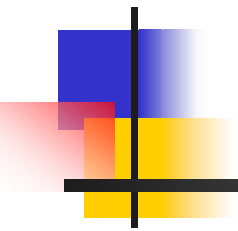


Introduction to RESORT for C(Pro*C)

Soft4Soft

www.soft4soft.com

Contents

- Background
- RESORT for C Product & Solution
- RESORT for C - SW Quality
- RESORT for C - Code Inspection

Background

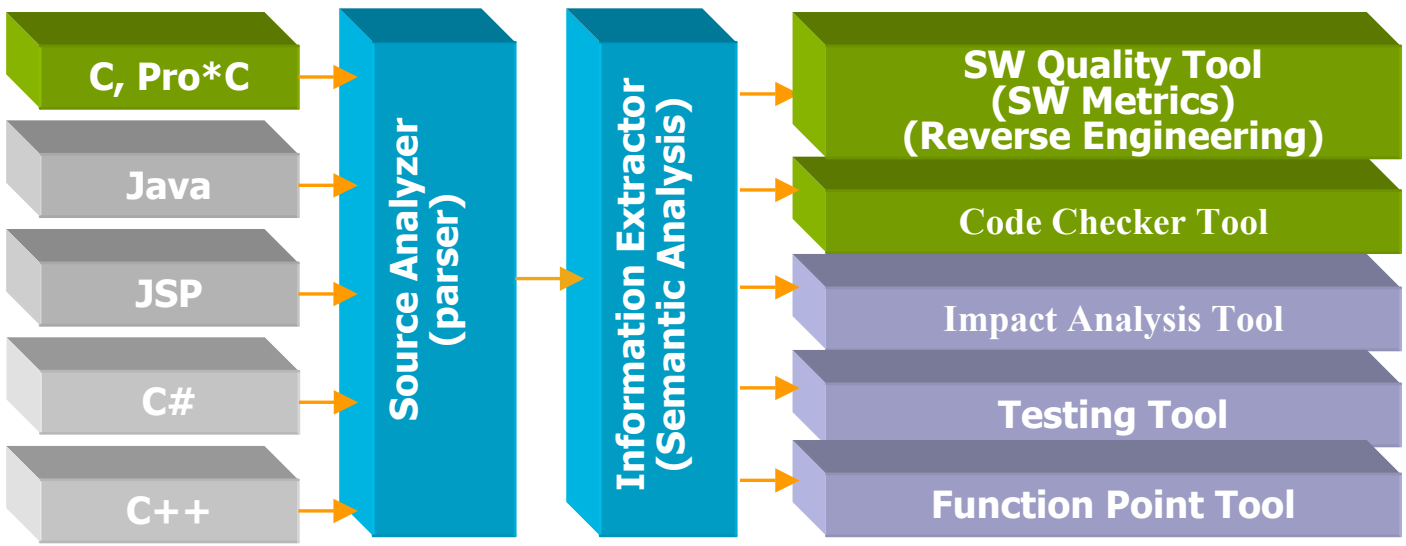
- 2001 Established Soft4Soft Co., Ltd.
- Main Business
  - SW Quality Solution Tool Development(QA Tool)
  - SW Quality Consultancy and Education Services
- Certifications – in KOREA
  - IT(excellent Information Technology) Mark
  - GS(GOOD Software) Mark
  - KT(Excellent Korean Technology) Mark
- Main Client List

SAMSUNG 삼성전자 | POSDATA | 비씨카드 | ETRI www.etri.re.kr
LG전자 | LG CNS | 농협 | TTA 한국정보통신기술협회
DAEWOO ELECTRONICS | SK C&C | 한국은행 | KISTI
현대·기아자동차 | AutoEverSystems | Banktown | 대법원
HANJIN SHIPPING | CyberLogitec | MERITZ | 대한생명

Soft4Soft

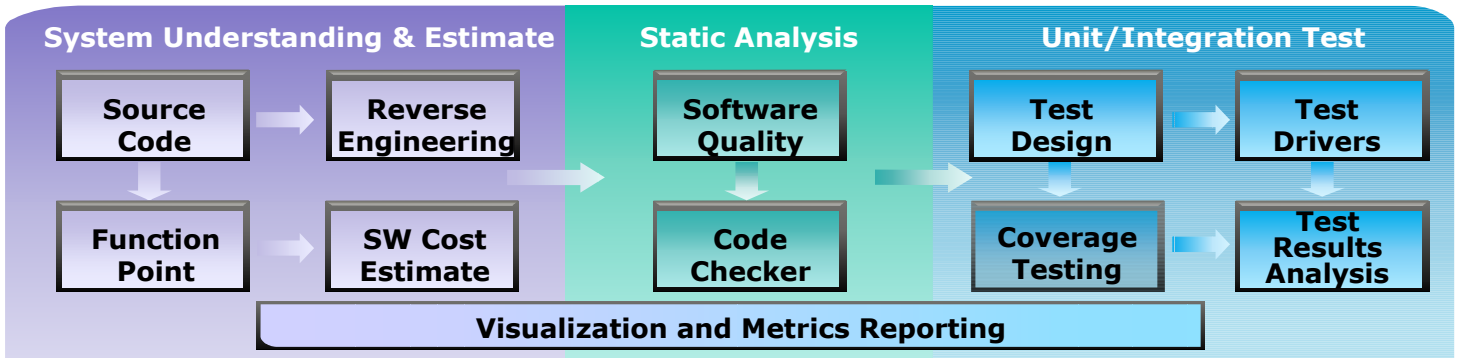
Products

- **Soft4Soft – Software Quality Assurance Products**
  - **Source code analysis of a compile level**
  - **Information analysis which is various and correct**
  - **Second statistical information to need to manager, quality team, in addition to developers.**

