Software Quality Assurance and Testing Lecture - 07

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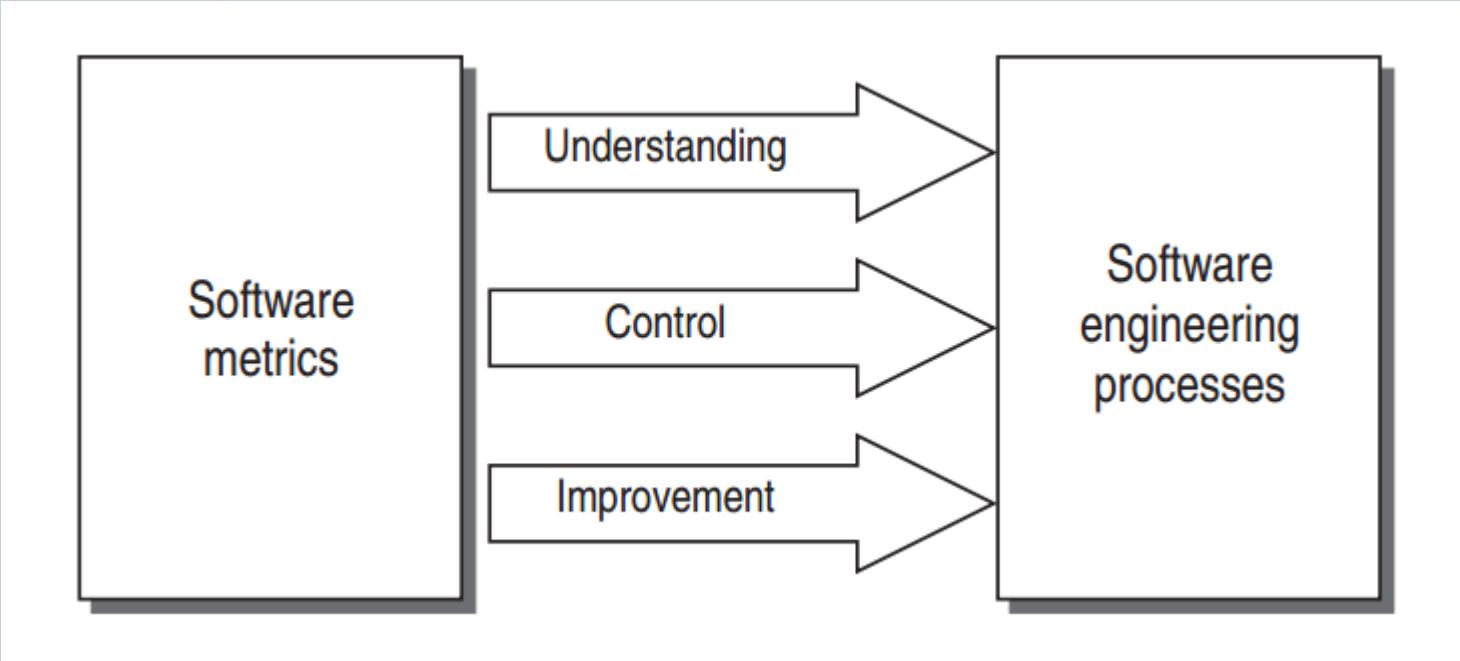
Software Metrics

Software Metrics

- “You cannot control what you cannot measure”
- “The continuous application of measurement-based techniques to the software development process and its products to supply meaningful and timely management information, together with the use of those techniques to improve that process and its products.”

NEED OF SOFTWARE MEASUREMENT



CLASSIFICATION OF SOFTWARE METRICS

- PRODUCT VS. PROCESS METRICS
- OBJECTIVE VS. SUBJECTIVE METRICS
- PRIMITIVE VS. COMPUTED METRICS
- PRIVATE VS. PUBLIC METRICS

ENTITIES TO BE MEASURED

- **Processes**: Any activity related to software development.
- **Product**: Any artifact produced during software development.
- **Resource**: People, hardware, or software needed for a process.

Attributes

- **Internal attributes** of any entity can be measured only based on the entity and therefore, measured directly. For example, size is an internal attribute of any software measurement.

- **External attributes** of any entity can be measured only with respect to how the entity is related with the environment and therefore, can only be measured indirectly. For example, reliability, an external attribute of a program, does not depend only on the program itself but also on the compiler, machine, and user. Productivity, an external attribute of a person, clearly depends on many factors such as the kind of process and the quality of the software delivered.

SIZE METRICS

- LINE OF CODE (LOC)
- TOKEN COUNT (HALSTEAD PRODUCT METRICS)

HALSTEAD PRODUCT METRICS

- Program Vocabulary
  - It is the number of unique operators plus the number of unique operands as given below:
  - n= n1 + n2
  - where n = program vocabulary
  - n1 = number of unique operators
  - n2 = number of unique operands

HALSTEAD PRODUCT METRICS

- Program Length
  - It is the total usage of all the operators and operands appearing in the implementation. It is given as,
  - N= N1 + N2
  - where N= program length
  - N1 = all operators appearing in the implementation
  - N2 = all operands appearing in the implementation

HALSTEAD PRODUCT METRICS

- Program Volume
  - The volume refers to the size of the program and it is defined as the program length times the logarithmic base 2 of the program vocabulary. It is given as,
  - $V = N\log_2 n$
  - Where, V = program volume
  - N = program length
  - n = program vocabulary

Thank You

END OF CHAPTER