

**Systems & Software**

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**Systems include software**

- Technical Computer-based systems
- Socio-technical systems

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**Characteristics of Socio-Technical System**

- Emergent Properties
- Non-deterministic
- External influence

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## Emergent system properties

- Functional
- Non-functional

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## Systems Engineering & Software Engineering

System as a whole	Only the software components
Reworks usually difficult during development	Usually adaptable to changes
Interdisciplinary	Usually only domain knowledge and technology
Global	Local

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## Legacy System

A system that have been developed in the past, often using older or obsolete technology but is too expensive and too risky to discard

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## Critical System

- A system in which dependability is its most important property

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## Types of Critical Systems

- Safety-critical systems
- Mission-critical systems
- Business-critical systems

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## Dependability

- Availability = สภาพพร้อมใช้งาน
- Reliability = ความเชื่อถือได้
- Safety = ความปลอดภัย
- Security = ความมั่นคง
- Repairability = สภาพซ่อมได้
- Maintainability = สภาพบำรุงรักษาได้
- Survivability = ความอยู่รอดได้
- Error tolerance = ความทนต่อความผิดพลาด

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## Failure, Error, and Fault

Failure = ความขัดข้อง

Error = ความผิดพลาด

Fault = ความผิดพร่อง

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## 3 approaches to improve reliability

- Fault avoidance
- Fault detection and removal
- Fault tolerance

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