

SOFTWARE TESTING TOOLS

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1 Introduction

This work started from the subject of my pro gradu thesis “The newest methods and tools for software testing”. After a long search there were nearly 600 (six hundred) tools found. I am sure, that there are tools much more than these now occurred. A very good aid to me was the list in Internet (www.testingfaqs.org), which Brian Marick made famous and is now maintained by Danny Faught. Other sources have been Internet overall, the brochures of the products and the literature. Because the amount of the tools was so large, I had to restrict them and to take up only the most interesting once. The division to the main groups was: Design, GUI (Graphical User Interface), Load and Performance, Management, Implementation, Evaluation, Static Analysis and outside of inspection: Defect Tracking, Web Sites and Miscellaneous.

The limits between the groups are out of focus, because there are many tools, which can belong to several classes (See Figure 1.).

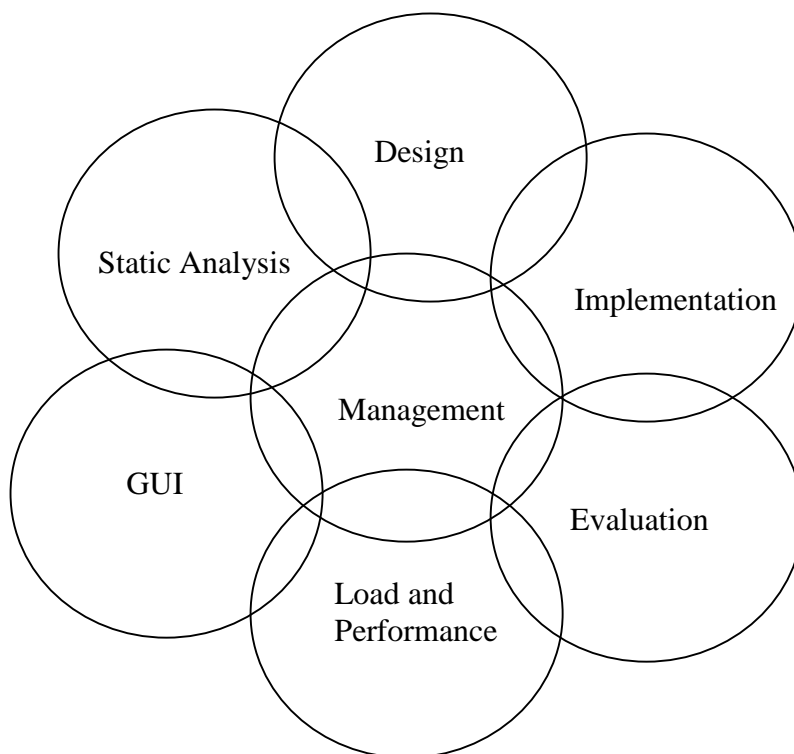


Figure 1. The Division of the tools

A short description of the main groups:

Test Design Tools

Tools that help you decide what tests need to be executed. Test data and test case generators.

Total 15 tools.

GUI Test Drivers

Tools that automate execution of tests for products with graphical user interfaces. Client/server test automation tools, including load testers, also go here.

Total 28 tools.

Load and Performance Tools

Tools that specialize in putting a heavy load on systems (especially client-server systems). These tools are often also GUI test drivers.

Total 21 tools.

Test Management Tools

Tools that automate execution of tests for products without graphical user interfaces. Also tools that help you work with large test suites.

Total 43 tools.

Test Implementation Tools

Miscellaneous tools that help you implement tests. For example, tools that automatically generate stub routines go here, as do tools that attempt to make failures more obvious (assertion generators, etc.)

Total 27 tools.

Test Evaluation Tools

Tools that help you evaluate the quality of your tests. Code coverage tools go here.

Total 31 tools.

Static Analysis Tools

Tools that analyse programs without running them. Metrics tools fall in this category.

Total 33 tools.

Total sum 198 tools.

In PlugIT-project interesting tools are at least: Regression, requirement, component, integration, object-oriented, coverage, test case and use case.

Searching with these words the recent 198 tools the results were:

Regression Tools

Regression testing tools are used to test software after modification. Dividing in groups as above (one or two typical examples per group are presented) there were:

Design: None

GUI: Auto Tester for Windows (No 3) is specifically meant to support project teams in automating regression testing. Others 4, 6, 12, 15 and 27.

Load and Performance: Teleprocessing Network Simulator (No20) can be used to automate regression testing. Others 10 and 12.

Management: Test Manager (No 2) provides an interactive development environment for working with regression test suites. OTF – On Object Testing Framework (No 18) is a tool for Smalltalk objects, in which regression testing is automatic with full logging of results. Others 1, 4, 5, 10, 14, 16, 27, 28, 29, 37 and 38.

Implementation: Junit (No 5) is a regression testing framework used by developers who implement unit tests in Java. Others 1, 15 and 18.

Evaluation: Logiscope (No 26) identifies effective non regression if program files have been modified.

Statistic Analysis: ParaSoft Jtest (No 6) automatically performs regression testing of Java code.

Total 28 tools.

Requirement Tools

Requirement-based or requirement definition related tools.

Design: Caliber-RBT (No 1) is a test case design system for requirement-based testing. Others 6 and 15.

GUI: Panorama-2 (No 8) is a tool for requirement analysis. Another 17.

Load and Performance: SilkRealizer (No 19) is a tool that enables users develop and deploy system level testing simulating real world events to assure that applications will meet the requirements.

Management: AutoAdviser (No13) provides from requirements through production a central repository for organizing and managing business requirements, tests and associated files. Others 18, 21, 35 and 37.

Implementation: None

Evaluation: Panorama C/C++ (No 15) is a requirement and test case analysis tool.

Static Analysis: None

Total 12 tools.

Component Tools

Tools, which have some relationships with component-programming.

Design: Inferno's (No 2) capabilities include creation of an intuitive library of reusable components that support shared-scripts and data-driven-scripts.

GUI: None

Load and Performance: None

Management: SilkPilot (No 1) lets you test the behaviour of distributed objects within your application's server components. AutoAdviser (No 13) consolidates your test library components and provides test team members with access to those components. Others 2, 32, 40 and 42.

Implementation: AssertMate for Java (No 2) is a system that aids Java engineers use assertions to ensure proper implementation of component interfaces. Another 1.