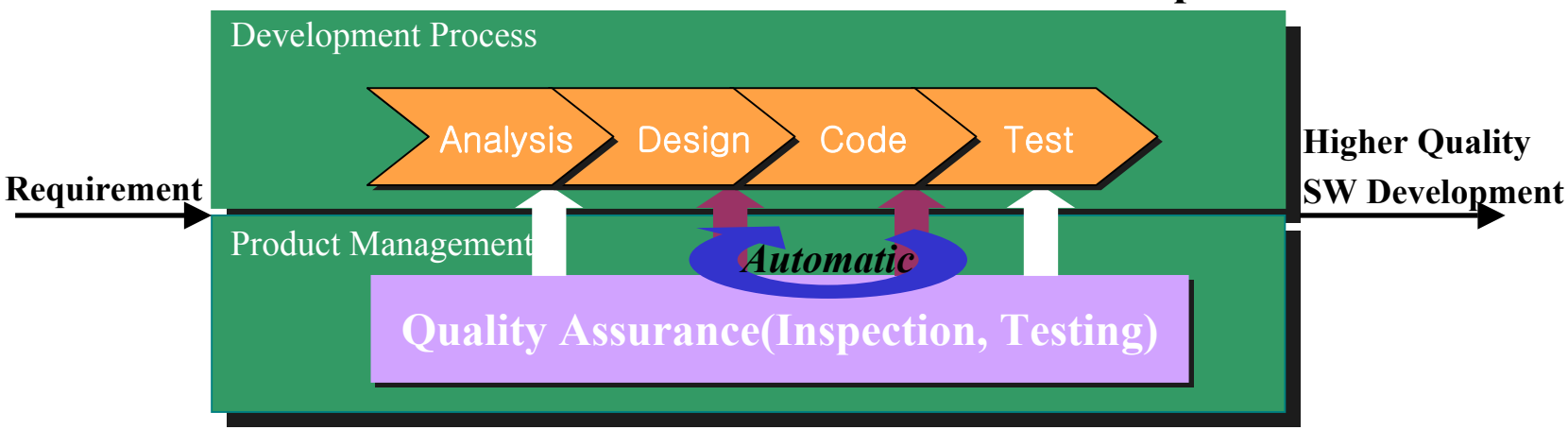


Solutions

- **Soft4Soft – Software Quality Assurance Solution**

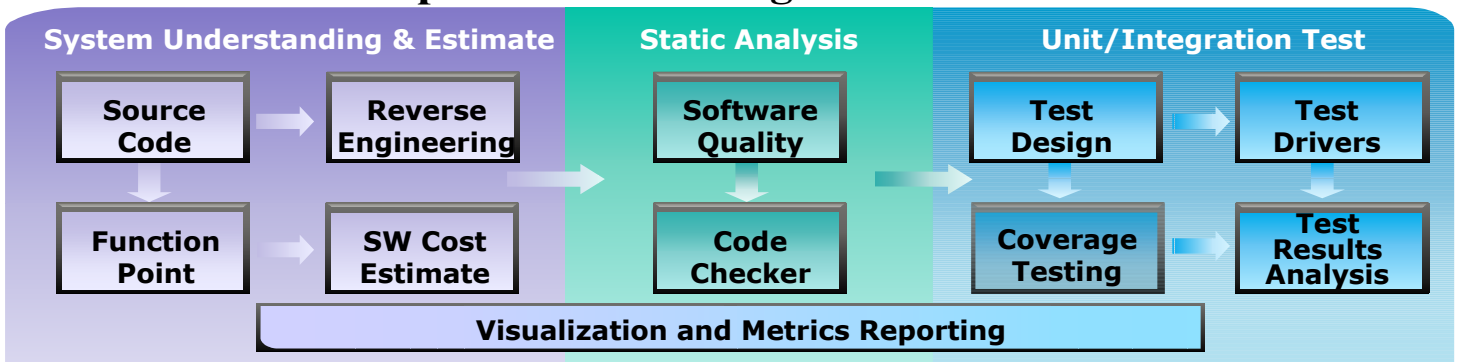


- **Software Process Model and RESORT Products Map**



RESORT for C Toolset

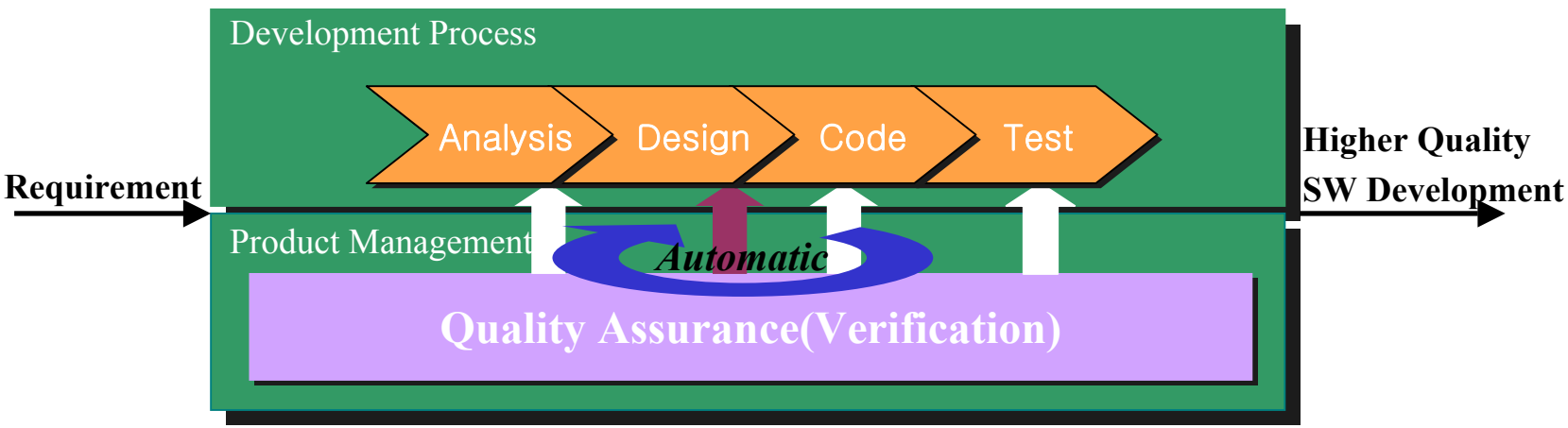
- **Product Development and Management Process with RESORT**



Tools	Features	View Type
SW Quality (Reverse)	Automatic Diagram Generation(UML Diagram) Understand both the Design and Architecture of SW Various SW Quality Measurement(size, structure) Multi-Reports to monitor&manage SW Quality	Diagram: Class/Package Sequence/Collaboration Control-Flow/Data-Flow Source Code Browser SW Quality: OO/Halstead/ Package/Quality/System
Code Inspection	Coding Error Detection(Application,MISRA-C:2004) Multi-Reports to monitor&manage Code Quality	Audit per File/Function/MISRA File/Function/MISRA Inspection

