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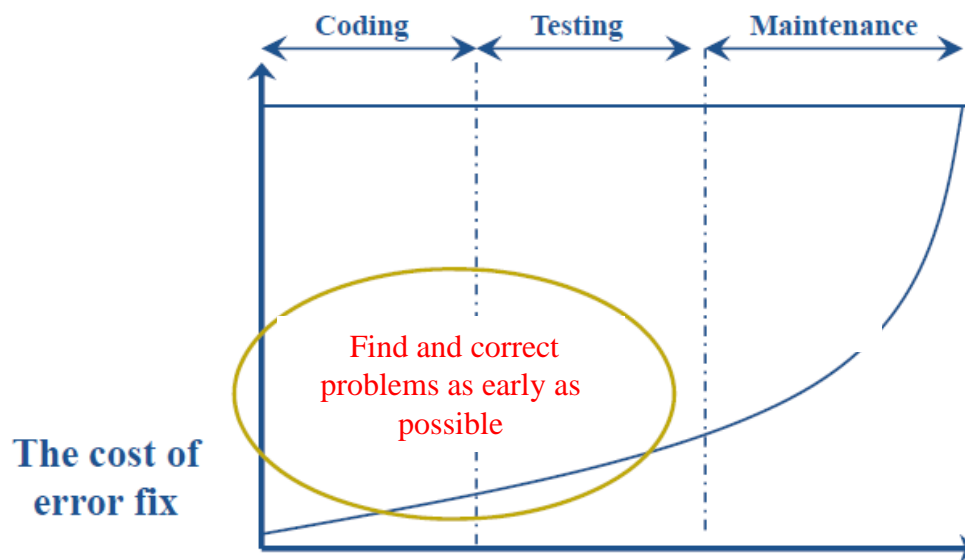
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Atollic TrueVERIFIER™

Improve software quality with test automation!



Software errors are more expensive to find & fix later



By finding bugs earlier, you reduce cost, development time and secure your company/product reputation

Test automation



What is it?	The means by which a software tool analyse the source code of a program, generates suitable test cases and run them automatically.
Why do it?	With auto-generated test cases, the code & tests are always synchronized, test cases cover a much larger part of the code, and good testing becomes easier and better.
How does it work?	A tool analyze an application, generate test cases, and execute them with execution-path monitoring. Once a test session is completed, test results and test coverage information is presented to the developer or tester.

Automatic generation of tests

Example code to be tested

```
int MyFunc( char x )
{
    if( x < 50 )
        return 0;
    else
        return 1;
}
```

Important parameter values are found by analysing the code

`MyFunc (-128);` Test minimum value of datatype

`MyFunc (-2);`

`MyFunc (-1);`

`MyFunc (0);`

Test values around 0

`MyFunc (1);`

`MyFunc (2);`

`MyFunc (49);`

`MyFunc (50);`

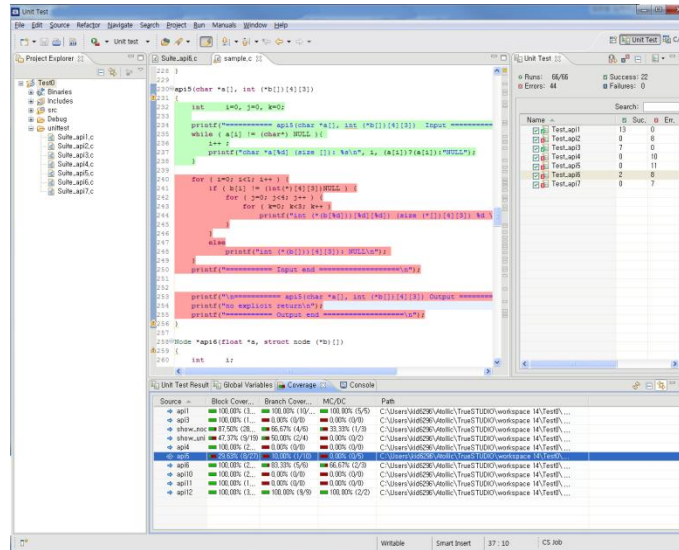
Test values around 50

`MyFunc (51);`

`MyFunc (127);` Test maximum value of datatype

Auto-generated unit tests (function calls)

