

a

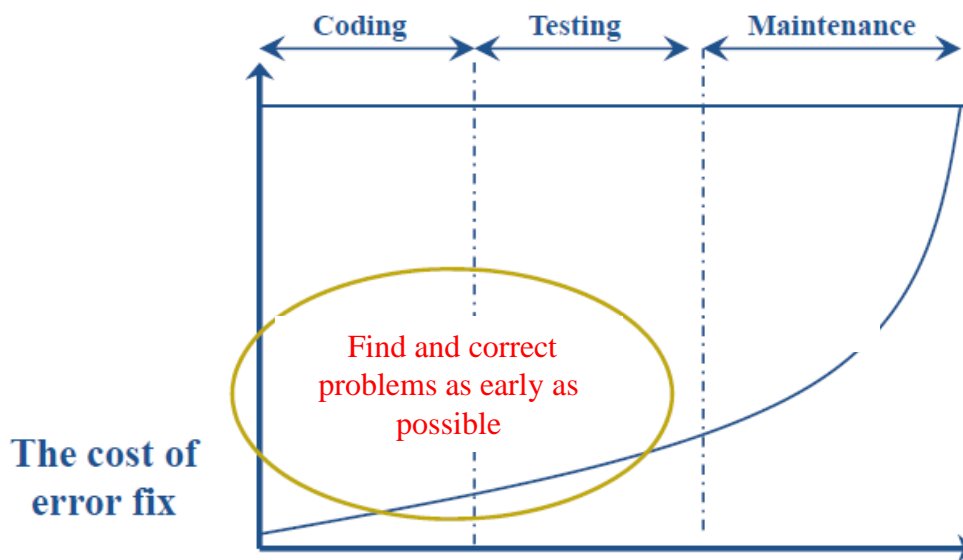
atollic



Atollic TrueANALYZER[®]

*Measure test quality with dynamic execution flow analysis
(code coverage analysis)!*

Software errors are more expensive to find & fix later



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

Code coverage analysis

Measure the quality of your tests



What is it?	Code coverage analysis gives information on what parts of a program have been executed during a test session.
Why do it?	With knowledge on what execution paths have been exercised during test, you also know what parts of the program is untested and needs to be tested better.
How does it work?	A tool analyze an application, instrument it, and execute it with execution-path monitoring. Once a test session is completed, code coverage information is presented to the developer or tester.

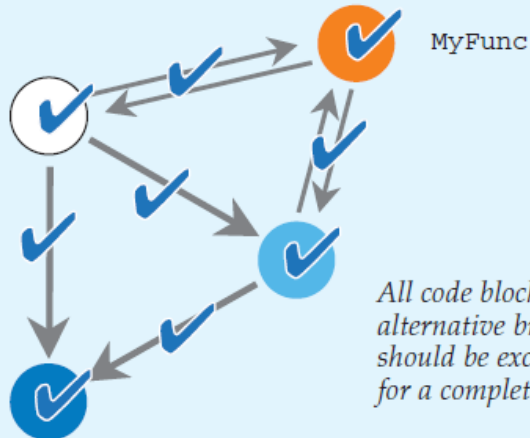
Measuring test quality

Even trivial code is difficult to test rigorously

```
MyFunc ();  
...statements...  
if ( (a || b) && c )  
{  
    MyFunc ();  
    ...statements...  
}  
...statements...
```

For MC/DC all subexpressions must have affected the branch decision independently of other subexpressions.