SW Quality(Reverse Eng.) Tool

- **SW Quality Improvement**
  - **Understandability**
  - **Maintainability**
  - **Performance**
  - **Code Optimization**
- **SW Quality and SW Process Model Map**
  - **Prevent SW Potential Problems early in the Development Cycle**



SW Quality Solution

- SW Quality Measurement and Expected Effect
  - Identify high-risk components in the short-term
  - Consider portability and reusability in the long-term

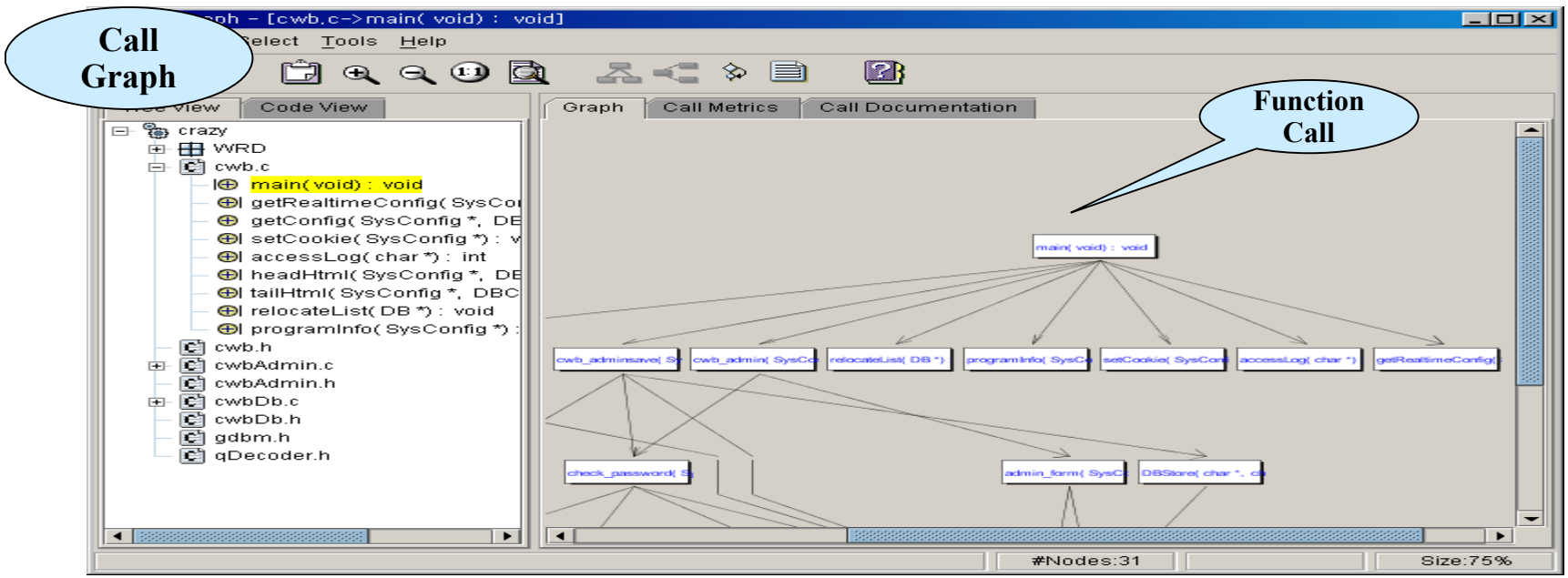
Quality characteristic	Quality sub-characteristic	Effect
High-risk Components	SW Potential Error Measurement -Architecture's Potential Error	-SW Problem Identification -High-risk Components Identification
SW Optimization	SW Optimization Measurement -Code Optimization	-Impurity Code Prevention -Program Size Reduction -Program Run-Time Reduction -Testing Cost-Saving
SW Complexity	SW Quality Measurement -Function Size Metrics -Function Structure Metrics	-SW Quality Improvement -SW Productivity Improvement -SW Maintainability Improvement -SW Reusability Improvement -Testing Cost-Saving
SW Usability	Understandability -Size, Comment, Optimization	-Understandability Evaluation of ISO 9126-3 Usability
SW Maintainability	Analyzability , Changeability, Stability, Testability	-ISO 9126-3 Maintainability Evaluation

Reverse Engineering Tool

SW Quality - Reverse Engineering

- Automatic UML Diagram Generation
  - .Call Graph
  - .File Diagram
  - .Variable Reference Graph

- -Support Various Visualization
- -Analyze Detail Design&Architecture of SW
- -Identify High-risk SW Structure
- -Prevent SW Potential Problems



