CSE31 : Lab #1 - Basics

This lab contains several parts. To ensure you get full credit, make sure you read this lab carefully and follow the instructions precisely.

Overview

This lab will take you through the steps to compile C program, use gdb and figure out the number representation of the computers used in lab.

(Reference) Reading

zyBooks : 1.1-1.3
K&R : 1.1-1.5

(Exercise) Simple C Program

Download output0.c file from the assignment page. The code in the file looks like this :

```
#include <stdio.h>
int main ( ) {
  int n;
  n = _____;
  printf ("%c\n", n);
  return 0;
}
```

Only modify the line "n = _____;" so the output displays 0. Expected output is shown below:

```
$ gcc -c output0.c
$ gcc output0.o -o output0
$ ./output0
0
```

Q1. What does the –c flag do in gcc?

Q2. What does the –o flag do in gcc?

Compile the program using –g flag so we can use the debugger, gdb.
You may want to use the following site as a reference:
http://cseweb.ucsd.edu/classes/fa09/cse141/tutorial_gcc_gdb.html

Q3. How do you load output0 into gdb? (give the command)

Q4. How do you set breakpoint at main? (give the command)

Q5. Command to run output0 inside gdb

Q6. Command to single-step through the program

(Exercise) Number Representation

Download biggestInt.c file from the assignment page. The code works by using 1 and shifting the number until it wraps around or overflows. It exploits the fact C does not really check for these conditions. It allows us to test the limits in a particular system and see the underlying number representation. You may wish to follow the exact steps the code is executing but it is not essential to answer the questions.

Q7. First output gives the value of the most significant bit (MSB) of an unsigned int. What is the size (# of bits) of an unsigned int?

Q8. Second output gives the value of a long long int. What is the size of a long long?

Q9. Third output shows the most negative signed int. Is the size of a signed int the same as an unsigned int?

Q10. Fourth line shows the value of the most negative value's negation, ie –most_negative_number. What is the output and the reason for the value to be this way? (Hint: remember the property of 2's complement representation)

Collaboration

Credit anyone you worked with in three different ways:

- Given help to
- Gotten help from
- Collaborated with and worked together

What to hand in

When you are done with this lab assignment, you are ready to submit your work. Make sure you have done the following ***before*** you press Submit:

- Answers to Q1-Q10.
- Attach output0.c
- List of collaborators (just the names)