

03-1 Development Tools

Chapters 13 and 15

gdb and friends

gdb

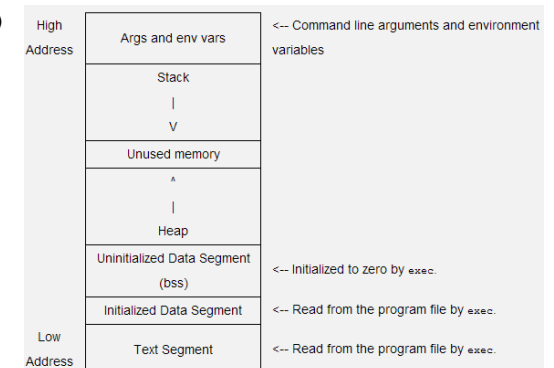
- gdb allows you to see what is going on 'inside' a program while it executes
- gdb can do four main kinds of things:
 - Start your program
 - Make your program stop on specified conditions.
 - Examine what has happened
 - Change things in your program
- The program being debugged can be written in Ada, C, C++, Objective-C, Pascal (and many other languages)
- Those programs might be executing on the same machine as GDB (native) or on another machine (remote)

Exercise 16- gdb

- In Exercise 16 we'll try the following commands in gdb
 - help, break, run, continue, list, step, next, backtrace
- We'll also try remote debugging later.
- Remote debugging is used when your target can't run gdb
- Go do
- http://elinux.org/EBC_Exercise_14_gdb_Debugging

Memory Layout

- **Text Segment:**
- **Initialized Data Segment:**
- **Uninitialized Data Segment:** Also named "bss" (block started by symbol)
- **The stack:**
- **The heap:**



Tutorial Example

```
beagle$ size hello_world-1 hello_world-1.o
text    data    bss     dec      hex filename
882     284      4     1170    492 hello_world-1
44       0      0      44     2c hello_world-1.o
```

- hi

Tutorial

```
beagle$ objdump -h hello_world-1.o

hello_world-1.o:      file format elf32-littlearm

Sections:
Idx Name              Size      VMA           LMA           File off  Algn
 0 .text              00000020  00000000  00000000  00000034  2**2
                  CONTENTS, ALLOC, LOAD, RELOC, READONLY, CODE
 1 .data              00000000  00000000  00000000  00000054  2**0
                  CONTENTS, ALLOC, LOAD, DATA
 2 .bss               00000000  00000000  00000000  00000054  2**0
                  ALLOC
 3 .rodata            0000000c  00000000  00000000  00000054  2**2
                  CONTENTS, ALLOC, LOAD, READONLY, DATA
 4 .comment            0000003e  00000000  00000000  00000060  2**0
                  CONTENTS, READONLY
 5 .note.GNU-stack    00000000  00000000  00000000  0000009e  2**0
                  CONTENTS, READONLY
 6 .ARM.attributes    00000033  00000000  00000000  0000009e  2**0
                  CONTENTS, READONLY
```

binutils

- Section 13.5 on page 355 gives a nice summary of many handy binary utilities
 - **readelf**
 - **objdump**
 - **strip**
 - **strings**
 - **ldd**
 - **nm**
- Check them out

Quiz

- In one week
- Segment Names
 - Text, data, bss, stack, heap
- gcc flags
 - -g
 - -ggdb3
- gdb commands
 - list
 - print
 - breakpoints
 - step
 - run
 - continue