



Software Measurement

Software Measurement And Metrics

- Software measurement is concerned with deriving a numeric value for some attribute of a software product or a software process.
- By comparing these values with each other and to standards that apply across an organisation the conclusion about the quality of software or software processes can be drawn
- There are two ways in which a software product measurements can be used
 - To make general predictions about a system – By measuring the characteristics of system components and then aggregating these measurements one can derive a general estimate of some system attribute such as number of faults in the system
 - To identify anomalous components – Measurements can identify individual components whose characteristic deviate from some norm. For example one can measure components to discover those with the highest complexity and assuming these are likely to have more errors concentrate on those components during the review process

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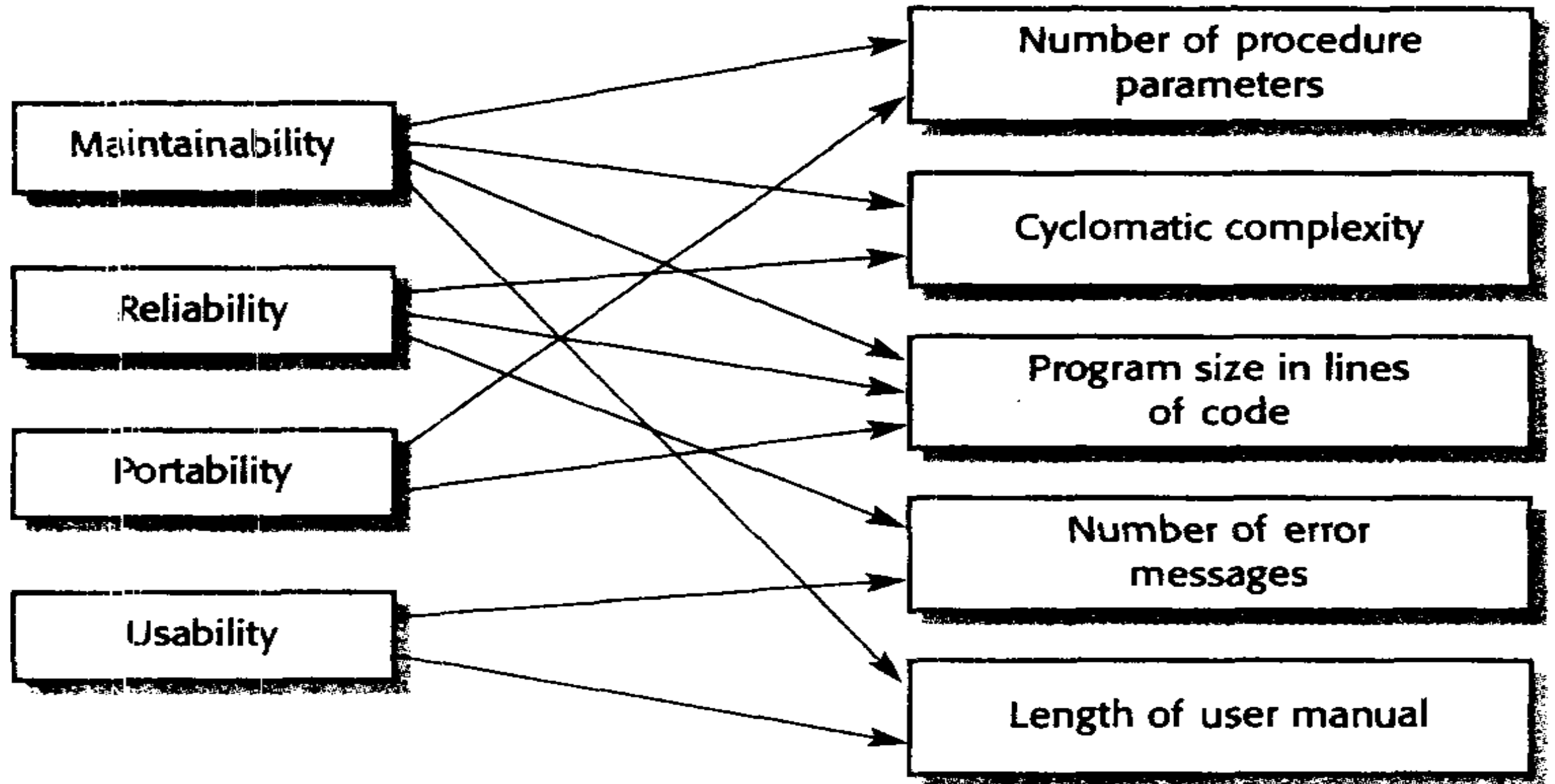
- A software metric is any type of measurement that relates to a software system, process or related documentation. For example size of a product in lines of code
- Software metrics may be either control metrics or predictor metrics
- The following figure shows some external quality attributes that might be of interest and internal attributes that might be related to them
- The diagram suggests that there may be relationships between external and internal attributes .
- If the measure of the internal attribute is to be useful predictor of the external software characteristic three conditions must hold
 - The internal attribute must be measured accurately
 - A relationship must exist between what we can measure and the external behavioural attribute in which we are interested
 - This relationship is understood, has been violated and can be expressed in terms of a formula or model

Measurement Process

Measurement Process

- Formulation : The derivation of software measures and metrics appropriate for the representation of the software that is being considered.
- Collection : The mechanism used to accumulate data required to derive the formulated metrics.
- Analysis: The computation of metrics and the application of mathematical tools.
- Interpretation : The evaluation of metrics results in an effort to gain insight into the quality of the representation.
- Feedback : Recommendations derived from the interpretation of product metrics transmitted to the software team.

Relationships Between Internal And External Software Attributes



Product Metrics

- They are concerned with the characteristics of the software itself
- The software characteristics such as size and cyclomatic complexity do not have consistent relationship with understandability and maintainability because these relationships depend on development processes, technology used and the type of system being developed
- Product metrics fall into two classes
 - Dynamic metrics that are collected by measurements made of a program in execution. They help to assess the efficiency and the reliability of a program. They are usually closely related to software quality attributes
 - Static metric that are collected by measurements made of representation of the system such as design, program or documentation. They help us to assess the complexity, understandability and maintainability of a software system. These have an indirect relationship with quality attributes