GDB Advanced tutorial

Athanasios Nakas

Giorgos Stilianakis

Michalis Vardoulakis

GDB-1 revision

- GDB is available on the department machines
- Must use –g flag when compiling your code
- gdb <executable_file> to run with GDB

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- run(r) : Begin the execution of your program without stopping at main

- break(b) : Sets a breakpoint at a part of your code. The debugger will stop the execution of the program at every breakpoint
  - e.g. break <function name>|<line>

- delete(d) : Remove a breakpoint. Can also remove all breakpoints

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- continue(c) : continue execution from breakpoint
- info breakpoints : View all breakpoints
- next(n) : Execute current command and move to next

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- print(p) :
  - print : prints any kind of variable
  - print x : prints the value of var x
  - expressions are supported (e.g. print &x prints the address of x)
- backtrace(bt) : display function call stack (with function arguments)
- list(l) <line number> | <function> : prints code around <line number> | <function>

Examine Memory

- To examine a memory segment you can use x[/FMT] ADDRESS
  - ADDRESS is an expression for the memory address to examine
  - FMT is a repeat count followed by a format letter and a size letter
  - Format letters are o(octal), x(hex), d(decimal), u(unsigned decimal), t(binary), f(float), a(address), i(instruction), c(char), s(string) and z(hex, zero padded on the left).

- example: Print contents of the memory address i in decimal format
  - (gdb) x/d &i
  - 0xbffff46c: 10

Modify memory Content

- One can alter the memory contents using set

```
(gdb) info locals
 i = 15
 j=5

 (gdb) set j = 0
 (gdb) info locals
  i = 15
  j=0
```

Moving in the stack

We can also move in the stack:

- up: go to the upper stack frame
- down: go to the down stack frame
- select-frame: jump at a specific stack frame
- Use bt or f command to view the backtrace(bt) or current(f) stack frame

Useful links

- https://www.tutorialspoint.com/gnu_debugger/index.htm
- https://www.cs.umd.edu/~srhuang/teaching/cmsc212/gdb-tutorial-handout.pdf

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