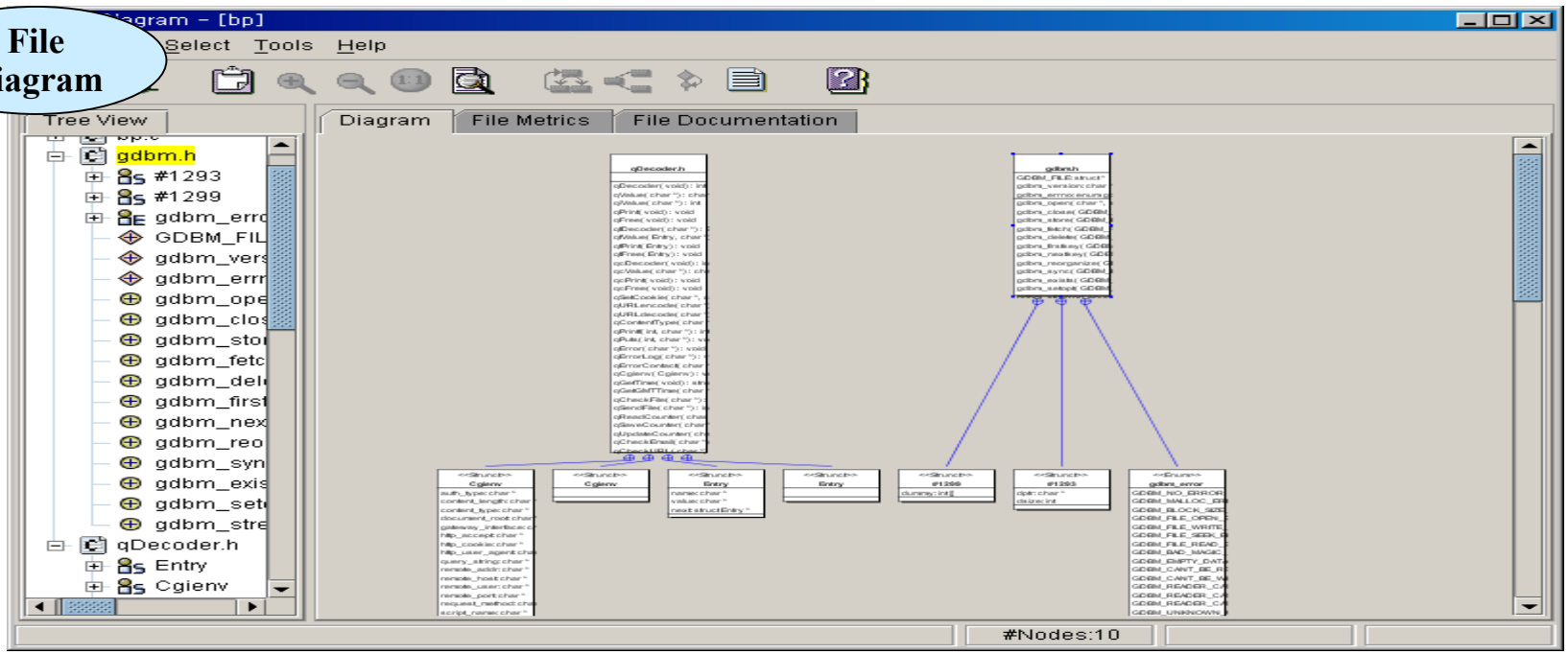
Reverse Engineering Tool

SW Quality - Reverse Engineering

-File Diagram
. User Defined File
. Header File

-Dependency Analysis between Files
-Relationship Analysis between File and Data Structure

