**Software Maintenance & Evolution**

Software Engineering - Cairo University

# ****Basic**** Concept ****and Preliminaries****

## Maintenance Versus Evolution

* ***Maintenance***means fixing bugs but preserving their functionalities.
  + All support activities carried out *after* delivery of software are put under the category of *maintenance*.
* ***Evolution***means a continual change from a lesser, simpler, or worse state to a higher or better state
  + All activities carried out to effect changes in requirements are put under the category of *evolution*
* ***maintenance*** for all post-delivery support and ***evolution*** to those driven by changes in requirements.

### Software Evolution

Laws of Leman applies to ***closed source systems*** – E Type Systems

***Continuing change:*** A system will become progressively less satisfying to its user over time, unless it is continually adapted to meet new needs.

***Increasing complexity:*** A system will become progressively more complex, unless work is done to explicitly reduce the complexity.

***Self-Regulation:*** The process of software evolution is self-regulation with respect to the distributions of the products and artifacts that are produced.

***Conservation of organizational stability:*** The average effective global activity rate on an evolving system does not change over time, that is the average amount of work that goes into each release is about the same.

***Conservation of familiarity:*** The amount of new content in each successive release of a system tends to stay constant or decrease over time.

***Continuing growth:*** The amount of functionality in a system will increase over time, in order to please its users.

***Declining quality:*** A system will be perceived as loosing quality over time, unless its design is carefully maintained and adapted to new operational constraints.

***Feedback system:*** Successfully evolving a software system requires recognition that the development process is a multi-loop, multi-agent, multi-level feedback system.

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