Master Thesis – Mutation Testing

Description
For any software it is important that it is possible to write tests to ensure that the software is working as intended. If the software that we want to test is large it is convenient if we can test parts of it in isolation. By isolation we mean that we should not have to compile the whole application just to test a selected function in our code.

One way in which we can achieve this kind of testing is to take our function and manually write fake implementations of all code that it depends on; this is known as stubbing. However, writing these stubs manually is very time-consuming and also the stubs must be updated whenever the behavior of the code that it imitates is updated.

To remedy the problems with stubbing we can use a technique known mocking in which the test code contain specifications on how dependencies should behave in this particular test case; this eliminates the need for stub implementations.

The goal for this Master Thesis is to make isolated testing of individual C files easy by using GCC plugins. Any function calls that are made from the tested file to an outside function should be mocked automatically, using information that is available in the compiler.

Qualifications
This is a technically advanced project and you will need the following in order to succeed:

- Very good knowledge of C programming.
- Knowledge of how compilers and linkers work.
- Some understanding of software testing is also required

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