Oregon TECH

Computer Systems Engineering Technology
CST 345 – HW/SW Co-Design

HW 3 – Picoblaze Programming
Winter 2015
Instructor: Troy Scevers
Possible Points: 30

Name_____
Due Date: Monday, February 9th @ 5 pm

Instructions

Binary to BCD conversion

An efficient technique for binary-to-BCD conversion is that of the so-called ADD-3 algorithm, and will convert the original binary number into three BCD digits (HUNDREDS, TENS, UNITS). The algorithm can be expressed as follows:

1. Set HUNDREDS=0, TENS=0, UNITS=0, COUNT=8.
2. If the binary value in any of the BCD columns is 5 or greater, add 3 to that value in that BCD column.
3. Decrement COUNT and shift left. The bit shifted from the 8-bit binary is carried into UNITS; the bit shifted from UNITS is carried to TENS, etc.
4. If count not equal to 0, to step 2, else STOP.

Example:

HUNDREDS	TENS	UNITS	BINARY		Description
0000	0000	0000	1111	1111	Start
0000	0000	0001	1111	1110	Shift 1
0000	0000	0011	1111	1100	Shift 2
0000	0000	0111	1111	1000	Shift 3
0000	0000	1010	1111	0000	ADD-3 to UNITS
0000	0001	0101	1111	0000	Shift 4
0000	0001	1000	1111	0000	ADD-3 to UNITS
0000	0011	0001	1110	0000	Shift 5
0000	0110	0011	1100	0000	Shift 6
0000	1001	0011	1100	0000	ADD-3 to TENS
0001	0010	0111	1000	0000	Shift 7
0001	0010	1010	1000	0000	ADD-3 to UNITS
0010	0101	0101	0000	0000	Shift 8

Procedure

1. Develop the Picoblaze assembly language code for this algorithm and test it using the ***FIDEX*** to simulate. Make sure your code conforms to the Style guide. Upload a copy of your code to blackboard after verifying that it works.