Homework 1

Assigned Date: Monday, September 8, 2014
Due Date: Monday, September 15, 2014

Weight: 60 pts

NOTE: Please be sure to place your lab section and TA's name on your electronic homework before you submit it via ANGEL! https://lms.wsu.edu/

Description:

The purpose of this homework is to give you practice with number conversions, general microcontroller terminology, and computer architecture. It also helps you with understanding where to find important reference documents that you will rely on throughout the course! Please show all work necessary to solve each of the problems. You will receive partial credit for showing your work. You must type your solutions and submit them electronically!

Problem 1: (10 points total / 2 pts each)

a. Convert $1,834_{10}$ to its equivalent 16-bit binary representation.
_____

b. Convert $1001\ 1110_2$ to its equivalent unsigned decimal representation.
_____

c. Convert $0011\ 1011\ 1010\ 0101_2$ to its equivalent hexadecimal representation.
_____

d. Convert 173_{10} to its equivalent 2-digit hexadecimal representation.
_____

e. Provided the following memory table. Fill in the appropriate hexadecimal address value. Note: each MIPS instruction is 32-bits. Exactly one instruction fits into each memory cell.

Address	Instruction
$A000 0014	ADD $t2, $t0, $t1
$	BGTZ $t2, LABEL
$A000 001C	SW $t2, VAR

Problem 2: (10 points)

Discuss 5 differences between standard microprocessors and microcontrollers (use the Microcontrollers vs Microprocessors unit for help; also look online for help).

Problem 3: (10 points)

Describe the RISC design philosophy (use the Computer Architectures unit for help; also look online for help).

Problem 4: (10 points)

Compare and contrast Harvard vs Von Neumann architectures (use the Computer Architectures unit for help; also look online for help).

Problem 5: (10 points)

List and describe 10 features of the Microchip PIC32MX460F512L MIPS microcontroller (use the PIC32MX460F512L data sheet for help).

Problem 6: (10 points)

List and describe 5 features of the Digilent Cerebot MX4cK embedded microcontroller board (use the Cerebot MX4cK reference manual for help).