

# EXPLORE ON CATEGORIES OF SOFTWARE ENGINEERING TOOLS

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**Abstract** - computerized tools play considerable role in software engineering methods and process. Development of these tools itself a cogent software engineering task. There are extensive software engineering tools though these tools differ in the methods, activities, and phases of the software development cycle, constructors of these tools often face the similar implementation issues. This paper will explore software engineering tools with Advantages and Disadvantages.

**Key Words:** SDLC, Tools, Functions, Categories.

## 1.INTRODUCTION

Software Development Life cycle (SDLC) is a process used by the Software Industry to design and develop high quality software. This Software Industry makes use of some tools to design and develop this software. The first five corresponds to requirements, design, construction, testing and maintenance area and other correspond to configuration management and management area.

## 2.SOFTWARE TOOLS

**Software tool** is a program that is employed in the development, repair, or enhancement programs. It is now observed that software tools can benefit in all activities of all phases of the software development life cycle including management and quality-assurance activities. Thus a expansive set would address such issues as requirements specification, design, validation, configuration control, and project management. Such type of tools would frequently form part of an integrated software engineering environment.

### 2.1 Software Requirements tools

software requirement tools have been divided into two topic:

#### **Requirement modeling tools**

We build models in requirement analysis to understand

- current business process which we are trying to automate
- how users will use a new system.

Tools which is used for eliciting, recording, analyzing and validating software requirements belongs to this section.

#### **Traceability tools**

Requirements traceability is the ability to describe and follow requirement life, both in forward and backward direction. It is becoming increasingly important as the complexity of software system grow.

#### **Advantages:**

- Reduction in costs.
- Reduce re-work.
- Quality improvement.

#### **Disadvantages:**

- Increased documentation.
- storing more requirement statements sometimes reduce memory space.

### 2.2. Software Design Tool

Software design includes activities, which help the transformation of specifications in the requirement into implementation. Requirement specifications specify functional and non-functional expectations from the software. Tools for creating and checking software design belong to this section.

#### **Advantages:**

- Increased speed
- Better documentation
- Intangible benefits

#### **Disadvantages:**

- Every new release of the design tool software has its own new features for which there is a compulsion of a designer to improve the skills towards it.
- May be difficult to customize.
- May be difficult to use with different systems.

### 2.3. Software construction tools

Software construction is the process of creating meaningful software through a combination of design, coding, testing, verification. tools are used in these processes called as software construction tools, also it produce and translate

program representation which is sufficiently detailed and explicit to enables the execution process in software development.

**Program editors** : these tools are used for program creation and modification, and possibly the documents associated with them. They can be general-purpose text or document editors, or they can be the better form a target language.

**Compilers and code generators**: Normally, compilers are non-interaction source code translators but used to integrated programming environments. This part also as processors, linker/loaders, and code generators.

**Interpreters**: These tools are used to provide execution of software through the emulation software execution through emulation. The can support the controlling activity observable environment for execution of the program.

**Debuggers**: These tools are used to software construction process, but they are different from program editors and compilers and also debuggers are separated.

#### Advantages:

- Greater in error handling,exception handling,fault detection.
- Configuration in Run-time.
- Reduction of complexity,reuse.
- Managing Object-oriented run-time issues that increase the flexibility and adaptability of the programs like data abstraction,encapsulation,reflection.

#### Disadvantages

- Overload error.
- Inadequate risk management.
- Capabilities are limited.

## 2.4.Software Testing Tools

Software testing tools are act as test manager in software development process, that is used in day to day testing activities, and also it automate and manages the testing activities.

categories of testing tools, testing process used here is

**Test generators**: These tools are used in test case development process.

**Test execution frameworks** :These tools are performs the test case execution that controls environment where the object test behaviour is observed.

**Test evaluation tools**: These tools are support the assessment of the results of test execution, helping to determine whether or not the observed behaviour conforms to the expected behaviour.

**Test management tools**: These tools are used for providing support to all aspects of the software testing process.

**Performance analysis tools**: these tools are used for software performance measuring and analysis activity. The goal is to performance behaviour rather than correctness(functional behaviour),special form of testing.

#### Advantages:

- Repetitive work reduction.Greater repeat-ability , consistency.
- Ease of access to tests or testing information.

#### Disadvantages:

- Unrealistic expectation from the tool.
- Mistakes from the people by underestimating the cost, effort and time for the initial introduction of a tool.
- Effort required to maintain the test assets that are generated by the tool.

