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Evolving role of Software

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1. It is a product
2. vehicle for delivering a product.

As a product, it delivers the computing potential embodied by computer hardware. Whether it resides within a mobile phone or operates inside a mainframe computer, software is an information transformer.

As the vehicle used to deliver the product, software acts as the basis for the control of the computer (operating systems), the communication of information (networks), and the creation and control other programs (software tools and environments).

The role of computer software has undergone significant change over the last half-century.

Sophistication and complexity can produce dazzling results when a system succeeds, but they can also pose huge problems for those who must build complex systems.

Common questions to lone programmer and group of specialists:

Why does it take so long to get software finished?
Why are development costs so high?
Why can’t we find all errors before we give the software to our customers?
Why do we spend so much time and effort maintaining existing programs?
Why do we continue to have difficulty in measuring progress as software is being developed and maintained?

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Defining Software

Software is: (1) instructions (computer programs) that when executed provide desired features, function, and performance;

(2) data structures that enable the programs to adequately manipulate information,

and (3) descriptive information in both hard copy and virtual forms that describes the operation and use of the programs.

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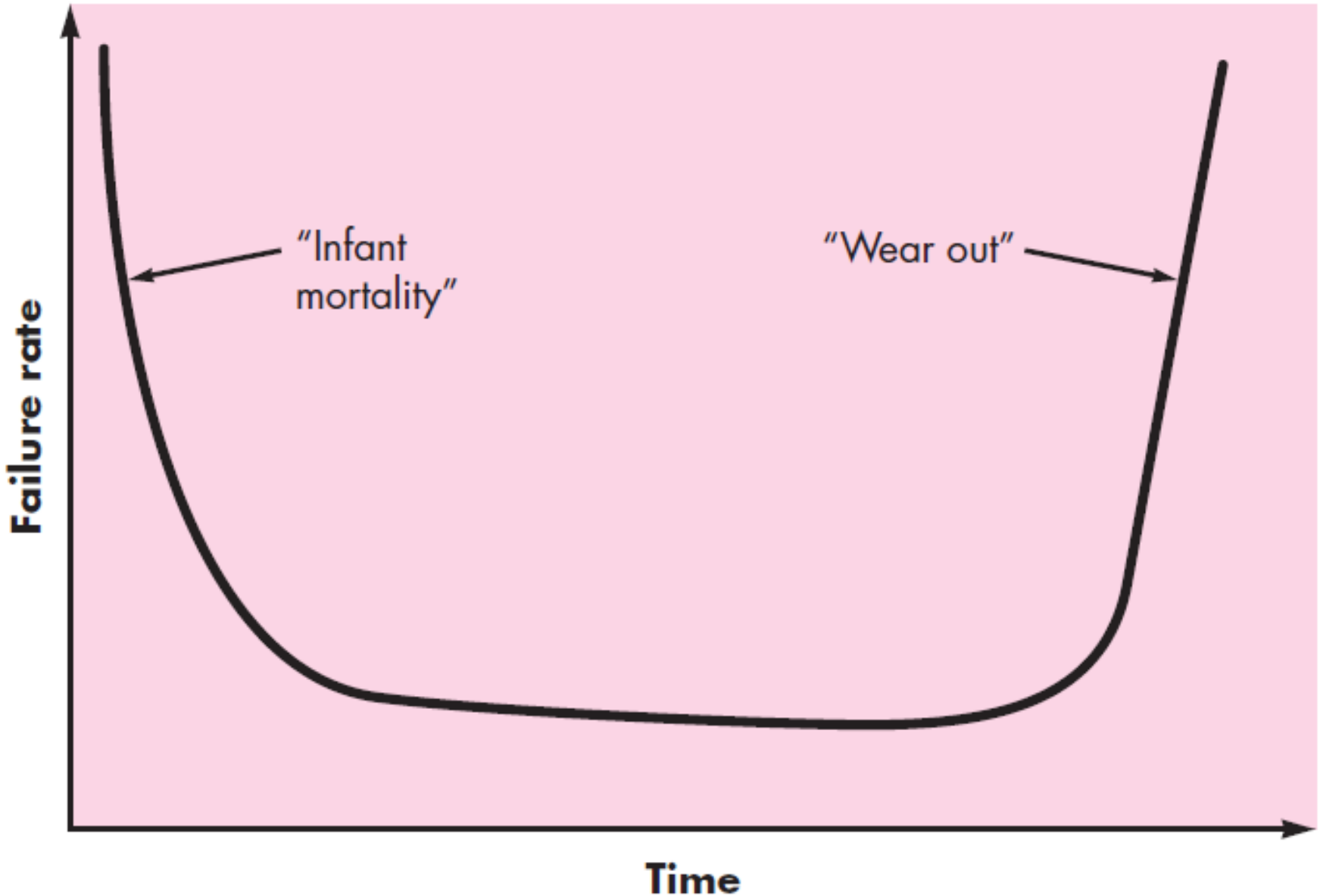
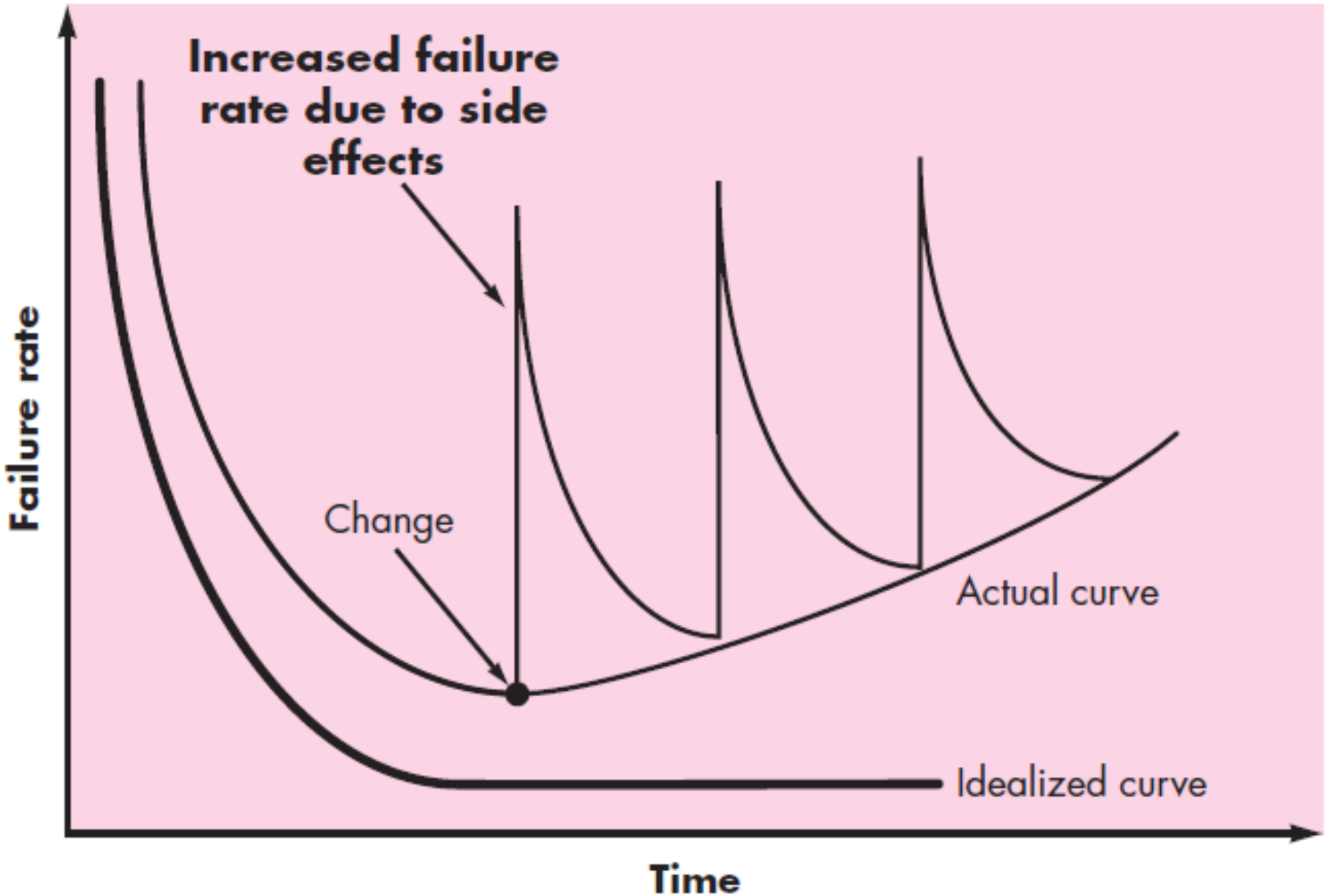
Difference between Hardware and Software Characteristics

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 construction, most software continues to be custom built.


Failure rate
"Infant mortality"
"Wear out"
Time


Increased failure rate due to side effects
Change
Actual curve
Idealized curve
Failure rate
Time

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Changing Nature of Software

1. System software
2. Application software
3. Engineering/scientific software
4. Embedded software
5. Product-line software
6. Web applications
7. Artificial intelligence software

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Characteristics of System Software

1. Heavy interaction with Computer hardware
2. Heavy usage with multiple users
3. Concurrent operation that needs scheduling
4. Resource sharing
5. Sophisticated process management
6. Complex data structures
7. Multiple external interfaces.

Challenges of a Software Engineer in the following fields

- Ubiquitous or Pervasive Computing
- Netsourcing
- Open source