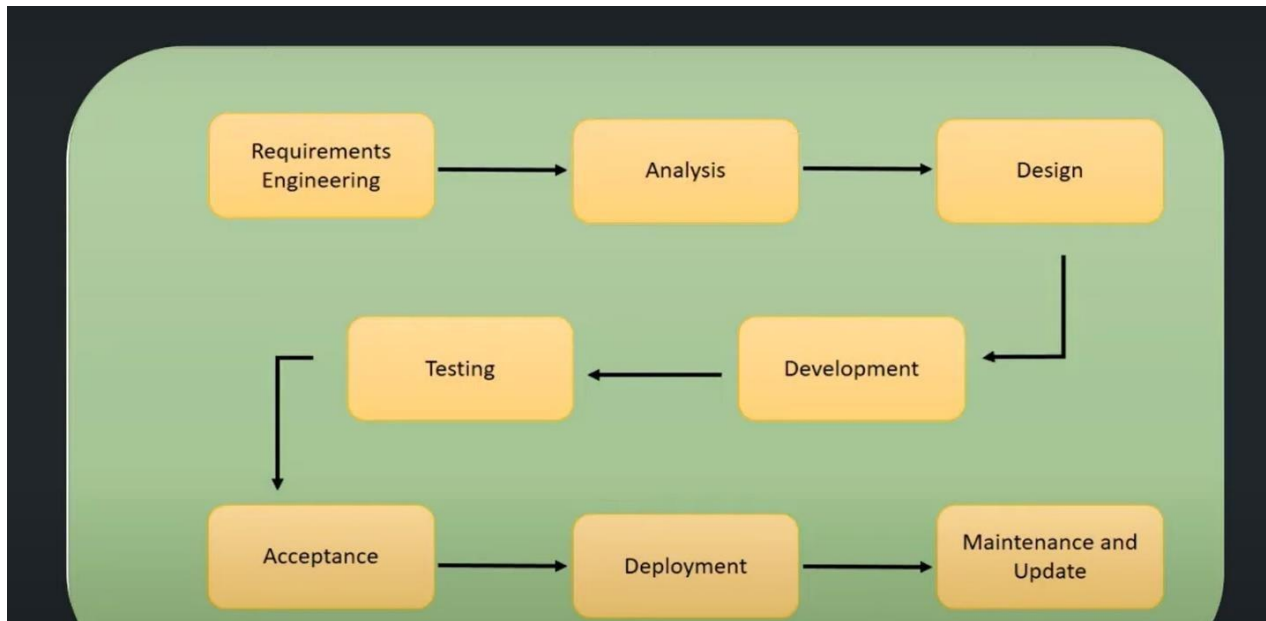


CENG 5434 DEVELOPMENT Process and Tools



<https://www.youtube.com/watch?v=ITkL1oIMiaU&list=PLSyLGd0D0b4ThfElztKEueqQ5SIHjUEU>

Software Architecture | Architectural patterns | Architecture vs Design pattern

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GENERAL DESCRIPTION:

https://en.wikipedia.org/wiki/Embedded_system

I.REQUIREMENTS ARE VITAL

<https://www.edgefxtech.com/blog/embedded-systems-development-process/#more-2284>

Embedded System Development Cycle

- Determine the requirements
- Design the system architecture
- Select the OS
- Choose the processor and peripherals
- Choose the development platform
- Code the applications and optimize
- Verify the software on the host system
- Verify the software on the target system

TLH VIEW OF REQUIREMENTS

General Requirements

The general specifications of the operation of a product **that must be met by the end product**. These specifications should define the characteristics of the product **as experienced by the end user**. Examples might include such topics as number of users, power consumption, size, weight, and speed. Numerical values should be assigned to a requirement whenever possible. The **Acceptance Testing** should verify that the product meets the General Requirements.

Detailed Requirements

1. Description of purpose and general operation including a physical description.
2. In normal operation for input and output
 - Number and type of inputs (i.e. analog inputs, digital inputs, etc.-What do they represent?)
 - Range and resolution of values (i.e. 0-600volts, +- .01 volts)
 - Frequency range (if required)
 - Such values determine the following:
 - Samples per second per channel for analog inputs or data rates for digital data
 - For outputs, what will the user see (or hear)? How does the user control the product-keyboard, touch screen, etc.
3. Other conditions
 - Response to over-range or errors of input values- What happens when something goes wrong?
 - Alarm conditions (if necessary)
 - “Hard real-time” timing constraints (if any) and overall timing diagram
4. Acceptance Testing Protocol
 - What will satisfy the “user” that the product performs as described?

5. Special Requirements

Power/safety/environmental considerations

II. CHOICES

Designer Choices	Comments
Type of Product or System	<ul style="list-style-type: none">• Stand-alone embedded system• Real-time embedded system• Networked appliances, IOT• Mobile devices• Etc.
Type of Software – OS? Language? Special Features – e.g. RTOS	The program of the embedded system is written in any language to control the operation of the system. Assy, C, C++, Python, Java, ...
Type of Processor	Choose processor and peripherals. Select data size 8, 16, or 32-bit processor. Select for special features such as floating-point, DSP, deterministic control, etc.
Type of UP modules and Peripherals	User interfaces, timing, logic and math, communication, digital I/O, PWM, analog interfaces, safety, security.
Type Development and Testing tools	SW: Evaluation board, IDE, cross compilers, special -Visual Studio, etc. HW digital Logic Analyzer HW analog: Oscilloscope