TrueVERIFIER™ overview

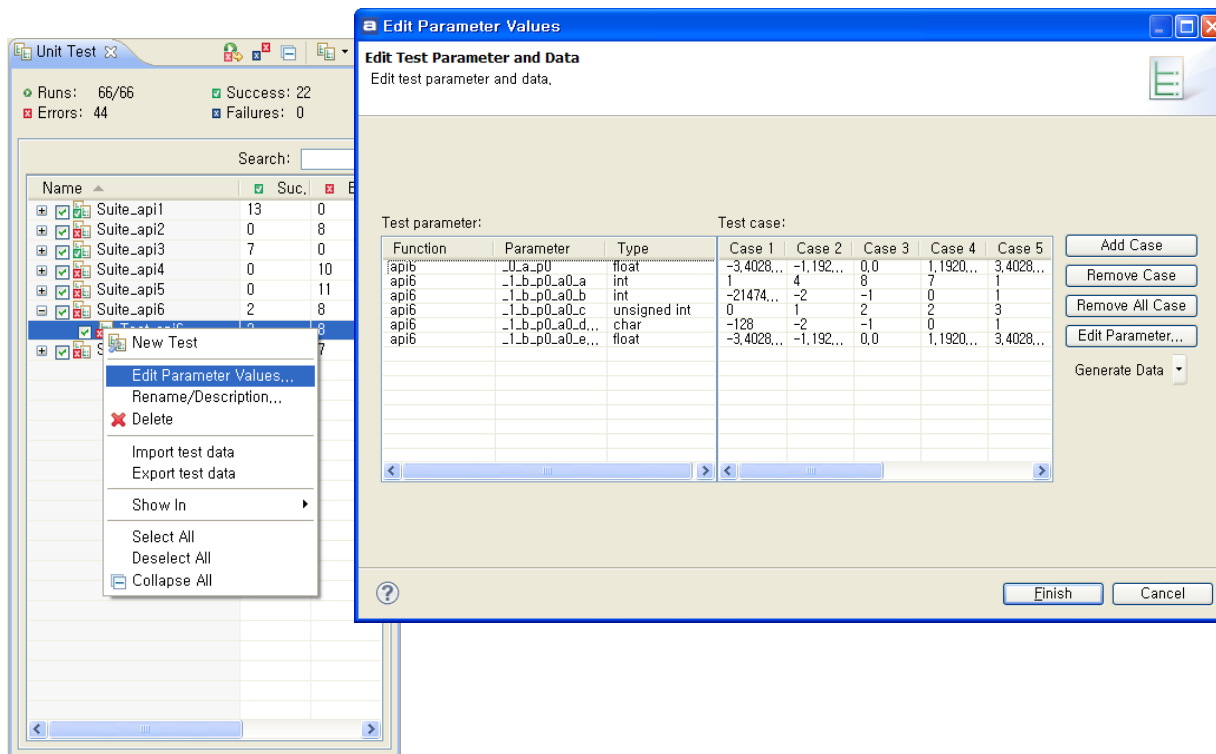


JTAG



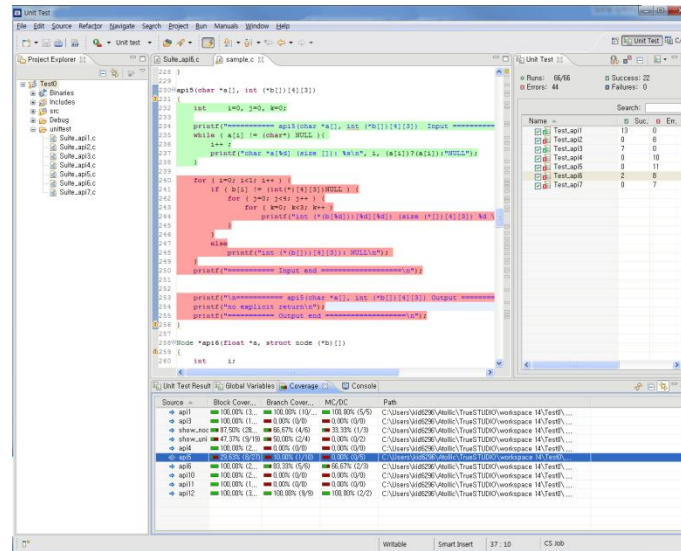
- Test automation tool running unit tests on target board
- Analyses the application source code
- Auto-generation and auto-compilation of unit test source code (C)
- Auto-download (JTAG) and auto-execution in target board
- Auto-upload test results and test coverage (MC/DC-level)