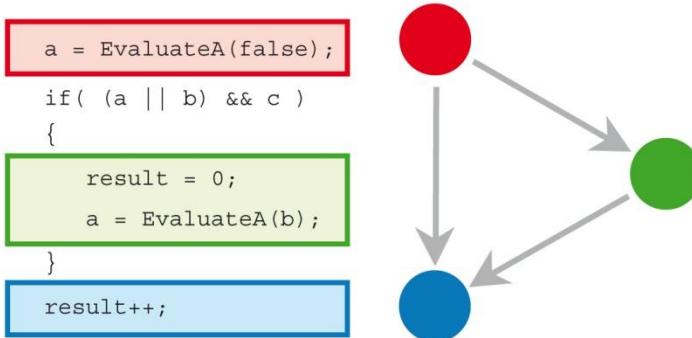
a	b	c
TRUE	FALSE	TRUE
FALSE	FALSE	TRUE
FALSE	TRUE	TRUE
FALSE	TRUE	FALSE



Test quality can be measured automatically with dynamic execution flow analysis

Different types of analysis

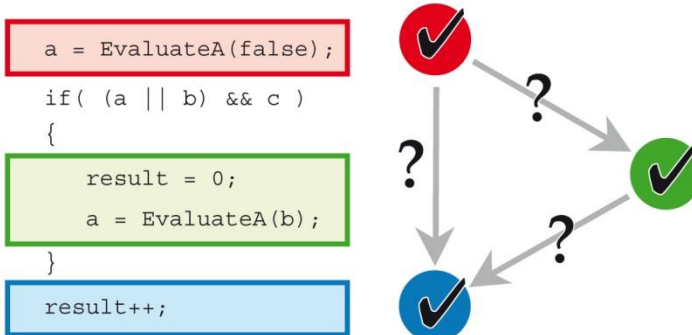
A small code example ...



Comment

This small code example contains 3 blocks of code. One of them is conditional, resulting in 2 potential execution paths. This can be visualised using an execution path diagram.

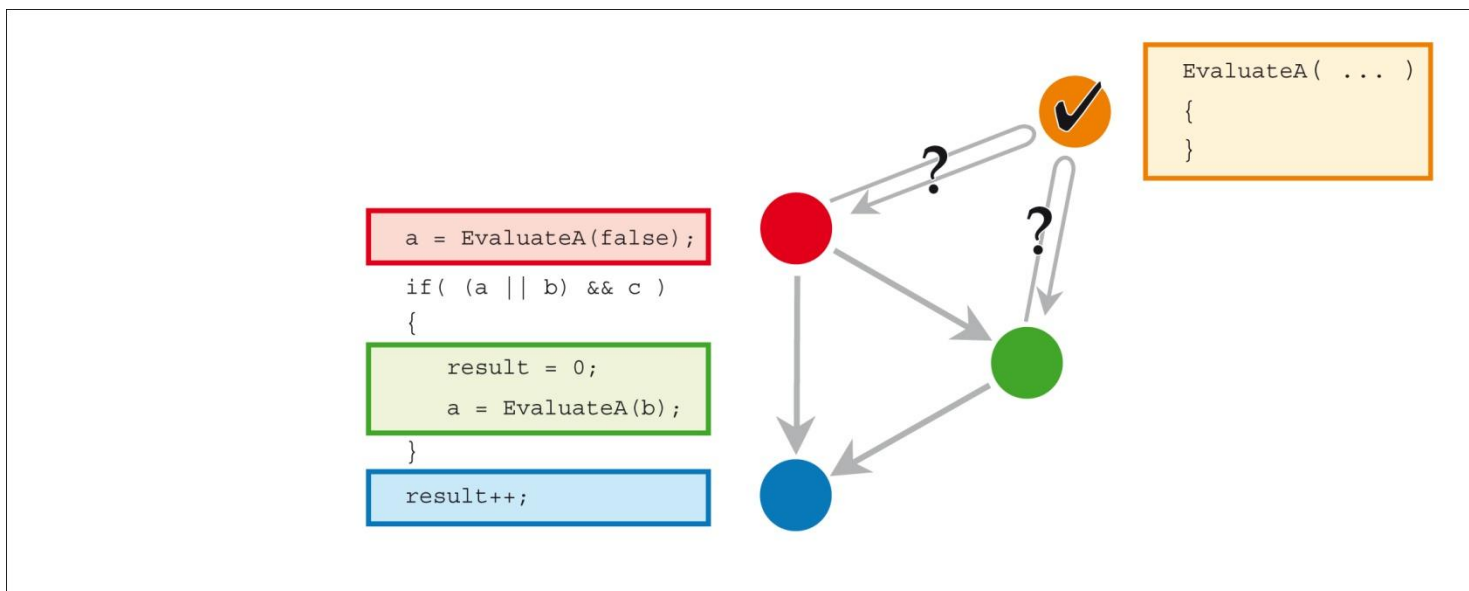
Statement/block coverage



Comment

Statement and block coverage is a very basic type of code coverage analysis. It can only verify what blocks of code (=set of statements) have been executed, not under what circumstances it happened.

