

ECE571: Advanced Microprocessor Design – Homework 1

Due: Thursday, 31 January 2013, 12:30PM

1. Set up the ARM environment

- Log into the ARM pandaboard machine (in umelst that's a lowercase L):
`ssh username@vincent-weaver-1.umelst.maine.edu`
Where "username" is the username on the slip of paper I gave out in class (if you missed class please stop by my office for your account) and the password is also from the slip of paper.
- Download the code from:
`http://www.eece.maine.edu/~vweaver/classes/ece571_2013s/hw1_code.tar.gz`
You can use `wget` on the ARM machine to do this:
`wget http://www.eece.maine.edu/~vweaver/classes/ece571_2013s/hw1_code.tar.gz`
- Uncompress/unpack it with the command `tar -xzvf hw1_code.tar.gz`
- Change into the `hw1_code` directory `cd hw1_code`
- Run `make` to build the code.

2. Make the ARM processor count down from 32.

- This first part is similar to the example shown in Lecture 4.
- Run `./countdown_32`
This should only print "0"
- Modify the `countdown_32.s` file so it counts down from 32 to 0.
Be sure to comment your code!
Hint: make sure you keep track of which registers are over-written by subroutines.

3. Describe how the provided decimal printing routine in `countdown_32.s` works. Put your answer in the README file.

4. Make a program that counts down in hexadecimal (base-16) rather than decimal.

- Copy your working countdown 32 code over the included file:
`cp countdown_32.s countdown_32_hex.s`
- Convert the `print_number` routine in `countdown_32_hex.s` to print hexadecimal (base 16).
Hints: `man ascii` can help when figuring out how to print letters efficiently. Also remember that dividing by 16 is easier than dividing by 10.
The finished program should countdown from 0x20 to 0 in hex.

5. Submitting your work.

- Run `make submit` which will create a `hw1_submit.tar.gz` file containing `countdown_32.s` and `countdown_32_hex.s`.
You can verify the contents with `tar -tzvf hw1_submit.tar.gz`
- e-mail the `hw1_submit.tar.gz` file to me by the homework deadline. Be sure to send the proper file!