

EE 371 First Semester Test - Thursday September 27, 2001  
35 Points, 16.667% of Final Grade

Please put your name on the outside of the paper also.  
Hand in the test folded so your name shows on the outside.

Name KEY

1. Assume the following information in the HC12 registers for each of the following instructions.  
 $A = \$00$   $B = \$01$   $X = \$6000$   $Y = \$6010$   
 The data in memory locations  $\$6000 - \$600F$ , as shown by a MD 6000 command in the Dbug-12 monitor is:  
 $6000 \quad 11 \ 23 \ 42 \ 00 - 60 \ 00 \ 65 \ 02 - 11 \ 22 \ 48 \ 65 - 6c \ 70 \ 4d \ 65 \ .\#B..!e..\"HelpMe$

Give the addressing mode used, the effective address for the source data, and the results for each of the following instructions: (15 points)

Instruction	Addressing Mode	Effective Address	Results
ldab 0,x	Indexed	$\$6000$	$B = \$11$
ldab $\$600e$	Extended	$\$600E$	$B = \$4D$
ldab 8,x	Indexed	$\$6008$	$B = \$11$
ldab -1,y	Indexed	$\$600F$	$B = \$65$
ldab 1,x+	Indexed, automatic post increment	$\$6000$	$B = \$11, X = \$6001$

2. Fill in the empty boxes in the table below (4 points)

Code Name	Information	8-bit binary code word
Unsigned binary	$56_{10}$	0011 1000
2's complement binary	$-26_{10}$	1110 0110
Signed/magnitude binary	$-5_{10}$	1000 0101
ASCII	Capital A pressed on a keyboard	0100 0001

3. Encode the following decimal information using 8-bit unsigned, two's-complement, and signed/magnitude codes. (6 points)

Decimal Information	Unsigned Binary	Two's-complement	Signed/magnitude
+6.75	0001 10.11	0001 10.11	0001 10.11
- 8.25	Can't do	1101 11.11	1010 00.01

4. What conditional branch instruction would you use in each of the following program scenarios (5 points):

- Branch back to the start of a loop a number of times based on a counter in a register.  
BNE
- Branch to a part of the program if an unsigned overflow occurred.  
BCS
- Branch to a part of the program if a 2's complement overflow occurred.  
BVS
- Branch to a part of the program if adding 2 numbers results in a negative value.  
BMI
- Branch to a part of the program if an 8-bit unsigned binary number input from an A/D is less than one-half the maximum value.  
BLO

5. What Dbug-12 monitor command is used for: (5 points)

Displaying the contents of memory location \$6007?

MD 6000

Displaying registers?

RD

Setting a break point at memory location \$4007?

BR 4007

Removing a break point?

NOBR

Setting the program counter to \$4000?

PC 4000 or RM