File Diagram

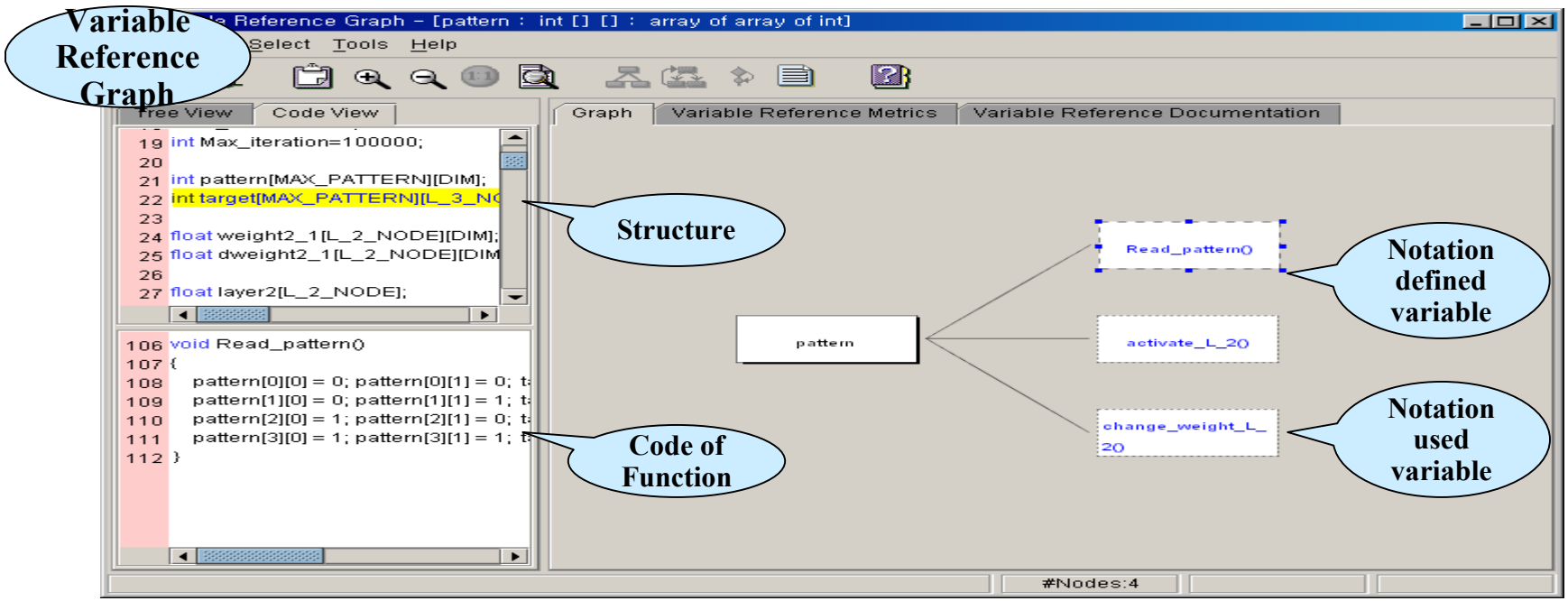


Reverse Engineering Tool

SW Quality - Reverse Engineering

-Variable Reference Graph
. Data Structure
. Referenced Function

-Function Analysis related to Global Variable
.Use, Definition, use/Definition

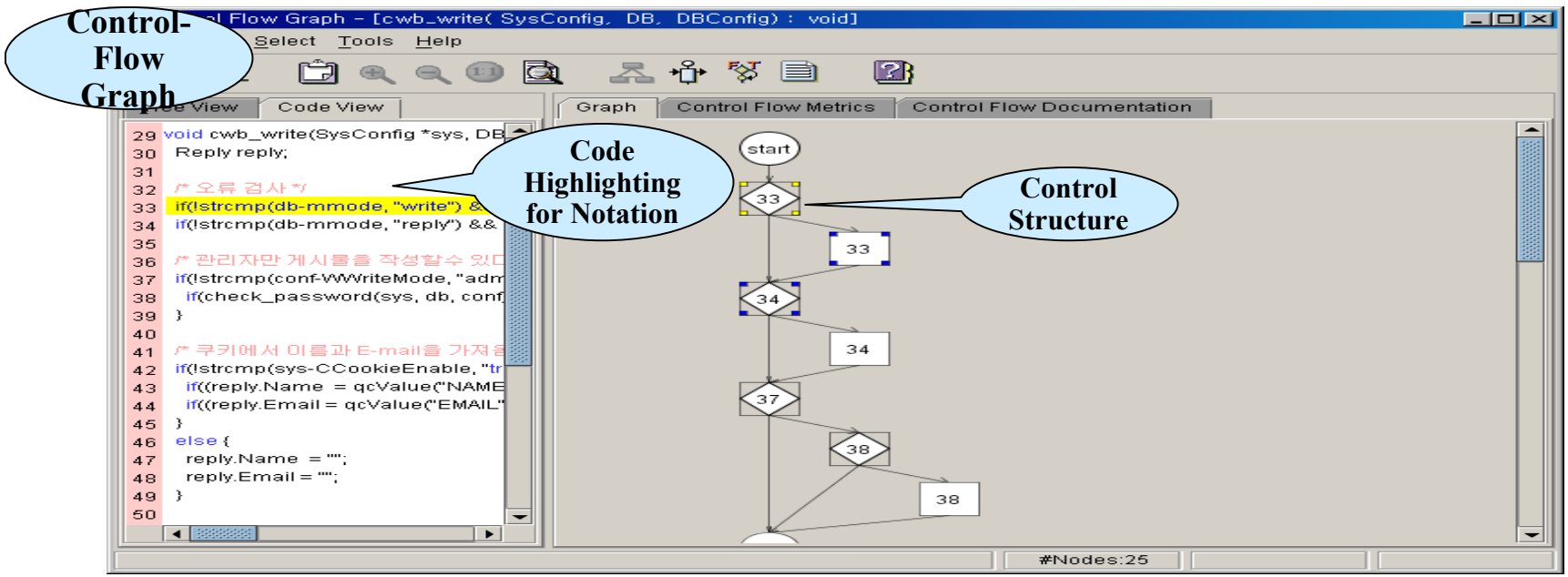


Reverse Engineering Tool

SW Quality - Reverse Engineering

- Automatic Graph Generation
  .Control-Flow Graph
  .Source Code Browser

-Control-Flow Analysis and Understand
  .Algorithm Structure Visualization
  .Structure Complexity Identification
  .Unconditional Structure(goto/exit/label)

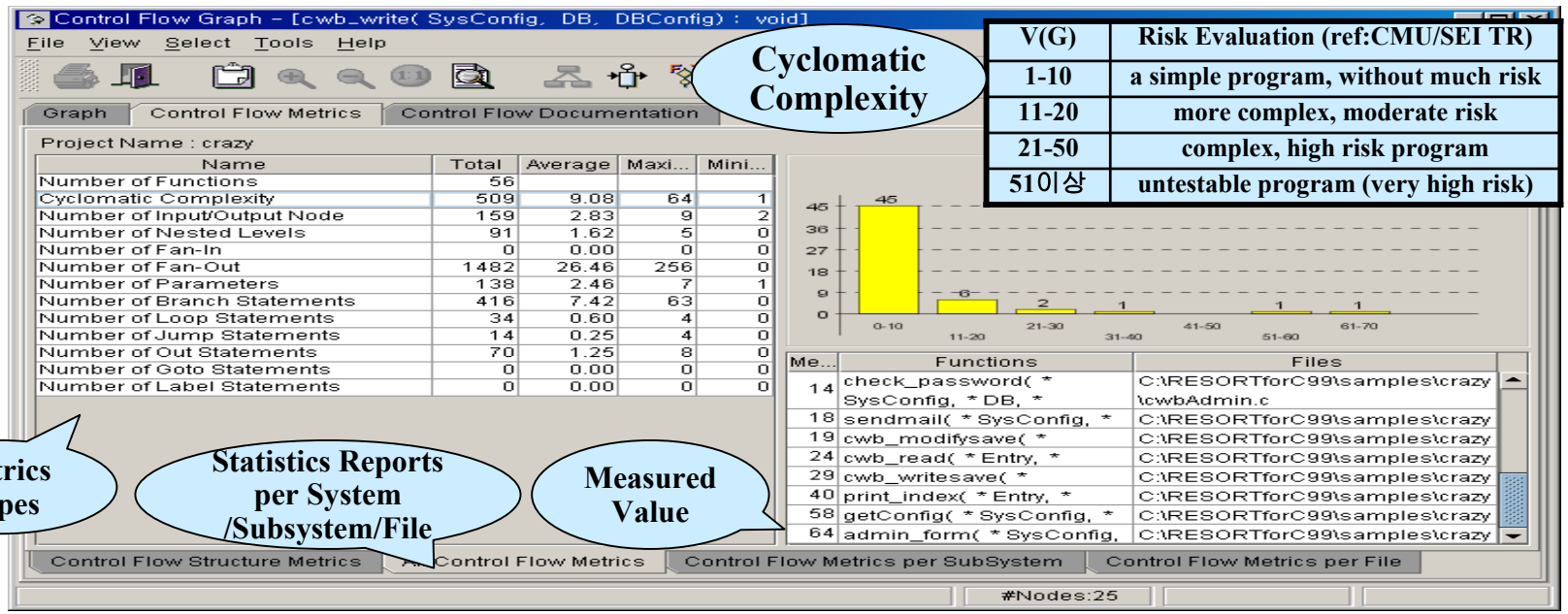


Reverse Engineering Tool

SW Quality – Quality Metrics(90+)

- Multi-level Statistical Metrics Reports
  - .File: Include File/Macro, etc.
  - .Function: Size, Coupling,Cohesion, etc.
  - .Control Flow: Complexity, Branch, etc.

- Size, Structure Metrics
  - .SW Structure Analysis & Understand
  - .High-risk Analysis of SW Structure
  - .SW Complexity, Performance, etc.