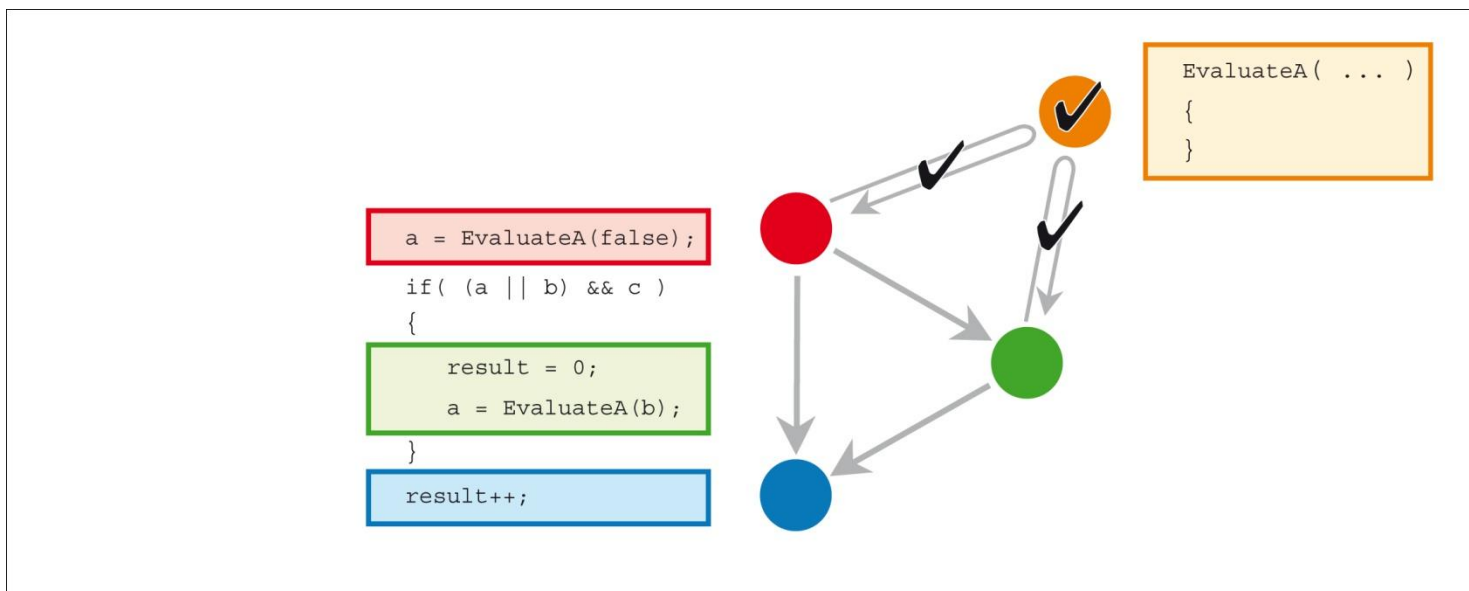
Function coverage



Comment

Function coverage is a very basic type of code coverage analysis. Function coverage can only verify if a function have been executed, not that all function calls were in fact made or that the function was properly tested.

Function call coverage



Comment

Function call coverage verifies how many of the function calls have in fact been executed in a code section.

Branch coverage

The expression is tested with true & false results but it is unclear what subexpression results were part in the branch decision.