## 2.5 Software Maintenance Tools

Software maintenance is the process of software product modification after delivery to correct faults, to improving attributes or performance. Instead of these process improvement software maintenance tools are makes use consequently in development life cycle of software. these tools are having particular importance in software maintenance where existing systems are modified two categories are,

**Comprehension tools**: These tools are assists the program of human comprehension .

**Re-engineering tools** are support that activity, which are used in reconstitution and subsequent implementation.

**Reverse engineering tools**: These tools are used in the process of transformation. the process are from existing product working backward progress that creates artifacts design description and specification artifacts, which then can be transformed to generate a new product from an old product.

#### Advantages:

- Improvement in performance.
- Various bugs fixing.
- Current trend having up to date progress.
- Reducing time,no need to spend more time extra bucks.

#### Disadvantages:

- cost estimation that includes resource,mostly it increases budget.
- required clear specification of problem report.
- very complex code is difficult to maintain safely.

## 2.6 Software engineering process Tools

### **Process modelling tools:**

Process modeling tools is the tools to modulate and invest process models.

### **Integrated CASE environment**

Computer-aided software engineering tools covers multiple phases of the software development life cycle belong in this section. Such type of tools perform multiple functions and potentially interact with the software process .

### **Process centered software engineering environments:**

This covers the locale that explicitly assimilate software process cue and that guide and monitor the user according to the process that is defined.

### **Advantages:**

- Establishing high level view of project goals.
- Achieve desired features in software development cycle such as design, implementation, testing process.
- Greater Maintenance ability and management control

### **Disadvantages:**

- Requirements changes or information may be inapplicable are creates problem in process implementation.
- Possibilities of required considered amount of effort and time for implementation.
- Not suitable for every organization.

## 2.7 Software Quality Tools

### **Inspection tools:**

Tools which support reviews and inspection belong to this category.

### **Static Analysis Tools:**

Tools that confab software artifacts, such as syntactic and semantic analyzers, and data, control flow and dependency analyzers. Such type of tools are aimed for checking software artifacts for accord or for checking desired properties.

### **Advantages:**

- Reliable software development
- Source code efficiency and complexity management
- High security and maintainability

### **Disadvantages:**

- Functionality missing leads to ineffective result.
- Cost level is increased for maintenance.
- Experts or skilled developers are need,for they can handle the tools checking quality of the software.

## 2.8 Software Configuration Management Tools

software configuration management process helps the developers to manage simultaneous access for software repository in central. Instead of educating developers working progress tools are used in software configuration management.

**Tracking-problem and issues, defect finding, enhancement** :these tools are having association with a particular software product that has connection with tracking-problem and issues.

**version management tools:** These tools are involves the management process in multiple versions of product.

**build and release tools:** These tools are are managing the task of the software process , build and release.

these three categories are the main operational process in software configuration management tools and also includes installation tools ,which are used widely for configuring installation of software products.

### **Advantages:**

- Pain level is unacceptable with existing solution
- Very easy progressing in status accounting, auditing.
- Enables development in parallel way.
- Propagation changes in software configuration management

### **Disadvantages:**

- Requirement changes creates problem in managing software process.
- Teams in several locations are widely dispersed ,increasing complexity level.
- Parallel working process on developers in different phases of development.

## 2.9 Software Engineering Management Tools:

Management tools are further divided into three grades. They are

- Project planning and tracking tools
- Risk management tools
- Measurement tools

### **Advantages:**

- Reduction of budget used in development and maintenance team.
- Store important data that related to project, that can be reused.
- Easier management.

### **Disadvantages:**

- Not suitable for small organization, which have low budget.

- Non-linear process and the iterative process are involved.

Project management doesn't have definite beginning and ending and also it as continuous iteration cycle and deployment.

### 2.10 Infrastructure support tools

Tools that provide interpersonal communication, information retrieval, and system administration and support belong to this section. These tools are generally not specific to a particular life cycle stage.

#### Advantages:

- Cost effective solution, reliable and efficiency.
- Data security and increasing productivity.
- Making better customer services and regular maintenance in schedule.

#### Disadvantages:

- Tangential problem happens in physical or virtual environments.
- Organizing efficient data report increases time limit.
- Technological skill/expertise people needed for performing task.

### 3.CONCLUSION

The leading contention of this paper is to make others know about the software tools which plays a vital role in software development life cycle in many industries. This paper will be highly beneficial for beginners who wants to discover more about software tools.

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