

Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science

6.087: Practical Programming in C

IAP 2010

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=0xECAF`)

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 $(x=0xFF33, MASK=0xFF00)$. Expression: $c=x \& MASK ==0$;
- 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.

- `int 2nd_value=10;`
- Assume $(x=0, y=0, alliszero=1)$. `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. `(int MASK=0xF; ison=x\&MASK==MASK)`

MIT OpenCourseWare
<http://ocw.mit.edu>

6.087 Practical Programming in C
January (IAP) 2010

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.