Computer Aided Software Engineering (CASE) Tools /lec٦

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Interface design and development

UI stands for user interface. It is the point of contact between humans and computers. Any technology you interact with as a user is part of the user interface.

For example, screens, sounds, overall style, and responsiveness are all elements of UI. A user interface involves the following four components:

- **Navigational elements.** Navigational elements help users navigate an interface. Examples of navigational elements in UI include slide bars, search fields, and back arrows.

Interface design and development tools

- **Input controls.** On-page elements that enable users to input information are input controls. Buttons, checkboxes, and text fields are all examples of input controls.
- **Informational components.** Informational components are used to communicate information to the user. A progress bar under a video or tutorial is an example of an informational component.
- **Containers.** is a graphical element that holds and organizes content within a user interface. Containers help group related items together and provide a visual hierarchy to the layout of an interface.

Interface design and development tools

Interface design and development tools are actually a tool kit of software components (classes) such as menus, buttons, window structures, icons, scrolling mechanisms, and so forth.

However, these tool kits are being replaced by interface prototyping tools that enable rapid onscreen creation of sophisticated user interfaces that conform to the interfacing standard that has been adopted for the software.

Prototyping tools

A variety of different prototyping tools can be used.

Screen painters enable a software engineer to define screen layout rapidly for interactive applications.

sophisticated CASE prototyping tools enable the creation of a data design, coupled with both screen and report layouts.

Many analysis and design tools have extensions that provide a prototyping option.

PRO/SIM tools generate skeleton Ada and C source code for engineering (real-time) applications.

Prototyping tools

Finally, a variety of Fourth Generation Tools have prototyping features.

4GT:software tools that have one thing in common: each enables the software engineer to specify some characteristic of software at a high level. The tool then automatically generates source code based on the developer's specification.

Currently, a software development environment that supports the 4GT paradigm includes some or all of the following tools: database query, report generation, data manipulation, screen interaction and definition, code generation and automated generation of HTML and similar languages used for Web-site creation.

Programming tools

The programming tools category encompasses the compilers, editors, and debuggers that are available to support most conventional programming languages. **A compiler** is a special program that translates a programming language's source code into machine code.An **Editor** is a software tool for editing something, i.e. introducing changes into some text, graphics or programming:text editor, source code editor, graphics editor. A **Debugger** is a computer program that is used to test and debug other programs.

In addition, object-oriented programming environments ,fourth generation languages, graphical programming environments, application generators, and database query languages.

Web development tools

The activities associated with Web engineering are supported by a variety of tools for WebApp (Web Applications) development.

The best web development tools make it simple and easy for developers to create and design a custom software platform.

These include tools that assist in the generation of text, graphics, forms, scripts, and other elements of a Web page.

Web tools also provide live preview of what is being developed and how will it look after completion.

Web development tools

For example:

1. Chrome Developer Tools: are a set of web editing and debugging tools built into the Google Chrome browser.
2. Sublime Text: is the best option for beginners who have just started learning who to code.
3. Bootstrap: is a widely-used front-end development framework for creating responsive web applications.

It features various HTML, CSS, and JavaScript-based scripts for web design components and functions, saving web developers a lot of time from having to code them manually.

Integration and testing tools

In their directory of software testing tools, Software Quality Engineering defines the following testing tools categories:

1. Data acquisition—tools that acquire data to be used during testing.

2. Static measurement—tools that analyze source code without executing test cases.

3. Dynamic measurement—tools that analyze source code during execution.

Integration and testing tools

4. Simulation—tools that simulate function of hardware or other externals.

5. Test management—tools that assist in the planning, development, and control of testing.

6. Cross-functional tools—tools that cross the bounds of the preceding categories.

It should be noted that many testing tools have features that span two or more of the categories.

Static analysis tools

Static testing tools assist the software engineer in deriving test cases.

Three different types of static testing tools are used in the industry:

(1) code-based testing tools.

(2) specialized testing languages.

(3) requirements-based testing tools.

Static analysis tools

- Code-based testing tools: accept source code as input and perform a number of analyses that result in the generation of test cases.
- Specialized testing languages: enable a software engineer to write detailed test specifications that describe each test case and the logistics for its execution.
- Requirements-based testing tools isolate specific user requirements and suggest test cases (or classes of tests) that will exercise the requirements.

Dynamic analysis tools

Dynamic testing tools interact with an executing program, checking path coverage, testing assertions about the value of specific variables, and otherwise implementing and checking the execution flow of the program.

Dynamic tools can be either intrusive or nonintrusive.

An intrusive tool: changes the software to be tested by inserting probes (extra instructions) that perform the activities just mentioned.

Nonintrusive testing tools: use a separate hardware processor that runs in parallel with the processor containing the program that is being tested.

Test management tools

Test management tools are used to control and coordinate software testing for each of the major testing steps.

Tools in this category manage and coordinate regression testing, perform comparisons that ascertain differences between actual and expected output, and conduct batch testing(testing method that runs test cases in groups instead of only one) of programs with interactive human/computer interfaces.

Regression testing is a software testing practice that ensures an application still functions as expected after any code changes, updates, or improvements.

Test management tools

Regression testing is responsible for the overall stability and functionality of the existing features. Whenever a new modification is added to the code, regression testing is applied to guarantee that after each update, the system stays sustainable under continuous improvements.

