Debugging with GDB

GDB -- GNU DeBugger

- On lab machines and ldc.cs.wwu.edu machines

- Compiling
  - gcc -g hello.c
  - gcc -g -o hello hello.c

- Running
  - Normal run: no difference
  - Under gdb:
    - gdb a.out
    - gdb hello
  - ddd or xxgdb:
    - ddd a.out
    - xxgdb hello

Basic GDB Commands

- Help: help
- Breakpoints: break main
- Running: run arg_list
- Step to next line: next
- Step into functions: step
- Continue running: cont
- List source: list
- Quiting: quit

Running GDB with a core dump ... (p1.c)

- NetBSD (possibly other *BSDs)
  - gdb a.out a.out.core
  - gdb name name.core
- Linux, Solaris & others
  - gdb a.out core
  - gdb name core
- Having Linux generate a core dump (bash shell)
  - show all limits: ulimit -a
  - set core limit: ulimit -c unlimited

GDB commands useful with a core dump

- location & func calls -- where
- printing variables
  - info locals
  - info args
  - info frame
  - up
  - down
  - print var_name
  - print /o var_name
  - print /x var_name
  - printf "formatstring", data, data, ...
  - printf "a=%d\n", a

p2.c

Infinite loops

- ps(1) -- get pid
- attach pid
- set variable name = value
- detach
- kill

Functions (p3.c)

- step vs next
- print f(n)
- call f(n)
- where
- finish

Breakpoints -- stopping in time! (funcs.c)

- Setting
  - break function_name
  - break

- listing breakpoints: info break
- disable breakpoint: disable 24
- enable breakpoint: enable 24
- deleting: delete break num
- conditional: break <pos> if <expr>
- printing at breaks: display expr
- listing displays: info display
- not printing: undisplay n

Other things (Part 2)

GDB Variables

- set $i = 0
- print a[$i++]   (over and over again [cr])
- printf "a[%d] = %d\n", $i, a[$i++]

Printing dynamic arrays (dyn.c)

- print *a@len

User Defined commands

define name

...

end

$arg0, $arg1, ... $arg9

if/else/end

while/end

document command

More ...

GDB initialization

- ~/.gdbinit

Source code

- list
- search
- reverse-search
- dir
- show directories
- info sources
- info functions
- info variables

Global variables

global.c:

- run it

```
set write on
file a.out
set var debug = 0
set var x = 20
quit
```

- run it again
- Note: int debug = 0; -> in BSS and doesn't work.

Commands at a breakpoint (bug.c)

break ...
commands
....
end

- silent
- continue

- if statements!