Lab 4: GDB

By: CS 382 CAs

Using GDB with ARM

Starting GDB with your program

- Install gdb-multiarch package:
  - **sudo apt-get install gdb-multiarch**

- Assemble using -g flag and then link
  - **aarch64-linux-gnu-as demo.s -g -o demo.o**
  - **aarch64-linux-gnu-ld demo.o**

- Run your program and wait for GDB to connect using the `-g 1234` flag
  - **qemu-aarch64 -g 1234 a.out**

- On another terminal window, run gdb and connect to the program
  - **gdb-multiarch --nh -q a.out -ex 'set disassemble-next-line on' **
    **-ex 'target remote :1234' **
    -ex 'set solib-search-path /usr/aarch64-linux-gnu-lib/' -ex 'layout regs'

Note: You can find these steps in section **B.3.2** of the textbook,
backslashes in the final command simply denote new lines.

Interacting with GDB

- Please read section **B.3.3** in the textbook (p.184)

- Breakpoints
  - Use **b <label>** to pause the program when it reaches the label
  - Ex: **b _start** to pause at the start of the program

- Moving through the program
  - Resume execution using **continue** or **c**
  - Step through the program using **step** or **s**

- Panel focus
  - Use **focus regs** to view the values of the registers
  - Use **focus asm** to go back to the assembly code panel

Printing Memory

- Read section B.3.4 in the textbook

- To print data stored in memory we use the following command:
  - **x/<length><format><unit> address**

- If we wanted to print 5 bytes in character from the label hello:
  - **x/5cb &hello**

- To print 2 bytes in decimal from the address stored in x10:
  - **x/2db $x10**

Lab 4 Assignment

Task Time

Starter Code

```
.data
vec1:   .quad   10, 20, 30
vec2:   .quad   1,  2,  3
dot:    .quad   0
```

- Come up for attendance before leaving

- Task 1: Calculating Dot Product
  - Use the data in "vec1" and "vec2" to calculate the dot product and store it in "dot"
  - Must be able to assemble, link, and execute without error
  - You are allowed to use the MUL instruction as needed
  - **Comment every line**

- Task 2: Debugging using GDB
  - Look at appendix B.3
  - Write a report about your program from Task 1