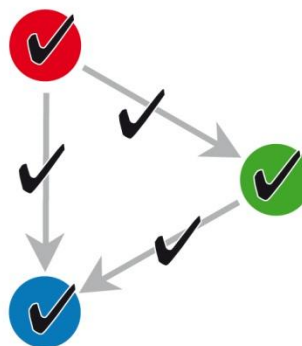
This example must at least be tested twice – true or false.

```
a = EvaluateA(false);
```

```
if( (a || b) && c )  
{
```

```
    result = 0;  
    a = EvaluateA(b);  
}
```

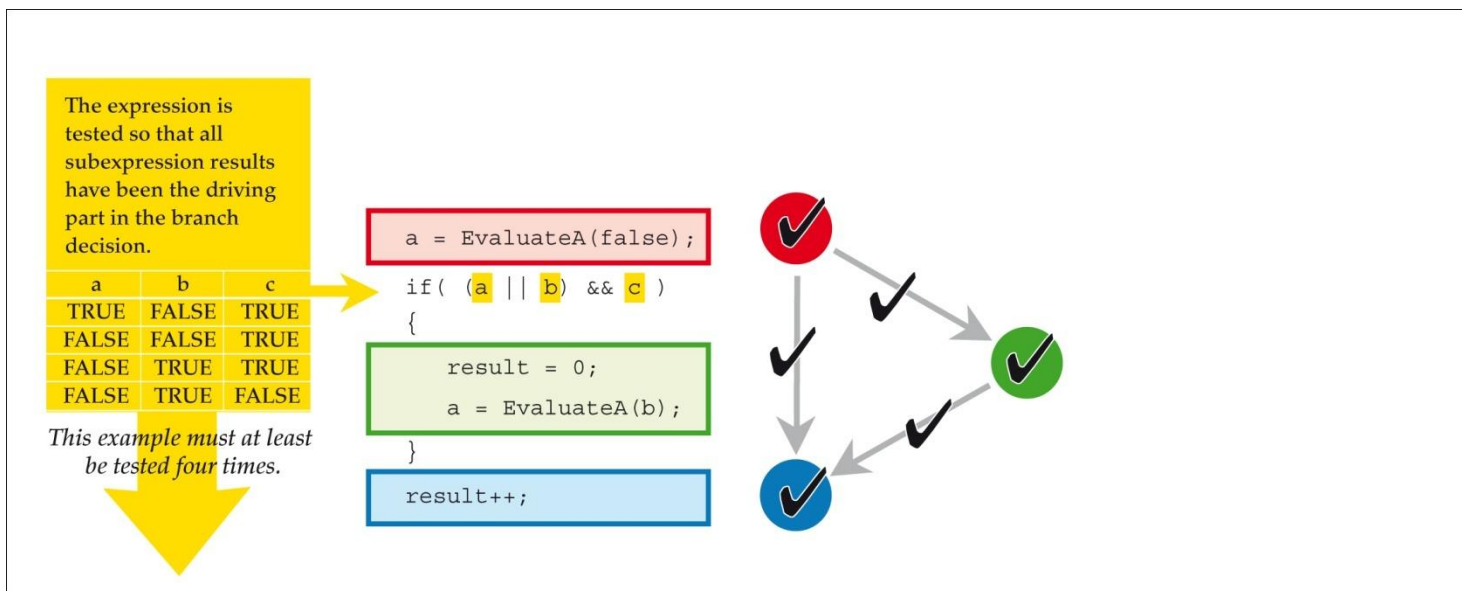
```
result++;
```



Comment

Branch coverage is a more advanced type of code coverage analysis. Branch coverage ensures that all code blocks have been exercised and that all branch paths have been executed. It does not consider how a branch decision was taken in a complex branch expression.