Evaluation: QC/Coverage (No 16) helps users by identifying code components that have not been adequately tested.

Static Analysis: WhiteBox (No 33) provide insight into the complexity of different components of the software.

Total 11 tools.

Integration Tools

Tools used with integration testing.

Design: ObjectPlanner (No 13) allows software developers and managers to calculate the approximate time schedules to perform unit and integration testing. Another 15.

GUI: Solution Evaluation Tool (No 14) is usable in testing the integration of new applications.

Load and Performance: None

Management: Cantata (No 3) is a solution for unit and integration testing of C and C++ code. Others 5, 6, 14, 25, 32 and 40.

Implementation: Autotest (No 14) is an automatic test harness tool for integration testing. Another 15.

Evaluation: Cantata++ (No 7) is an effective tool for C++ integration testing. Others 18 and 27.

Static Analysis: None.

Total 15 tools.

Object-oriented Tools

Tools used specially with object-oriented systems. All Java and C++ tools fall automatically in this category although the search has not found them with keyword object.

Design: T-VEC Test Generation System (No 15) is integrated in an environment to support the development and management of structured or object-oriented requirements specifications. Another 12.

GUI: Vermont HighTest Plus (No 23) includes object-level record/playback of all Windows and VB controls. Others 4, 8, 16, 17, 18 and 27.

Load and Performance: None

Management: TOOTSIE (No 42) is a total object-oriented testing support environment. Others 1, 2 and 18.

Implementation: ObjectTester (No 11) is a software tool to automate the generation of C++ unit test scripts. Others 1 and 2.

Evaluation: TotalMetric for Java (No 1) is a software metrics tool to calculate and display object-oriented metrics for the Java language.

Static Analysis: ObjectDetail (No 12) is a software tool to help automate the metrics generation of C++ programs. Another 27.

Total 19 tools.

Coverage Tools

Code coverage, test case coverage, test coverage and so on.

Design: Caliber-RBT (No 1) uses the requirements as a basis to design the minimum number of test cases needed for full functional coverage. Others 2, 4 and 15.

GUI: Smalltalk Test Mentor (No 15) automatically gathers execution and method coverage metrics. Others 8, 18 and 20.

Load and Performance: DataShark (No 6) generates the minimal number of test cases with maximum coverage based on equivalence class partitioning and boundary condition analysis.

Management: Cantata (No 3) is a code coverage analyser. Others 10, 13 and 38.

Implementation: None

Evaluation: DeepCover (No 2) provides test coverage analysis for C/C++ and Java applications. ObjectCoverage (No 13) a branch coverage analysis tool for C++. Others all but 1, 21 and 24.

Static Analysis: Plum Hall (No 15) is a static analysis and code coverage tool for testing C/C++ code. Others 21, 31 and 33.

Total 45 tools.

Test case Tools

Tools used e.g. in test case design.

Design: Validator/Req (No 6) performs test case generation. Others 1, 2, 3, 4 and 5.

GUI: imbus GUI Test Case Library (No 26) is a library of predefined test cases for automated GUI testing. Others 8 and 19.

Load and Performance: DataShark (No 6) generates the minimal number of test cases with maximum coverage based on equivalence class partitioning and boundary condition analysis.

Management: QCIT (nr 21) tracks the software testing process from requirement development, through test plan and test case development and execution. Test Case Manager-TCM (No 30) organizes test cases for storage and execution logging. Others 5, 10, 25, 26, 28, 31, 34, 35 and 40.

Implementation: Autotest (No 14) controls a series of test cases on different programs and software units Visula. Others 11 and 13.

Evaluation: Object/Coverage (No 13) analyses statements and generates a test case coverage report. Others 15 and 24.

Static Analysis: Poly Space Verifier (No 16) is a tool designed to directly detect run-time errors and non-deterministic constructs at compilation time. Others 15, 31 and 33.

Total 31 tools

Use case Tools

Use case testing and design.

Every group none.

Total sum 161 tools.

If you are interested for example in regression tools, you have them now in the same group and you don't have to scan through all the 198.

Here you had two examples how to divide tools in the groups. There are many other grounds to do the same thing. Everyone can think himself what is the best.

We can also place the different types of tools in the software development life cycle (Figure 2.). The limits between groups are ambiguous. The division is based on the divisions by Fewster and Graham [FeG99] and Tervonen [Ter00].

Test management tools can be used in the whole software development life cycle. Test design and inspection tools can be used in requirement specification, in architectural design and in the detailed design phases. The static analysis tools help testing in the coding phase. Execution and comparison tools can be used overall on the right side of V-model. Dynamic analysis tools are usable in functionality, integration and unit testing. They assess the system while the software is running. Coverage tools are designed specifically for unit testing. Acceptance and system tests fall in load and performance tools. GUI test drivers have features of many other tools and are useful in the whole implementation and evaluation area, but they are designed for GUI testing and are distinctly an own group.