In addition to the functions noted, many test management tools also serve as generic test drivers.

A test driver reads one or more test cases from a testing file, formats the test data to conform to the needs of the software under test, and then invokes the software to be tested.

Client/Server (C/S) testing tools

the Client-Server application consists of two systems, one is the Client and the other is the Server.

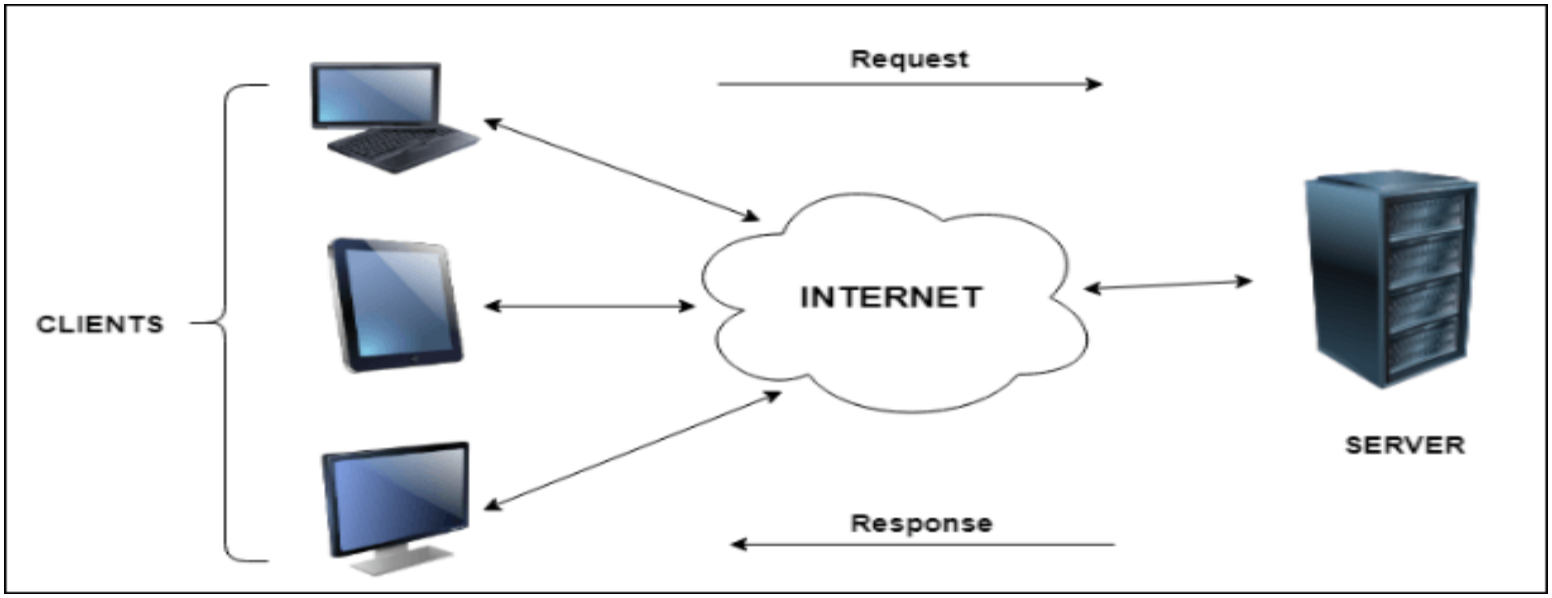
Here, the client and server interact with each other over the computer network.

In Client-Server application testing, the client sends requests to the server for specific information and the server sends the response back to the client with the requested information.

Hence, this testing is also known as two-tier application testing.

client-server application are Email.

Client/Server (C/S) testing tools



WebLOAD is a tool of choice for enterprises with heavy user load and complex testing requirements. It allows you to perform load and stress testing on any internet application by generating load from the cloud and on-premises machines.

WebLOAD's strengths are its flexibility and ease of use – enabling you to quickly define the tests you need .

Reengineering tools

is a process of software development which is done to improve the maintainability of a software system. Re-engineering is the examination and alteration of a system to reconstitute it in a new form.

The reengineering tools category can be subdivided into the following functions:

1. Reverse engineering to specification tools:

take source code as input and generate graphical structured analysis and design models, where-used lists, and other design information.

Reengineering tools

2. Code restructuring and analysis tools:

analyze program syntax, generate a control flow graph, and automatically generate a structured program.

3. On-line system reengineering tools:

are used to modify on-line database systems (e.g., convert older types of databases into entity-relationship format).

Software maintenance tools

Software maintenance refers to the process of updating a software system after it has been delivered to the customer. This can include fixing bugs, adding new features, improving performance, or updating the software to work with new hardware or software systems.

Software maintenance tools are programs used by software engineers to increase their productivity for gathering data, detecting bugs and managing their software. Without these tools, it would be nearly impossible for these engineers to go through thousands of lines of code to find errors .

Software maintenance tools

One of the commonly used maintenance tool is text editor.This tool creates a copy of the documentation or the code. The key feature of this tool is that it provides a medium to roll back (when required) from the current version of a file to the previous one.

Bugzilla

This program is used by thousands of software companies as a "defect tracking system." The program keeps track of bugs that crop up in a software product and allows individuals or groups of developers to communicate and solve the problems. Bugzilla allows software engineers to manage quality assurance and track bugs.

THANKS