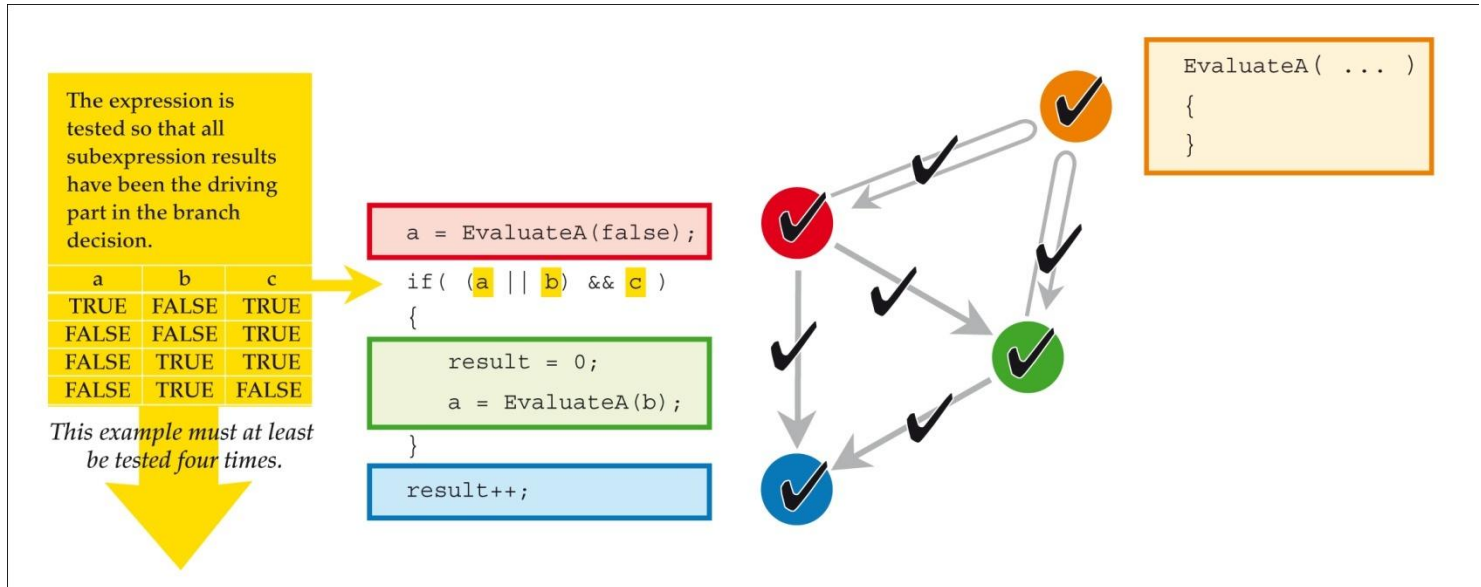
Modified condition/decision coverage (aka MC/DC)



Comment

Modified condition/decision coverage is a very advanced type of code coverage analysis. MC/DC ensures that all code blocks and branch paths have been exercised and that all subexpressions in branch decisions have been shown to affect the branch decision independently of other subexpressions. MC/DC-level coverage is required by RTCA DO-178B for "Level A" software - the most critical type of airborne software.

Atollic TrueANALYZER[®] supports all these types of code coverage analysis!



- Statement (block) coverage
- Function and Function call coverage
- Branch coverage and Modified condition/Decision coverage (MC/DC)
- Supports the most rigorous of test procedures (similar to what is required by RTCA DO-178B for flight control systems)



atollic™

DEMO

Improve your software quality with
Atollic TrueANALYZER®!

www.atollic.com

"Embedded passion"



Contact Us

atollicTM

- **Italy**

Fenway Embedded Systems

Via Don Giovanni Minzoni, 31

20010 Arluno (MI) - Italy

Tel. +39 02 97310120

Email: sales@fenwayembedded.com

Web: www.fenwayembedded.com



- **Headquarter**

Atollic AB

Science Park Jönköping

Gjuterigatan 7

SE-553 18 Jönköping – Sweden

Email: sales@atollic.com

Web: www.atollic.com

atollic ab

Science Park Jönköping

Gjuterigatan 7

SE-553 18 Jönköping

Sweden

atollic inc.

115 Route 46

Building F, Suite 1000

Parsippany

NJ, 070504

USA

www.atollic.com