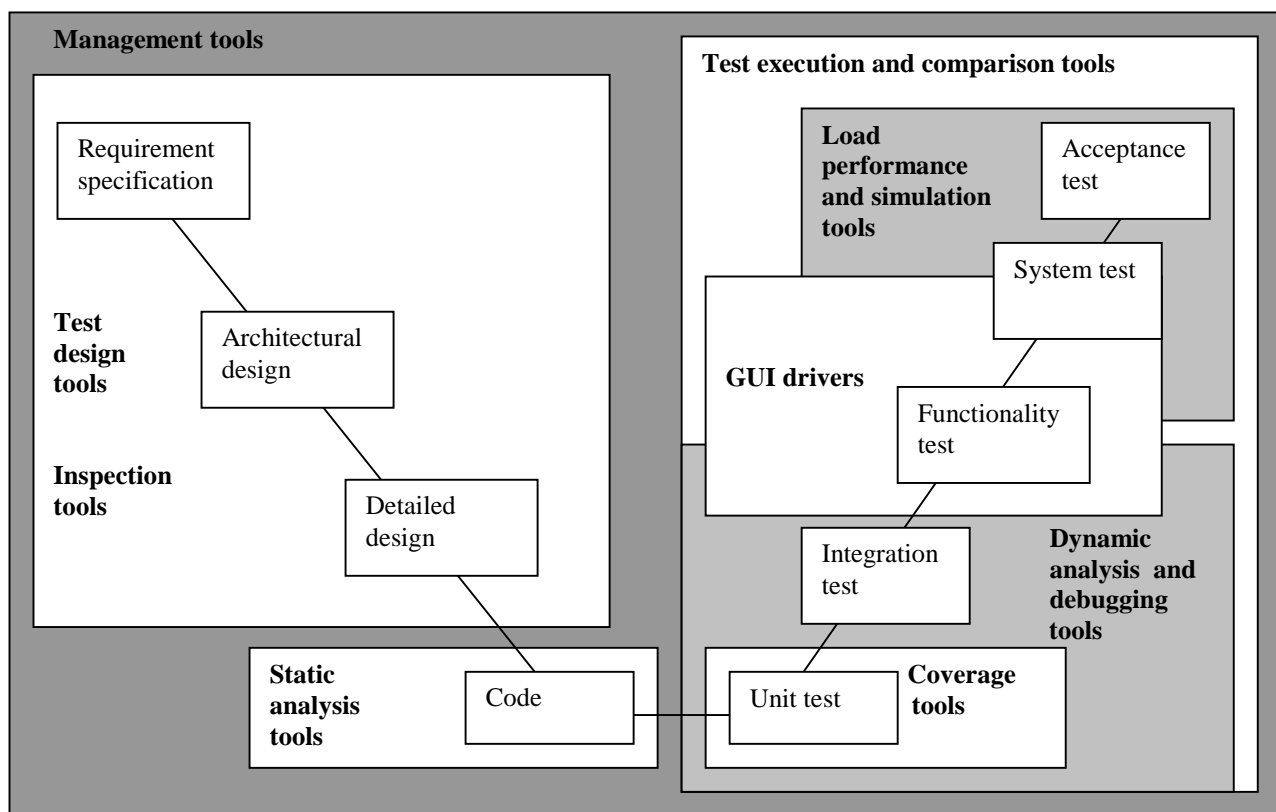


Figure 2. Division of the tools in the software development life cycle (V-model)

2 References

- [FeG99] Fewster, M., Graham, D.: Software Test Automation. ACM Press, New York, 1999.
- [Ter00] Tervonen, I.: Katselmointi ja testaus. Lecture notes in University of Oulu, 2000.

3 Division of the Tools

Every tool has a similar structure of the description. It contains firstly in the header line: Name of the tool, Company name and www-address(es). Then the description begins with one sentence, which explains the main scope of the tool. A short software description is after that and finally in the last lines possible free use and platforms of the tool if known.

3.1 Test Design Tools

3.1.1 Test Case Tools

1. Caliber-RBT, Technology Builders, www.TBI.com

Test case design system for requirements-based testing. CaliberRBT is a requirements-based, functional test case design system that drives clarification of application requirements and designs the minimum number of test cases for maximum functional coverage. By thoroughly evaluating application requirements for errors and logical inconsistencies, CaliberRBT enables project teams to refine and validate the requirements earlier in the development cycle. The earlier in the cycle requirement errors are found and corrected, the less costly and time-consuming they are to fix. CaliberRBT uses the requirements as a basis to design the minimum number of test cases needed for full functional coverage.

CaliberRBT then allows project teams to review both the requirements and the test cases in a variety of formats, including a logic diagram and structured English functional specification, to ensure that the requirements are correct, complete, fully understood and testable.

Free demo.

Platforms: Any

2. Inferno, Gresham Enterprise Software, www.gresham-software.com

Test cases creating tool. Automating with Inferno allows you to create repeatable test cases and leverage your investment throughout the lifetime of the application. Automated testing with Inferno condenses testing cycles while increasing test coverage. Inferno's capabilities include simplified script development and maintenance, creation of an intuitive library of reusable components that support shared-scripts and data-driven-scripts, and the ability to conduct unattended testing 24x7, even through system under test failures.

Free demo.

3. RadSTAR, IMI Systems Inc., [FeG99].

Test design and execution. RadSTAR is a model-based, automated software testing approach initially developed in the USA by IMI Systems Inc. It is a combination of a test planning methodology and an automated engine, which executes the planned test cases.
Platforms: Any

4. SoftTest, Bender and Associates, www.methods-tools.com/tools/testing.html

Test case design tool. SoftTest is a functional test case design tool that can be used to generate test definition scripts for any type of application, written in any language, and run on any platform. It uses a mathematically rigorous technique to verify a system's functional requirements by generating a minimum set of test case scripts designed for maximum functional coverage.

Version: 5.2

Platforms: Any

5. TDGEN, Software Research, Inc., www.soft.com/Products/index.html, www.testingfaqs.org/t-design.htm#TDGEN

Test case generation tool. TDGEN is a test data generator which works as a stand-alone product or as part of the fully integrated TestWorks/Advisor tool suite. TDGEN takes an existing test script and substitutes new random or sequential data values to create additional tests. TDGEN increases the size of a test suite to more fully exercise the application under test. TDGEN behaves as an intelligent macro processor. The user either creates new test data files or configures existing test scripts to substitute different data items for selected fields. With TDGEN, hundreds of additional tests can be created in a short amount of time.

Platforms: SPARC SunOS; SPARC Solaris ; HP-9000; DEC-Alpha OSF1; NCR 3000; DOS

6. Validator/Req, Aonix, www.aonix.com, <http://www.methods-tools.com/tools/testing.html>

Test case generator. Validator/Req performs test case generation. Producing up to 1000 test cases per minute, Validator/Req automatically extracts test specifications from project models. The Validator/Req product includes StP/T. StP 2.6 combined with Validator/Req is a suite of development tools to close the loop between requirement specification, modeling and testing.

Platforms: Sun Solaris/SunOS, HP-UX, AIX, Silicon Graphics IRIX, Digital Unix

3.1.2 Database Tools

7. DataFactory, Quest Software Inc., www.quest.com

Populate test databases with meaningful test data. DataFactory will read a database schema and display database objects such as tables and columns, and users can then point, click, and specifically define how to populate the table.

Generates meaningful data from an extensive test database that includes tens of thousands of names, zip codes, area codes, cities, states, and more.

Enables users to test with millions of rows of data, giving a realistic picture of database performance in the production environment.

