302- Software Engineering

UNIT 1 : Introduction

1.1 Concept of software?

1.2 Software characteristics.

1.3 Software Engineering: definition.

1.4 Types of Software

Definition

Software is

(1) **Instructions** (computer programs) that when executed provide desired function and performance,

(2) **Data structures** that enable the programs to adequately (sufficiently) manipulate information,

and

(3) **Documents** that describe the operation and use of the programs.

Software Characteristics

1. Software is developed or engineered, it is not manufactured in the classical sense
2. Software doesn't "wear out“
3. Although the industry is moving toward component-based assembly, most software continues to be custom built

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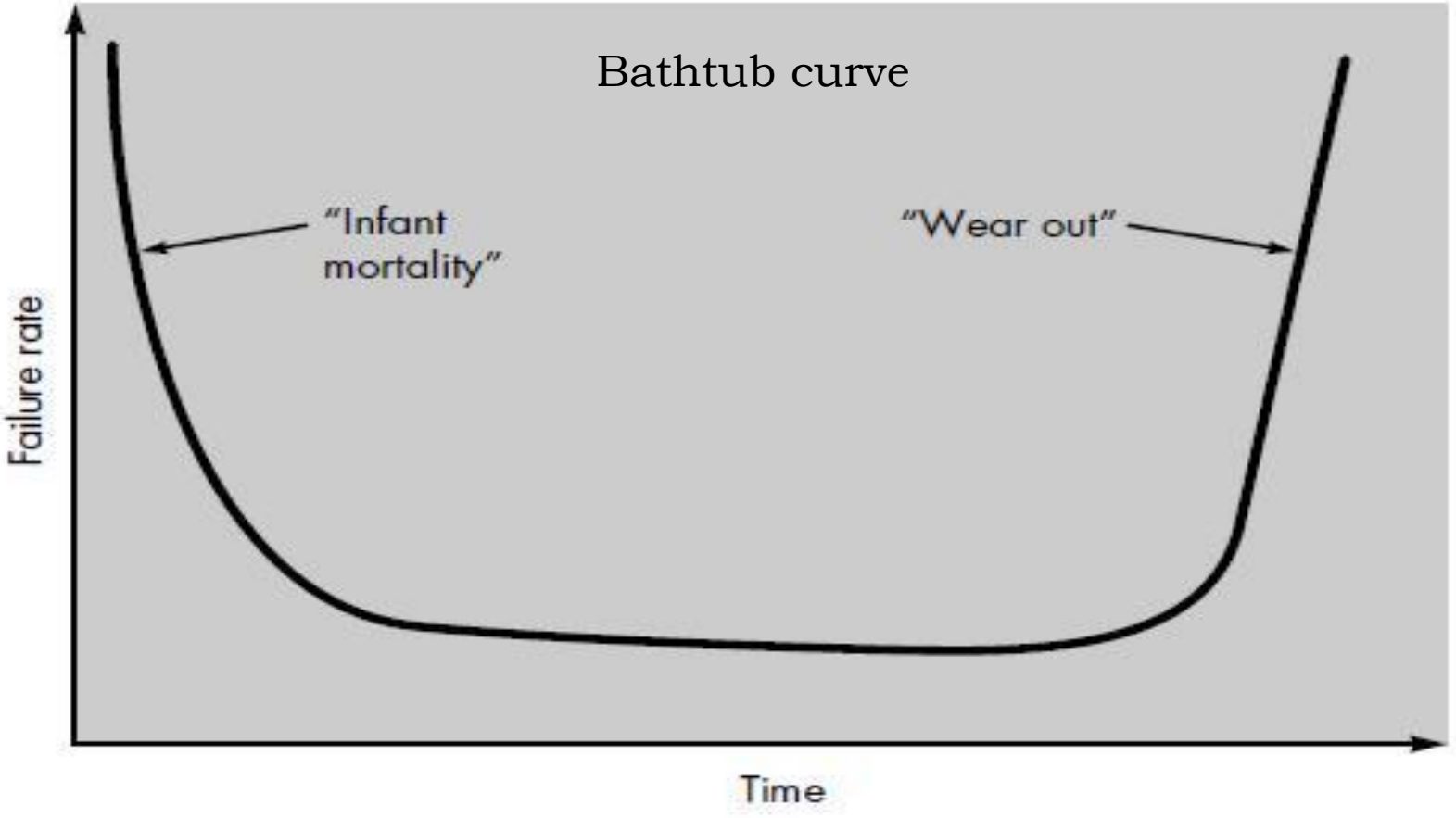
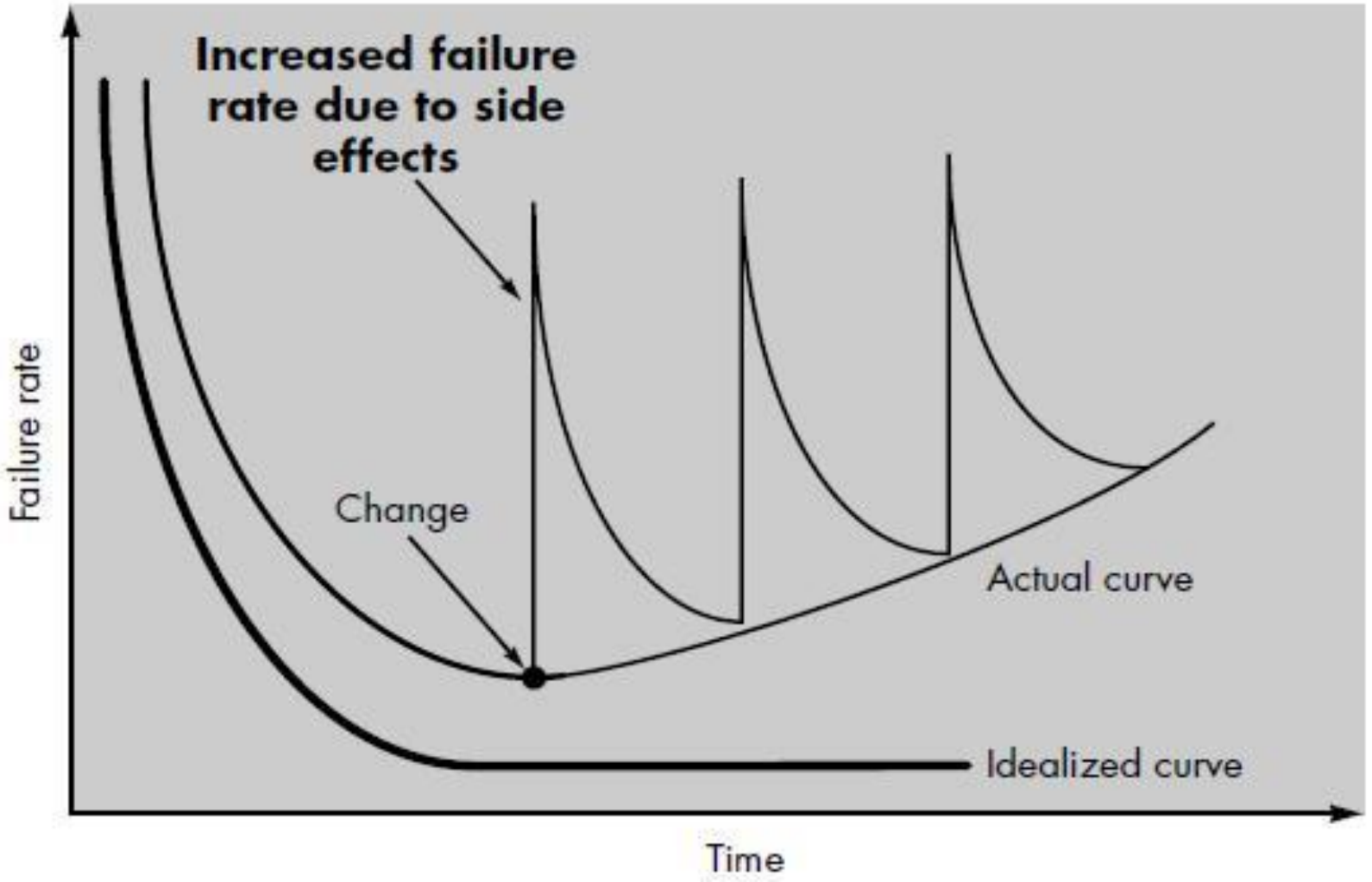
2. Software doesn't "wear out"



