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Assertions in C/C++

Assertions are statements used to test assumptions made by programmer. For example, we may use assertion to check if pointer returned by malloc() is NULL or not.

Following is syntax for assertion.

```
void assert( int expression );
```

If expression evaluates to 0 (false), then the expression, sourcecode filename, and line number are sent to the standard error, and then abort() function is called.

For example, consider the following program.

```c
#include <stdio.h>
#include <assert.h>

int main()
{
    int x = 7;

    /*  Some big code in between and let's say x
        is accidentally changed to 9  */
    x = 9;

    // Programmer assumes x to be 7 in rest of the code
    assert(x==7);
```

```
    /* Rest of the code */

    return 0;
}
```

Output

```
 Assertion failed: x==7, file test.cpp, line 13
 This application has requested the Runtime to terminate it in an unusual
 way. Please contact the application's support team for more information.
```

Assertion Vs Normal Error Handling

Assertions are mainly used to check logically impossible situations. For example, they can be used to check the state a code expects before it starts running or state after it finishes running. Unlike normal error handling, assertions are generally disabled at run-time. Therefore, it is not a good idea to write statements in asser() that can cause side effects. For example writing something like assert(x = 5) is not a good ideas as x is changed and this change won't happen when assertions are disabled. See this for more details.

Ignoring Assertions

In C/C++, we can completely remove assertions at compile time using the preprocessor NODEBUG.

```
// The below program runs fine because NDEBUG is defined
# define NDEBUG
# include <assert.h>

int main()
{
    int x = 7;
    assert (x==5);
    return 0;
}
```

The above program compiles and runs fine.

In Java, assertions are not enabled by default and we must pass an option to run-time engine to enable them.

Reference:

http://en.wikipedia.org/wiki/Assertion_%28software_development%29

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2

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