Project-oriented architecture allows multiple tables and databases to be loaded in a single session.

Supports direct access to Oracle, DB2, Sybase and any ODBC (Open Database Connectivity) compliant database.

Enables developers to output to the database or to a flat text file.

Maintains referential integrity, including support for multiple foreign keys.

Gives developers the option to use DataFactory data tables or import their own data from a database or delimited text file.

3.1.3 Data Generators

8. Datagen2000, Superfine Software, www.superfinesoftware.com

Test data generator designed exclusively for Oracle databases. A level of flexibility, scalability and ease of use. The ability to harness the power of PL/SQL (Procedural Language/Structured Query Language) to define your test sets. Comprehensive support for foreign key relationships. An interactive generation environment.

Free download.

9. Datatect, Banner Software Inc, www.Datatect.com

Test data generation tool. Generate to flat files directly to database tables. Create flat ASCII files with fixed or variable length fields and records, which can be used with any appropriate application or imported into a database or spreadsheet. Directly populate tables for many popular databases, including Oracle, Microsoft SQL (Structured Query Language) Server, Informix, Sybase, and Access, using ODBC (Open Database Connectivity). The user has the capability to read in existing database table structures to aid in the generation of meaningful test data beds.

Free trial.

Platforms: Windows 95, 98, NT

10. JustData Enterprise, JustSoft Pty Ltd, www.justsoft.com.au, www.testingfaqs.org/t-design.htm#JustData

Multi Purpose Data Tool for IT people. JustData is a rapid data generation tool for IT person(s) who need to create large amounts of structured data, prior to testing applications. Working with ADO (Active Data Objects)/SQL ANSI92 compliant databases systems, General applications, Spreadsheet applications, MSSQL Server V6.0 - 7.0, Oracle 7.0 - i8.0 SQL*Loader.

Platforms: Windows 95, 98, NT, 2000

11. Move for Legacy, Princeton Softech, Inc.,

<http://princetonsoftech.com/products/comparefordb2.asp>

Move for Legacy™ is specifically designed to extract and move legacy data to support a variety of data processing tasks:

Integrate DB2 and legacy data to create accurate, consistent and realistic test data.

Take advantage of COBOL or PL/I copybook information for transforming legacy records.

Define relationships to extract all required legacy data for easy migration to a target legacy system or a relational database.

Move data from multiple databases and legacy data files without complex SQL or custom programs.

Mask sensitive data or transform legacy data for specific test scenarios.

Move for Legacy uses sophisticated algorithms to maximize its performance. Extracts that had taken hours using other approaches are done in minutes. Whether you need to create unique test databases, split or combine databases, or move data into production, Move for Legacy gets the job done with guaranteed accuracy.

3.1.4 General Test Design

12. ObjectGeode, Verolog Inc., www.methods-tools.com/tools/testing.html

ObjectGEODE is a solution for the analysis, design, verification and validation (through design model simulation), code generation, and testing of real-time and distributed applications. ObjectGEODE supports the consistent integration of complementary object-oriented approaches based on the OMT (Object Modelling Technique), SDL (object-oriented design language) and MSC (trace language) standard notations.

Version: 1.1.

Platforms: Sun Solaris/SunOS, AIX, HP-UX

13. ObjectPlanner, ObjectSoftware Inc., www.obsoft.com,

<http://www.testingfaqs.org/t-misc.htm#objectplanner>

C++ Test schedule generator tool. ObjectPlanner is a software tool to automate the generation of testing schedules. Applications written in the C++ language require unit and integration testing to reveal errors. The amount of time, number of people and other

resources required to test an application are usually not known. ObjectPlanner analyses C++ classes and calculates the approximate time that will be required to perform unit testing. This allows software developers and managers to calculate the approximate time schedules to perform unit and integration testing.
Platforms: SPARC - SunOs 4.1.X and Solaris 2.X

14. Test Designer, Intusoft, <http://www.intusoft.com/products.htm>

Test synthesis, fault analysis, isolation strategies and strategy reports. Test Designer automates test synthesis, fault analysis, isolation strategies, and generates detailed test strategy reports. It is valid for all types of system, IC (Integrated Circuit), and board-level designs. It can include analog, mixed-signal, and mechanical elements as well as behavioral and C code AHDL (Hardware Description Language) blocks. The user can easily pair different circuit configurations with various analyses to create test setups, assign measurements and define pass/fail limits for the detection of failures.
Free demo.
Platforms: Win 95/98/ME & NT 4.0/2000/XP

15. T-VEC Test Generation System, T-VEC Technologies, www.t-vec.com, www.testingfaqs.org/t-design.htm#tvec_anchor

Specification-based Test Vector Generator, Coverage Analysis and Test Driver Generation. The toolset, called the T-VEC Factory, provides specification-based test vector generation, coverage analysis and test driver generation. The Factory tools are integrated in an environment to support the development and management of structured or object-oriented requirements specifications. This process supports both unit testing, integration and software system testing through hierarchical specifications. A Specification Compiler verifies the consistency of the specification and then transforms it into a form appropriate for test vector generation.
The Test Vector Generator automatically generates tests by determining the input space boundaries for each requirement specification element, and then selects inputs along the boundaries; it uses the inputs to compute the expected output based on the specification. The Test Coverage Analyzer verifies that each requirement specification element has associated test vectors; if not, uncovered requirements are flagged. An execution/debug environment is included to aid in locating specification errors. The test execution can be fully automated from the specification-based tests.
The environment supports generation and management of specification-to-implementation objects mappings that can be customized for any implementation language and test environment. The Test Driver Generator automatically creates test drives from the object mappings to support test execution and results analysis.
The environment functionality is packaged in a visual environment that has a look and feel similar to the Microsoft WindowsNT Explorer and includes Visualization - a matrix representation of the test vectors and of artifact status.
Platforms: PC, WindowsNT

3.2 GUI Test Drivers

1. **Android, Smith House, <http://www.smith-house.org/open.html>, www.testingfaqs.org/t-gui.htm#Android**

Automated GUI Client Testing Tool. Android is an open-source GUI testing tool that can observe and record your interactions with a graphical user interface, creating a script that can repeat the session to any desired level of accuracy. The user can specify test points

where the designated window is to be checked to see if it differs from the "canonical" test run originally recorded, signalling a test failure if this is the case. It can also be used to write GUI automation scripts.