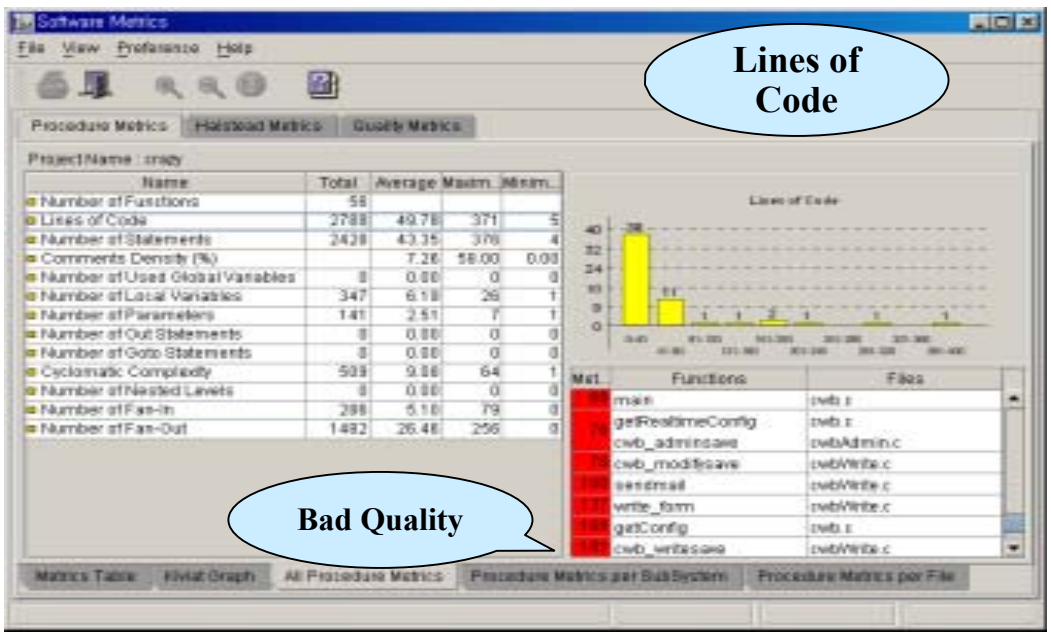


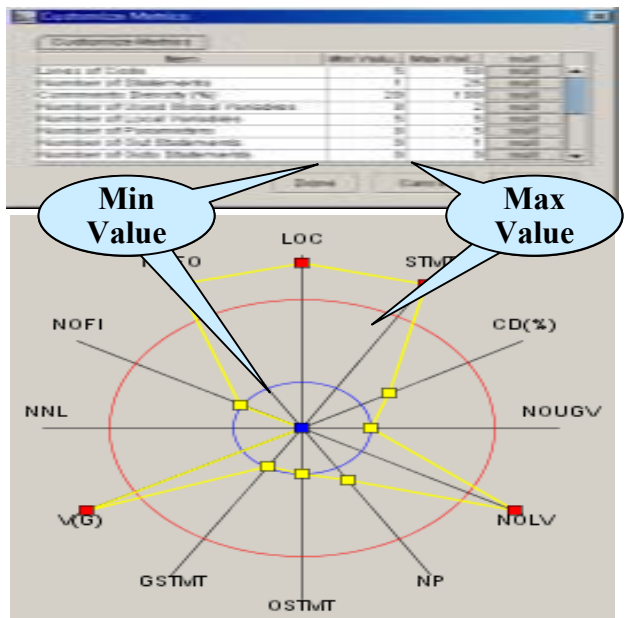
SW Quality Tool(Evaluation)

SW Quality - Software Metrics

- SW Quality Evaluation & Monitoring
  - .40+Metrics(Customizing Quality Goals)
  - .Measuring Good/Bad Quality
- Multi-level Statistical Metrics Reports

- Procedure Metrics
  - .SW Size Metrics Evaluation
  - .SW Structure Metrics Evaluation
  - .SW Complexity Evaluation





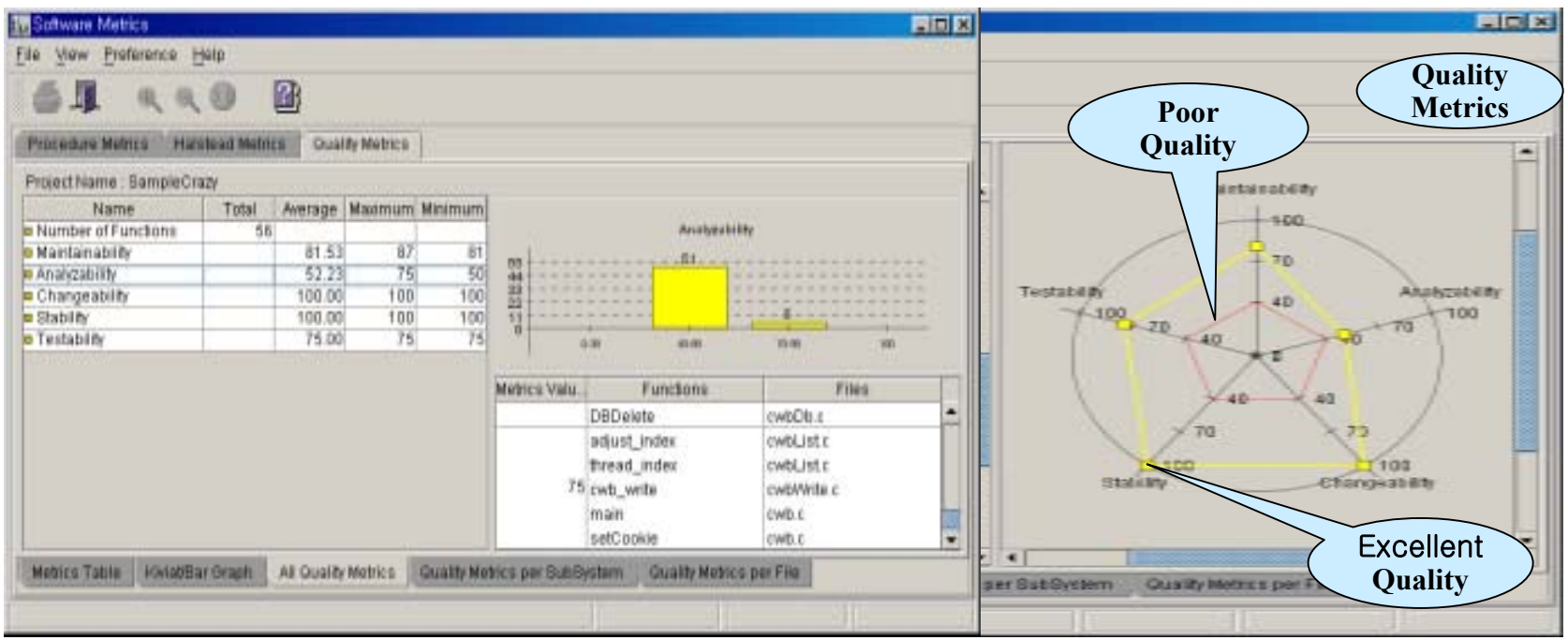
Soft4Soft

SW Quality Tool(Evaluation)

