System

**Oxford English Dictionary (1928)**

**F**rom Greek *σύστημα*, meaning an organized whole, government, or constitution. Made up of the root “set up with”.

1. An organized or connected group of objects.
2. A set of principles, a scheme, a method, etc.

**Saltzer & Kaashoek, Principles of Computer System Design: Section 1.A.2, 2009**

A set of interconnected components that has a specified behavior observed at the interface ⊆ (with) its environment.

Operating System

**Encarta 2007**

Master control program in a computer.

**American Heritage Dictionary, 4th Edition, 2000**

Software designed to control the hardware of a ~~specific data processing system~~ in order to allow users and application programs to make use of it.

OSes are machine specific.

**Wikipedia, Version 640779030, 2015-01-03**

Software that *manages* computer hardware and software resources and provides common services for computer programs.

The goal here is **clarity**. How can we make our systems obvious and clear?

Common System Problems

1. Incommensurate Scaling

**a. Diseconomies of Scale**

Ex. Star network: as the number of connections grows, so do the numbers of combinations

**b. Economies of Scale**

Ex. Pin Factory: If one were to buy special equipment and create many pins at once one would benefit more in the long run over making a pin by hand each time a pin is needed.

Both diseconomies and economies of scale can cause breakage/waste.

2. Emergent Qualitative Properties

**a. Campus Network at UCLA**

UCLA supplied the Internet for the dorms but did not account for piracy.