Freeware.

Platforms: Record mode requires Expect. Playback or scripting will work on any Posix-compliant system with a working port of Tcl/Tk (programming languages).

**2. AutoTester for OS/2, AutoTester Inc., www.autotester.com,
<http://www.testingfaqs.org/t-gui.htm#AUTOS2>**

Creation, execution and documentation of tests. AutoTester for OS/2 is an automated testing tool designed specifically for the creation, execution and documentation of automated tests for OS/2-based applications.

Platforms: OS/2-based apps.

**3. AutoTester for Windows, AutoTester Inc., www.autotester.com,
<http://www.testingfaqs.org/t-gui.htm#AUTWin>**

Creation, execution and documentation of tests. AutoTester for Windows is an automated testing solution designed for the creation, execution and documentation of automated tests for Windows 3.x, NT, and 95 applications. AutoTester®, a comprehensive automated testing application is specifically designed to support project teams in automating functional and regression testing.

Platforms: Windows 3.X, Windows 95, Windows NT

**4. CAPBAK, Software Research, Inc., www.soft.com/Products/index.html,
<http://www.testingfaqs.org/t-gui.htm#CAPBAK>**

Test Capture/Playback Tool. CAPBAK is a test capture/playback system, which works as a stand-alone product or as part of the fully integrated TestWorks/Regression multi-platform suite of testing tools. CAPBAK captures all user activities during the testing process using three modes: TrueTime, Character Recognition, and Object Oriented modes. Keystrokes, mouse movements, captured bitmap images, widget/object activity and extracted ASCII characters are captured into a test script. The captured images and characters provide baselines of expected application behavior against which future tests runs are compared. CAPBAK's automatic output synchronization capabilities ensures reliable playback, allowing tests to be run unsupervised as often as required.

Platforms: SPARC SunOS; SPARC Solaris; HP-9000; DEC-Alpha; NCR 3000; DOS; Win 3.x, 95, NT

**5. Certify, WorkSoft, Inc., <http://www.worksoft.com/>,
<http://www.testingfaqs.org/t-gui.htm#Certify>**

Business-user-oriented automated testing system. Certify provides enterprise-level test automation. It allows tests to span applications, platforms and test tools while shielding

users from the complexities of script languages. Certify detects application changes and automatically maps them to affected tests, simplifying maintenance and protecting the investment in the test repository.

Free demo.

Platforms: Windows 98, NT, 2000. May require third party test tool for client/server applications.

6. CitraTest, Tevron, LLC, <http://www.tevron.com>, <http://www.testingfaqs.org/t-gui.htm#CitraTest>

Automated GUI client testing tool. CitraTest is the client side Automated Testing Solution for all Citrix hosted applications.

This tool is ideal for latency, functional, and regression testing.

Platforms: Windows NT, Windows 2000, Windows 98, Windows 95, Windows ME

7. JavaStar, Sun Microsystems, www.methods-tools.com/tools/testing.html

JavaStar is an automated software testing tool for testing Java applications and applets through their GUIs. As a GUI testing tool, JavaStar compliments JavaSpec (Test Implementation Tools)- the Java API testing tool. JavaStar is created specifically for, and focused exclusively on, testing Java.

Version: JDK.

No support since 1999.

Platforms: 1.1.1. Java and JDK 1.1 platforms

8. Panorama-2, International Software Automation, Inc. (ISA), <http://www.softwareautomation.com>, http://www.testingfaqs.org/t-gui.htm#ISA_C

Capture/playback, Coverage, Test Case Minimization, Memory Check, Defect Tracing.

Panorama-2 is an enhanced product of Panorama C/C++. It is a comprehensive environment for software design, coding, testing, QA, reengineering, debugging, defect tracing, and problem management, consists of eight integrated tools (OO-Playback, OO-MemoryChecker, OO-DefectTracer, OO-Test, OO-SQA, OO-Browser, OO-Diagrammer, and OO-Analyzer), offers Object (Window) oriented and GUI-based capture/playback (without scripting and extra programming) with test coverage analysis and test case minimization so that only the minimized test cases will be played back.

Test coverage analysis of template/class/function/block/branch/ segment/loop boundary/condition & multi-condition outcome, code execution frequency analysis in function level and branch level, requirement/test case and code correspondence analysis and dynamic tracing.

Memory leak/violation checking, defect/problem tracing, quality measurement using static and dynamic OO-metrics. Automated error simulation, error checking/detecting/locating, dynamic test result mapping (from object code to source code or user-defined/system header files).

Dynamic test result display in colourful class inheritance chart, function call graph, on-line accessible reports, and logic/control flow diagrams with unexecuted path/segment/condition outcome highlighted.

Platforms: SUN Sparc, OS/Solaris, Windows NT, Windows 95, HP-UX (new).

**9. QARun, Compuware Corporation, www.compuware.com,
<http://www.testingfaqs.org/t-gui.htm#QARUN>**

GUI capture, script development test automation tool. *QARun*TM is an enterprise-wide test script development and execution tool that is part of Compuware's *QACenter*TM family of application testing products. *QARun*'s automated capabilities improve the productivity of testers, enabling them to efficiently create test scripts, verify tests, and analyze test results. Using *QARun*, tests can be easily maintained for repeat use.

With Compuware's *QACenter*, software testers and application developers can now ensure application quality with the enterprise-wide testing solution that includes client/server automated testing tools, mainframe testing tools, test process management tools and testing services. *QACenter* consists of client/server automated testing tools as well as Compuware's mainframe testing products, *QAHiperstation*TM, for VTAM (Virtual Telecommunications Access Method) applications, and *QAPlayback*TM, for CICS (Customer Information Control System) -based applications.

Platforms: All Windows and character based platforms

**10. QC/Replay, CenterLine Development Systems, Inc., www.centerline.com,
<http://www.testingfaqs.org/t-gui.htm#qcreplay>**

GUI record/replay/scripting language for X applications. QC/Replay offers "widget-based" testing of GUI based applications. Testers can record sessions and play them back on a variety of platforms. "Widget-based" rather than bitmap based verification makes test scripts robust: they are unaffected by changes in window size, position, window manager, screen size and colour, as well as changes in the application during normal development.