SW Quality - Software Metrics

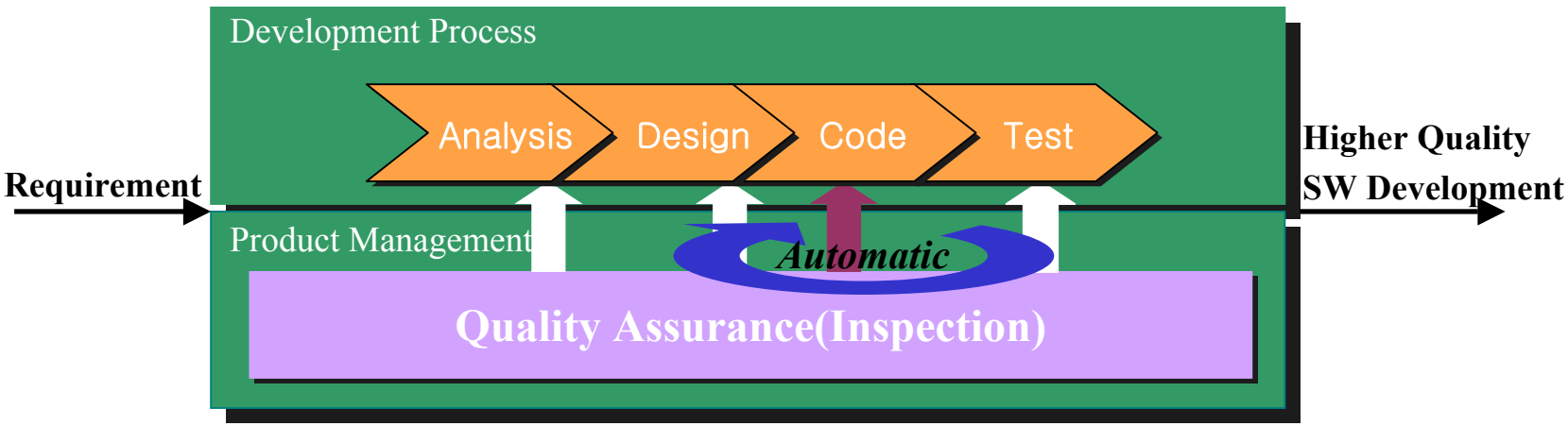
- Quality Metrics(ISO/IEC 9126-3)
  . Maintainability Characteristic
  . Maintainability Sub-Characteristic

- Rating Level
  . Satisfactory (Excellent, Good, Fair)
  . Unsatisfactory (Poor)

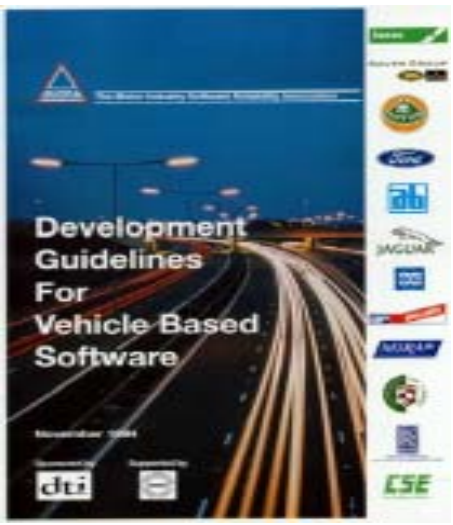


Code Checker Tool

- **Code Error Detection**
  - **Readability**
  - **Performance**
  - **Run-time error – Null pointer**
  - **MISRA-C: 2004 – Coding Guidelines**
- **Code Quality and SW Process Model Map**
  - **Identify source code problems early in the development cycle**



Code Checker Tool : MISRA-C



- MISRA-C (Motor Industry Software Reliability Association)
  - Motor Industry Software Reliability Association Best Published International Standard for C language
  - This documentation is based on ISO/IEC C Standard 9899:1990/1999
- MISRA-C Guideline(www.misra.org.uk)
  - Guidelines for the Use of the C Language in Critical Systems
  - 141 rules (121 mandatory, 20 advisory)
- MISRA Member
  - AB Automotive Electronics Ltd
  - Ford Motor Company Ltd
  - Jaguar Cars Ltd
  - Lotus Engineering
  - MIRA Ltd
  - Ricardo Tarragon Ltd
  - TRW Automotive Electronics