Test data



- Automatic test data generation
- Edit test parameters and data in GUI
- Export and import test data in CSV format

Test execution



JTAG



- Auto-build generated test cases using the TrueSTUDIO® compiler
- Auto-download compiled test cases using the TrueSTUDIO® debugger
- Auto-execution of test cases in target board
- Execution-path monitoring of code execution

Test results

```

sample.c Suite_api3.c
40
41 static void Test_api3(struct Test_api3_param *p)
42 {
43     /* variable declaration region */
44     char * a;
45     void *ptr0;
46     char b[1];
47     char c[10];
48
49     /* memory allocation region */
50     ptr0 = a = (char *)malloc(sizeof(char)*1);
51
52     /* variable definition region */
53     a[0] = p->_a_p0;
54     b[0] = p->_b_a0;
55     c[0] = p->_c_a0;
56
57     /* function call region */
58     CS_ASSERT (api3(a,b,c) != NULL);
59     CS_ASSERT (strlen(api3(a,b,c)) >= 10);
60

```

Unit Test Result Global Variables Coverage Console

Test case in test 'Test_Api3'

▲	Status	Statement coverage	Branch coverage	MC/DC	Trace Message	Test Data
1	success	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)		_0_a_p0 char 0
2	success	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)		_1_b_a0 char 0
3	success	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)		_2_c_a0 char 0
4	fail	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)	[ASSERT] strlen	
5	success	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)		
6	success	4.34% (19/438)	0.00% (0/103)	0.00% (0/49)		

```

sample.c
103 char* api3(char *a, char b[], char c[10])
104 {
105     char *ret;
106     printf("===== char* api3(char *a, char b[], char c[10]) Input =====\n");
107     printf("char a:%s\n", a?a:"NULL" );
108     printf("char b[]:%s\n", b?"NULL" );
109     printf("char c[10]:%s\n", c?"NULL" );
110     printf("===== Input end =====\n");
111
112     ret = (char*)malloc(strlen(a)+strlen(b)+strlen(c)+1);
113     strcpy(ret, a);
114     strcat(ret, b);
115     strcat(ret, c);
116
117     printf("%p===== char* api3(char *a, char b[], char c[10]) Output =====\n");
118     printf("char *ret : %s\n", ret?"NULL" );
119     printf("===== Output end =====\n");
120     return ret;
121 }
122

```

Unit Test Result Global Variables Coverage Console

Source	Block Cover...	Branch Cover...	MC/DC	Path
api1	100.00% (3/3)	100.00% (10/10)	100.00% (5/5)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
api3	100.00% (1/1)	0.00% (0/0)	0.00% (0/0)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
show_noc	87.50% (28/32)	66.67% (4/6)	33.33% (1/3)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
show_uni	47.37% (9/19)	50.00% (2/4)	0.00% (0/2)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
api4	100.00% (2/2)	0.00% (0/0)	0.00% (0/0)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
api5	29.63% (8/27)	10.00% (1/10)	0.00% (0/5)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
api6	100.00% (2/2)	83.33% (5/6)	66.67% (2/3)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...
api10	100.00% (2/2)	0.00% (0/0)	0.00% (0/0)	C:\Users\kidd6296W\Atollic\TrueSTUDIO\workspace_14W\TestOw...

- Display test results (success/failure/error)
- Display test coverage (Statement-, Branch-, MC/DC-coverage)



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DEMO

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"Embedded passion"



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