QC/Replay uses Tcl (programming language) for scripting, and supports portable testing across platforms.

Platforms: SunOS, Solaris, HP-UX, SVR4, UnixWare, Digital UNIX and AIX.

**11. QES/EZ for GUI, QES, Inc., www.qestest.com,
<http://www.testingfaqs.org/t-gui.htm#QESEZGUI>**

Automated GUI software testing system without scripting. QES/EZ is an automated GUI software testing system without the need for scripting or programming. The test data is stored in a relational database, which makes the maintenance and management of the test data very efficient and easy. QES/EZ for GUI has 2 run levels, extensive timing and comparison controls, reporting capabilities, variables, dynamic interaction with the target systems behaviour, etc. QES/EZ gives you the power to automatically validate, verify, test and populate any software systems without scripting. You do not have to tell QES/EZ what to test! You can instantly capture and execute the test!

Platforms: Windows 3.x, Windows/95, Windows/NT, OS/2

**12. Rational Robot, Rational Software Corp, www.rational.com,
<http://www.softwareqatest.com/qatweb1.html>**

Automated functional testing tool. Allows user to create, modify, and run automated functional, regression, and smoke tests for e-applications built using a wide variety of independent development environments. Rational TestManager and Rational SiteCheck are included, enhancing ability to manage all test assets and have them available to all team members; includes capabilities for Web site link management, site monitoring, and more.
Platforms: Windows

**13. Rational TeamTest, Rational Software Corp, www.rational.com,
<http://www.testingfaqs.org/t-gui.htm#TeamTest>**

Automated test tool for Windows client/server applications. Rational TeamTest is a complete set of functional testing tools, delivering seamlessly integrated functional testing of enterprise-level client/server applications. Built on a scalable, integrated server-based test repository, Rational TeamTest combines leading-edge testing power and comprehensive management tools to set the standard for automated testing of client/server applications.
Platforms: Windows NT 4.0 SP 5 or 6a; Windows 2000, Windows 98 second edition; or Windows 95 SR2

**14. SET (Solution Evaluation Tool), IBM,
<http://www.as.ibm.com/asus/svs.html>, <http://www.testingfaqs.org/t-gui.htm#SETTOOL>**

GUI test drivers and capture/replay tool, load and performance tool. The Solutions Evaluation Tool (SET) is IBM's unique, non-intrusive, automated, computer-aided software testing tool. It drives mouse, keyboard, and graphical interfaces to simulate peak work periods in complex client/server environments. SET works with any application under all operating systems in a multi vendor environment.

The SET tool can be beneficial in: Testing the performance of existing applications, testing the integration of new applications, performing server consolidation testing and evaluating e-business performance.

SET Highlights: Measures application performance and capacity, evaluates application design alternatives, validates functional specifications, determines network, server, and client workstation sizing parameters, isolates performance problems, measures actual end-to-end response times across any multi-tier environment, works in conjunction with and supports calibration of load generation tools and supports workstations, network stations, and portables.

Platforms: DOS based controller software will run on any PC with an ISA (Industry Standard Architecture) or MC (MicroChannel) architecture.

**15.Smalltalk Test Mentor, SilverMark, Inc., www.silvermark.com,
<http://www.testingfaqs.org/t-gui.htm#stm>**

Test framework for Smalltalk. Automated testing tool for VisualAge for Smalltalk and Cincom's VisualWorks. Test Mentor is a automated testing framework for Smalltalk. It seamlessly integrates UI record/playback with domain object testing for deep regression testing of your applications. Test Mentor automatically gathers execution and method coverage metrics, and provides analysis tools so you can rapidly measure the health of your project.

Platforms: All platforms supported by VisualAge for Smalltalk and Cincom's VisualWorks

**16.SQA TeamTest: ERP-Extension for SAP, Rational Software Corporation,
www.rational.com, <http://www.testingfaqs.org/t-gui.htm#TeamTestSAP>**

Functional Testing and Implementation Tool. SQA TeamTest ERP (Enterprise Resource Planning) Extension provides automated validation (functional testing) of SAP R/3 implementations. It is packaged as an SQA Robot extension, so you get the advantages of SQA Robot's object-level recording, which provides robust test scripts, even when the SAP application changes as a result of configuration changes.

Platforms: Microsoft Windows NT 3.51, Windows NT 4.0, or Windows 95, and SAP R/3

**17.SQA TestFoundation for PeopleSoft, Rational Software Corporation,
www.rational.com, <http://www.testingfaqs.org/t-gui.htm#TestFoundation>**

Functional Testing and Implementation Tool. SQA TestFoundation for PeopleSoft is an Automated Application Quality (AAQ) solution for PeopleSoft. AAQ products help ensure success in PeopleSoft implementations through predefined methodologies, steps and automatic processes.

SQA TestFoundation for PeopleSoft contains industry-proven methods for successful implementations, comprehensive requirements lists and their related validation steps, and the software solution for automated validation from Rational. Rational is the pioneer in automated testing of PeopleSoft applications and sets the standard for PeopleTools testing, with the industry's object-level integration with PeopleTools.

Platforms: Microsoft Windows NT 3.51, Windows NT 4.0, or Windows 95, and PeopleTools 6 or greater

**18.Test Mentor for VisualAge Smalltalk, SilverMark Inc.,
<http://www.javatesting.com/Product/VisualAge/VAsmtlkDev.html>,
www.methods-tools.com/tools/testing.html**

GUI record/playback and domain object (model) testing. Test Mentor for VisualAge Smalltalk is an automated testing solution designed specifically for VisualAge Smalltalk and Generator. It integrates GUI record/playback and domain object (model) testing, while providing a test architecture that strongly encourages test case reuse. SilverMark's Test Mentor exploits the VisualAge Smalltalk development environment for test case version control, and provides interfaces for test management, results analysis, and method coverage

metrics.

Version: 1.1b

Free evaluation copy.

Platforms: Win 95/98/NT, Win3.1, AIX, OS/2

19. Test Now, ST Labs, Inc., www.stlabs.com, <http://www.testingfaqs.org/t-gui.htm#testnow>

Add-on package to Microsoft Test. It has been discontinued, but is still available as a free download.

