit-Test-Debug
Cycle

Using a Target System	Using an Emulator for Target System	Using Target Processor and ICE	Using a Simulator for Hardware	Using IDE or Prototyping Tool

2. Software Tools

Software Tools

- Software Development Lit (SDK)

- Source-code Engineering Software

- RTOS

- Integrated Development Environment

- Prototyper

- Editor

- Interpreter

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Software Tools …

- Compiler

- Assembler

- Cross Assembler

- Testing and debugging tools

- Locator

3. Source Code Engineering Tool

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Typical tool Features

- Comprehension,

- Navigation and browsing,

- Editing,

- Debugging,

- Configuring (disabling and enabling specific C++ features)

- Compiling

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Typical tool Features…

- Searches and lists the definitions, symbols, hierarchy of the classes, and class inheritance trees

- Symbols include the class members

- Searches and lists the dependencies of symbols and defined symbols, variables and functions

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Typical tool Features …

- Monitors, enables and disables the implementation virtual functions.

- Finds the full effect of any code change on the source code.

- Searches and lists the dependencies and hierarchy of included header files.

Typical tool Features …

Navigates to and fro─

- between the implementation and symbol declaration.

- between the overridden and overriding methods.

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Typical tool Features …

Browses through

- information regarding instantiation (object creation) of a class.

- encapsulation of variables among the members

- public, private and protected visibility of the members.

- object component relationships

Typical tool Features …

- Automatically removes error- prone and unused tasks.

- Provides easy and automated search and replacement

Summary

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We learnt

- Software development process using editing, testing and debugging cycles

- Software development kit

- Source-code Engineering Software

- RTOS

- Integrated Development Environment

- Testing and debugging tools for testing and debugging

We learnt

- Number of software tools used to develop software for designing an embedded system.

- Sophisticated tools─ RTOS, Integrated Development Environment and Prototype development tools needed for integrated development of system software and hardware.

End of Lesson-1 of chapter 13 on Introduction to Embedded Software Development Process and Tools