Programmazione Avanzata per il Calcolo Scientifico

Advanced Programming for Scientific Computing

Lab 04 - 10/04/2015
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GDB Exercise 1

A linked-list of integers

```
int main (int argc, char** argv)
{
  using namespace std;
  int c = 1;
  // create a new list
  Node start (c);
  // add 10 nodes to the list
  while (c++ < 10)
    start.appendNew (c);
  // print the list
  start.print ();
  // find the node with value 5
  Node* t = start.find (5);
  // erase this node
  t->erase ();
  // print the list again
  start.print ();
  return 0;
}
```

Epected output:

```
 $ ./integer-list
1, 2, 3, 4, 5, 6, 7, 8, 9, 10
1, 2, 3, 4, 6, 7, 8, 9, 10
```

The program 'integer-list' in the directory 'buggy' has:

1) One compile error
2) One run-time error
3) One memory leak
4) A potential memory leak that is not captured in the main

find all the issues and fix them

(use gdb and valgrind appropriately)
(lcov may be useful)

LCOV

LCOV

LCOV is a graphical front-end for GCC's coverage testing tool **gcov**.

It collects gcov data for multiple source files and creates HTML pages containing the source code annotated with coverage information.

It also adds overview pages for easy navigation within the file structure. LCOV supports statement, function and branch coverage measurement.

1. Ensure that the project is built using GCC
2. Add --coverage to compiler and linker flags (for example CFLAGS and LDFLAGS)
3. Compile and run
4. Collect coverage data:
   lcov --capture --directory project-dir --output-file coverage.info
5. Generate HTML output:
   genhtml coverage.info --output-directory out
6. use --demangle for C++

LCOV

Challenge :

Convert the makefiles for the ‘integer-list’ example to CMakeLists.txt and build the code using CMake

Add tests in the CMakeLists.txt until 100% of the code in ‘integer-list.h’ is covered

Run the test and verify the coverage with lcov