The idea of the product is made up of four parts:

1. It supplies the user with common routines that must always be created when starting a new project with MS Test. Basically, it's 10,000 lines of code the user doesn't have to write but would have had to otherwise.
2. It supplies the user with a common approach to creating their test cases. All too often people are given MS Test and told to "automate the testing of the product." Keeping things flexible to make future changes and enhancements easier is difficult to do your first couple of times automating a product. This guides the user to help keep things flexible for future needs by allowing them to incorporate a "framework."
3. A full and heavily commented suite of tests is included. Basically, it's a "real world" test suite that they can tear apart and learn from when creating their own automated tests when using Microsoft Test.
4. A stand-alone utility for not only capturing X-Y coordinates when dealing with "fake" or virtual Windows controls, but to also keep it on an independent system so that moving from one resolution to another will keep coordinate changes to a bare minimum.

The product comes with the source code for most of the routines. We do not suggest nor support changes to the code, however.

Free download.

Platforms: Windows

20. TestBench400, Original Software, www.origsoft.com, <http://www.testingfaqs.org/t-gui.htm#TestBench400>

Total test automation for the IBM AS400 (iSeries). TestBench400 - fully integrated Database, Screen & Report test automation designed specifically for AS/400 systems:

- Batch and Interactive program coverage
- Advanced Test Planning, Data Creation and Management
- Recording, Playback and Verification of Scripts - Native, GUI & web browser
- Full Test Results Analysis and Audit-Ready Reporting

Platforms: AS400

21. TestQuest Pro Test Automation System, TestQuest, Inc.,
www.testquest.com, <http://www.testingfaqs.org/t-gui.htm#TestQuest>

Automated software testing tool. TestQuest provides non-intrusive test automation tools and services for information appliances, general computing, handheld devices and industrial control. Our products, services and expertise enable you to easily automate the testing of your complex products resulting in decreased test cycle time and increased product quality and customer satisfaction.

Free demo.

Platforms: The software under test may be executing under any operating system. The TestQuest Pro runs on MS Windows 2000.

22. TestRunner, Qronus Interactive, www.qronus.com,
<http://www.testingfaqs.org/t-gui.htm#testrunner>

For automated system testing. A non intrusive automated software quality system for interactive embedded and real-time environments. Specially designed to handle systems incorporating any combination of GUI and I/O channels. (Serial, Digital, Lan, etc.)

Platforms: TestRunner runs from an independent NT host, connecting Non-Intrusively to the system under test

23. Vermont HighTest Plus, Vermont Creative Software, www.vtsoft.com,
<http://www.testingfaqs.org/t-gui.htm#vermont>

Record-Playback. Vermont HighTest Plus is an integrated tool set for automated testing of Windows 95, NT, and 3.1 applications. Capabilities include object-level record/playback of all Windows and VB controls, a Point and Click Suite Manager, a natural-syntax scripting language, automatic logging of test results, and an integrated debugger. The Suite Manager lets users combine scripts into test suites, structure scripts into hierarchies, and create nested loops -- all without programming. The intuitive, natural scripting language makes it easy to revise scripts, declare variables, perform conditional logic, set up nested loops, manage data files, and write results. Scripts can be played back unattended. Script maintenance is simplified by object-level recording, modular scripts, and hierarchical script organization.

Free evaluation.

Platforms: Windows 95, NT, and 3.1

24. Visual Test, Rational Software Corporation, www.rational.com,
<http://www.testingfaqs.org/t-gui.htm#VisualTest>

GUI Test Drivers and Capture/Replay Tools. Rational Visual Test is an automated testing tool that makes it easier and cost-effective for organizations to deploy mission-critical applications for the Microsoft Windows 95 and Windows NT operating systems and for the Web. Rational Visual Test helps developers rapidly create tests for applications of virtually any size and created with any development tool. Visual Test is integrated with Microsoft Developer Studio, a desktop development environment, and has extensive integration with Microsoft Visual C++.

Platforms: Win 3.1x, Win for Workgroups 3.11, Win 95 and NT

25. WinRunner, www.merc-int.com, <http://www.testingfaqs.org/t-gui.htm#winrunner>

Automated GUI client testing tool. Automated Testing Tool for MS Windows applications. WinRunner is an integrated, functional testing tool for your entire enterprise. It captures, verifies and replays user interactions automatically, so that you can identify defects and ensure that business processes, which span across multiple applications and databases, work flawlessly the first time and remain reliable.

Platforms: Windows NT and OS/2

26. imbus GUI Test Case Library, imbus GmbH, <http://www.imbus.de>, <http://www.testingfaqs.org/t-gui.htm#GUI-TestLib>

Library of predefined test cases for automated GUI testing. The imbus Test Case Library is a powerful and easy to use add-on for Mercury Interactive's WinRunner. It extends WinRunner's functionality and provides solutions for frequent test programming problems. The library functions help you to improve, simplify and speed up your test implementation process. They have been proven in numerous GUI testing projects.

Platforms: Runs with Mercury Interactive WinRunner (4.04 or higher) on Windows NT/WIN 95 systems.

27. XRunner, Mercury Interactive, www.merc-int.com, <http://www.methods-tools.com/tools/testing.html>

Functional test tool. XRunner is designed for testing the GUI portion of XWindows applications. XRunner 4.0's integrated testing tool components includes the RapidTest Script Wizard, which navigates all available UI paths to create a complex test script suite for unattended regression testing, and the Visual Testing environment, which combines object-oriented recording, point-and-click test generation and test script logic into a single environment, flexible verification and replay options, sophisticated reporting tools, and portability across multiple platforms.

Version: 5.0

Platforms: IBM AS/400, Sun Solaris/SunOS, HP-UX, AIX, Digital Unix

28. X-Designer, Imperial Software Tecnology, [Imperial Software Technology](http://www.imperial-software.com), www.methods-tools.com/tools/testing.html

**26.SDTF – SNA Development Test Facility, Applied Computer Technology,
www.acomtech.com, <http://www.testingfaqs.org/t-driver.htm#sdtf>**

Network test driver/manager. SNA (Systems Network Architecture) network product testing system. Provides PC-based environment for development, architectural conformance verification, load/stress and performance testing. Provides over 13,000 ready-to-run validated tests, and allows development of additional tests using test case development tools and an open API (Application Programming Interface).