Failure curve for hardware



Idealized and actual failure curves for software

3. Although the industry is moving toward component-based assembly, most software continues to be custom built.

Software Engineering

- Software engineering is the establishment and use of sound engineering principles in order to obtain economically software that is reliable and works efficiently on real machines.

OR

- "More than a discipline or a body of knowledge, engineering is a verb, an action word, a way of approaching a problem"

- Scott Whitmire

- Software Engineering:
  - (1) The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software. (2) The study of approaches as in (1).

Types of Software OR S/WApplication

1. System software
2. Real-time software
3. Business software
4. Engineering and scientific software
5. Embedded software
6. Personal computer software
7. Web-based software
8. Artificial intelligence software

1. System Software

- System software is a collection of programs written to service other programs.
- system software area is characterized by heavy interaction with computer hardware.
- heavy usage by multiple users; concurrent operation that requires scheduling, resource sharing, and sophisticated process management; complex data structures; and multiple external interfaces.

Examples

- Compilers
- Editors
- File management utilities
- Operating system components
- Drivers
- Telecommunications processors

2. Real-Time Software

- Software that monitors/ analyzes/ controls real-world events as they occur is called *real time*.
- Elements of real-time software include a data gathering component that collects and formats information from an external environment.
- Examples:
  - Flood Control Software

3. Business Software

- Business information processing is the largest single software application area.
- In addition to conventional data processing application, business software applications also encompass interactive computing
- Example :
  - payroll
  - accounts receivable/payable,
  - Inventory

4. Engineering and scientific software.

- Engineering and scientific software have been characterized by "number crunching" algorithms.
- Applications range from astronomy to volcanology, from automotive stress analysis to space shuttle orbital dynamics, and from molecular biology to automated manufacturing.

Examples:

- SPSS (Statistical Package for Social Services)
- Software of space shuttle
- Construction Software

5. Embedded Software

- Embedded software resides in read-only memory and is used to control products and systems for the consumer and industrial markets.
- Embedded software can perform very limited and esoteric functions.

Example:

- Keypad control for a microwave oven
- digital functions in an automobile such as fuel control

6. Personal computer software

The Software used in Personal Computer are known as Personal Computer Software

Examples:

- Word processing
- Spreadsheets
- computer graphics
- Multimedia
- Entertainment
- Database Management
- Personal and Business Financial Applications
- External Network

7. Web-based software

- The Web pages retrieved by a browser are software that incorporates executable instructions.
- Example:
  - CGI
  - HTML
  - Perl
  - Java

8. Artificial intelligence software

- Artificial intelligence (AI) software makes use of non-numerical algorithms to solve complex problems that are not amenable to computation or straightforward analysis.
- Example
  - pattern recognition (image and voice)
  - game playing