Homework 4

Due: Thursday, 5/15 at 11:59pm

For this homework assignment, submit a MIPS assembly program executable within the MARS 4.4 simulation environment with the following features.

- The program must use system calls to read two integers typed in by the user, m and n.
- The program must contain a function computing the Ackermann-Peter function on m and n. The function is defined as follows:

\[
A(m, n) = \begin{cases} 
  n + 1 & \text{if } m = 0 \\
  A(m-1, 1) & \text{if } m > 0 \text{ and } n = 0 \\
  A(m-1, A(m, n-1)) & \text{if } m > 0 \text{ and } n > 0 
\end{cases}
\]

- The Ackermann-Peter function must be recursive, meaning that you must use jal and jr instructions to invoke itself.
- The result of the computer must be printed back to the console.

When testing your program, remember that the Ackermann-Peter function grows very rapidly. Look up online what the expected answer might be before you use your inputs to test. Specifically, I would not recommend testing with an m input higher than 3 without double-checking how long the program is likely to run.

To submit your assignment, access the Euclid server and copy the files you wish to submit into the CS201 submission folder. You can submit your entire Logisim circuit file as it is, and your answers to the other questions as a separate document. To access the Euclid server for submission from a Windows 7 computer, such as those in the SMC labs, open “My Computer” (in the Start menu). You should see the “Map Network Drive” across the top bar (click on the double-arrow tab on the bar to find it if it is not already visible.) The resource you want to map is your home directory from euclid; for me it is \\euclid\jastratton. You should replace “jastratton” with your own Knox ID. If you access the resource from your own computer, it will ask for authentication information. Make sure your group is “knox”, by typing in “knox\” in the account field before your user name.

It doesn’t matter which drive you use; I took the default, which was the Y: drive. If you would like to submit from off campus, go to the Knox ITS page on VPN access:

http://www.knox.edu/offices/information-technology-services/help-desk-support vpn-access.html

Follow the directions there to access the Euclid server through the webpage-based VPN client, or install the Cisco AnyConnect client on your machine directly and follow exactly the directions above. If you anticipate submitting your assignment in this way, please test your ability to connect early, and work with the ITS help desk if you need assistance.

Keep in mind that the system will only pick up files, not directories, and will have difficulty if your filename includes special characters like parentheses or spaces. Keep your filenames simple, and feel free to submit early and check that the submission came through successfully.