Platforms: DOS, Windows 98, Windows NT

**27.SMARTS, Software Research, Inc., www.soft.com/Products/index.html ,
<http://www.testingfaqs.org/t-driver.htm#SMARTS>**

Maintenance and regression testing. SMARTS is the software maintenance and regression test system which operates as a stand-alone product or as part of the fully integrated TestWorks/Regression multi-platform suite of testing tools. SMARTS automates and simplifies the testing process by organizing tests into a hierarchical tree, providing the capability to automatically execute all or a subset of tests, and generating a variety of reports based on test results. The tests can be supplemented with activation commands, comparison arguments and pass/fail evaluation methods. When executed, SMARTS performs the pre-stated actions, runs a difference check on the output against the baseline, and accumulates a detailed record of test results. Six reports are automatically generated from test outcomes: Latest, All, Regression, Time, Failed and Summary reports.

Platforms: HP-9000; HP-UX; DEC-Alpha; NCR 3000; DOS

27. McCabe Visual Quality Toolset, McCabe and Associates, www.methods-tools.com/tools/testing.html

McCabe Visual Quality Toolset calculates McCabe metrics, Halstead metrics, object-oriented metrics, and other user customizable metrics. It produces structure charts, flow graphs, and metrics reports to display software structures visually. Version: 5.11.
Platforms: Win3.1, Sun Solaris/SunOS, AIX, Silicon Graphics IRIX, DEC VMS, Win 95/98/NT, Digital Unix, HP-UX.

28. METRIC, Software Research, Inc., www.soft.com/Products/index.html, <http://www.testingfaqs.org/t-static.htm#METRIC>

Metric Analysis Tool. METRIC is the software metrics system for the fully integrated TestWorks/Advisor suite of static source code analysers and measurement tools. METRIC works as a stand-alone product or as part of the TestWorks/Advisor tool suite to quantitatively determine source code quality. After processing a source code file, METRIC automatically computes various software measurements. These metrics include the Halstead Software Science metrics, which measure data complexity in routines; the Cyclomatic Complexity metrics, which measure logic complexity in routines; and size metrics, such as number of lines, comments and executable statements.
Platforms: SPARC SunOS; SPARC; HP-9000; DEC-Alpha; NCR 3000; DOS

29. PC-Metric, SET Laboratories, Inc., www.molalla.net/~setlabs, <http://www.testingfaqs.org/t-static.htm#pc-metric>

Software measurement tool. PC-METRIC is a state-of-the-art software measurement tool which performs a variety of static measurements upon a program's source code. PC-METRIC's features do not stop there however. As most software measurement professionals know, the real work starts after the metrics are collected. PC-METRIC supports this task by providing an integrated analysis system that offers a variety of pre-defined reports, graphics and a custom report writing feature. PC-METRIC is the software measurement tool for today's serious software developer. Studies have shown that overly complex code is often less reliable and more difficult to maintain. PC-METRIC assesses the complexity of each function or procedure in an application using a set of industry standard measurement techniques.
Platforms: MS-DOS, UNIX, VMS

30. QA Fortran, Programming Research Ltd, www.prqa.co.uk, <http://www.testingfaqs.org/t-static.htm#PRLQAF>

Deep-flow static analyser. QA Fortran is a deep-flow static analysis tool which automates your early-cycle testing and inspection processes. A unique feature of the tool is its ability to detect language implementation errors, automatically enforce company or industry programming standards and identify dangerous programming practice. Produces industry-accepted metrics including Cyclomatic Complexity, Static Path Count and Myer's Interval

and a variety of graphical output reports such as Call Trees, Control Structure and Demographic Analysis.

Platforms: Sun (SunOS and Solaris), HP (HPUX), Dec Alpha (OSF1), IBM (AIX), SGI (IRIX).

31.SHOWFLOW, GRAY & GRAY Consulting Pty Ltd,
<http://www.testingfaqs.org/t-static.htm#SHOWFLOWDIS>

Development information system (with coverage analysis). SHOWFLOW is a Development Information System for MVS (Multiple Virtual Storage) mainframe. It fully analyses applications written in COBOL, PLI, ASSEMBLER, JCL, REXX, CLIST, CICS, etc and creates a database of all inter-element relationships, along with nice visual flow diagrams to show the flow of control and inclusion relationships - both forwards and backwards. This then allows cumulative knowledge of all the elements that can be flowed to from a given starting point, or conversely, all the start points that can flow to a given element. Static coverage analysis options are included, eg to work out the best (ie minimum) set of test cases which can be used to execute a given set of elements, or list all of the elements that can be executed from a given set of test cases (which for example could then be compared to a list of elements changed for Y2K conversion...). The whole system is fronted by a comprehensive set of easy to use ISPF (Internet Service Providers Forum) panels and menus, including panels to simplify job submission for the analysis and diagramming. Platforms: MVS Mainframe

32.SofAudit, SES Software-Engineering Service GmbH,
www.soring.hu/index.html, <http://www.testingfaqs.org/t-static.htm#SofAudit>

Metrics and quality checks. Supports the evaluation of the legacy systems through metrics and quality checks. SofAudit is a tool for the static analysis of Assembler, COBOL, PL/I and NATURAL programs as well as for IMS, CODASYL, ADABAS and SQL databases. Besides checking the source against predefined rules, it also measures the size, complexity and quality of the programs and data bases. It produces a metric report and a deficiency report.

Platforms: PC Windows (Windows 3.11, Windows95 and Windows/NT)

33.WhiteBox, Reliable Software Technologies, <http://www.cigital.com/>,
<http://www.cigital.com/news/whitebox301.html>

Metrics and code coverage. WhiteBox tool to perform software analysis that is needed to apply a complete WhiteBox methodology solution. The WhiteBox tool collects valuable static code metrics and dynamic code coverage information which are used to assist with test planning for software. Static code metrics provide insight into the complexity of different components of the software; they can be used to help determine where faults are likely to be hiding and therefore where to focus testing resources. Dynamic code coverage is used to determine how much of the code was reached when tests are performed. Using WhiteBox, you can track the code coverage levels obtained for a given test case or a suite of test cases

against the source code to determine missing or incomplete requirements, which when updated can be used to produce additional tests that cause the previously unreachable code to be exercised.

Free evaluation.