Code Inspection Solution

- **Code Inspection and and Expected Effect**

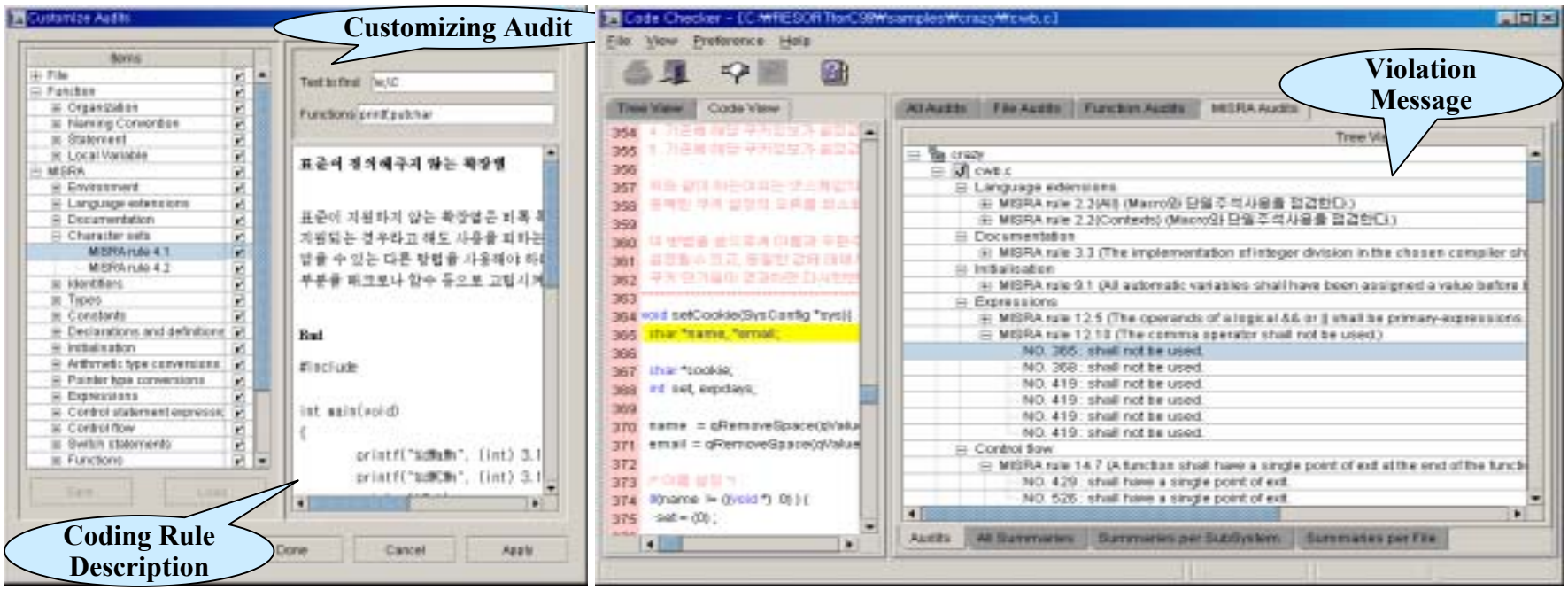
Inspection characteristic	Inspection sub-characteristic	Effect
Readability	Layout Style -Naming Convention Rules, etc. -Indentation & Comments Rules, etc.	-Readability Improvement -Easy to Maintenance
Hungarian Notation	Variable Naming Convention -Hungarian Notation <Scope><Type>_<Name>	-Readability Improvement -Easy to Maintenance
Potential error and Performance	Performance and Memory Guideline -Variable, Control Statement Rules, etc. -Unused Variable Rules -I/O Rules -Null Pointer Rules	-Performance Increase -Dead Code Prevention -Memory Leak Prevention -System Load Prevention -Testing Cost-Saving
MISRA-C:2004 (Industry Standard: 141 Rule)	-Compile Error Prevention (Unreachable Code, Dead Code, etc) -Run-time Error Prevention (Arithmetic, Pointer, Array, etc) -Human(Interface) Error Prevention (Loop, Point, Variable, etc)	-High Quality Code Development (Reliability & Maintainability Enhancement) -Standardized Structured Programming Enhancement

Code Checker Tool

Code Inspection - Code Checker

- Code Inspection per File/Function/MISRA
  - .170+ Rules(Customizing Quality Goals)
  - . Reporting Violation code& Messages
- customize and extend coding rules

- Coding Style Inspection
  - .Improving Readability & Maintainability
- Performance, Memory Leak Inspection
  - .Preventing Coding Errors

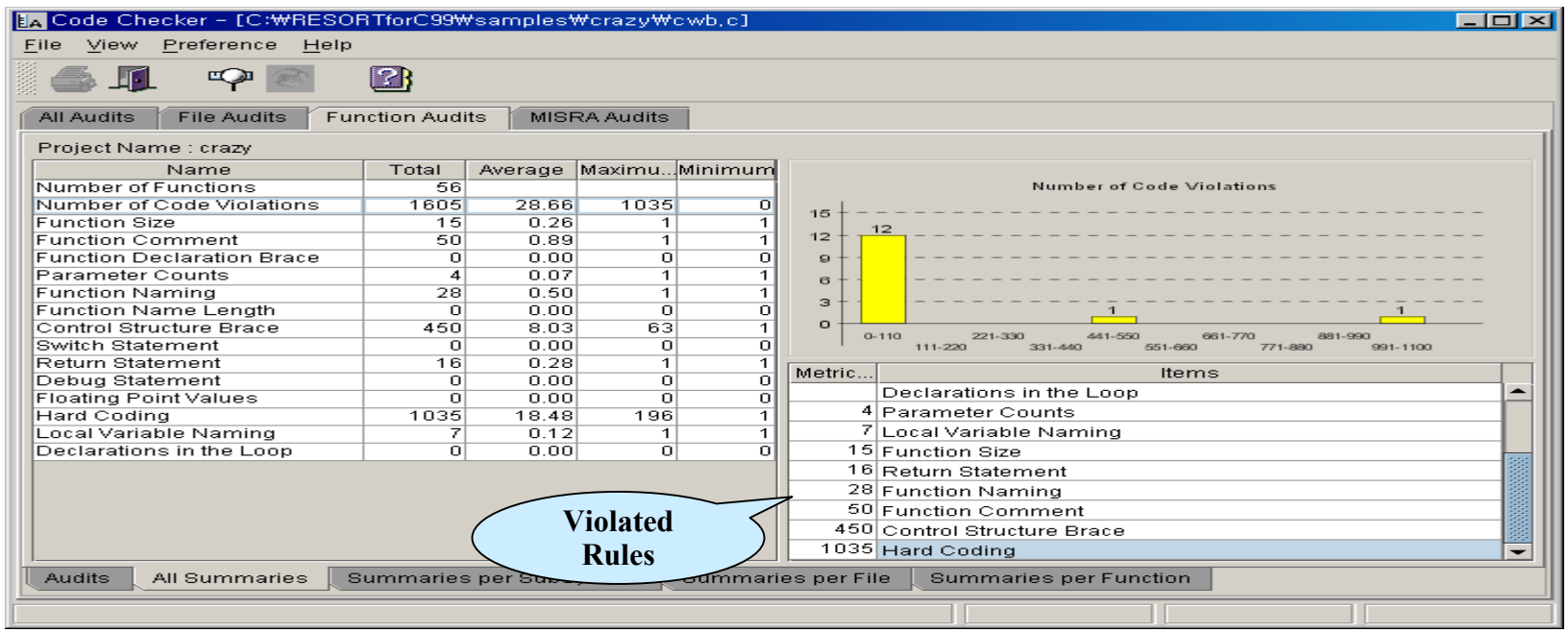


Soft4Soft

Code Checker Tool

Code Inspection - Code Checker

- Managing/Monitoring Code Quality per File/Class/Method
  .Rule Summary Report – Analysis for Violated Coding Rule
  .Each Rule Report – Analysis for Violated File/Class/Method per Rule



Soft4Soft

T205, ICU VBI Center, 103-6, Munji-Dong,
Yousung-Gu, Daejon, 305-714

Tel : +82-42-866-6632~3
Fax: +82-42-866-6626

Sale Supports : sales@soft4soft.com
Technical Supports : info@soft4soft.com

www.soft4soft.com