Problem Set 2
Types, operators, expressions

Out: Tuesday, January 12, 2010.  
Due: Wednesday, January 13, 2010.

Problem 2.1

Determine the size, minimum and maximum value following data types. Please specify if your machine is 32 bit or 64 bits in the answer.

- char
- unsigned char
- short
- int
- unsigned int
- unsigned long
- float

Hint: Use sizeof() operator, limits.h and float.h header files

Problem 2.2

Write logical expressions that tests whether a given character variable c is

- lower case letter
- upper case letter
- digit
- white space (includes space, tab, new line)

Problem 2.3

Consider int val=0xCAFE; Write expressions using bitwise operators that do the following:

- test if atleast three of last four bits (LSB) are on
- reverse the byte order (i.e., produce val=0xFECA)
- rotate fourbits (i.e., produce val=0xECBF)
Problem 2.4

Using precedence rules, evaluate the following expressions and determine the value of the variables (without running the code). Also rewrite them using parenthesis to make the order explicit.

- Assume \(x=0x\text{FF}33, \text{MASK}=0x\text{FF}00\). Expression: \(c=x \& \text{MASK} == 0;\)
- Assume \(x=10,y=2,z=2;\). Expression: \(z=y=x++ + ++y*2;\)
- Assume \(x=10,y=4,z=1;\). Expression: \(y>>= x&0x2 \&\& z\)

Problem 2.5

Determine if the following statements have any errors. If so, highlight them and explain why.

- \(\text{int } 2\text{nd}\_\text{value}=10;\)
- Assume \(x=0,y=0,\text{allszero}=1\). alliszero =\((x=1) \&\& (y=0);\)
- Assume \(x=10,y=3,z=0;\). \(y=++x+y; z=z--; x;\)
- Assume that we want to test if last four bits of \(x\) are on. \((\text{int } \text{MASK}=0xF; \text{ison}=x\&\text{MASK}==\text{MASK})\)