CZ1106 Problem Solving and Computation II

Tutorial 2

Students will present their answers to questions 5 to 6. Please prepare the solutions.

1.   What are the results of the following expressions ?
       (Assume all numbers are in bases 16.)

       (i)   b4 & 08
       (ii)   b4 | 08
       (iii)   c4 ^ 08
       (iv)   f0 >> 4
       (v)   14 << 2

2.   An integer n is a multiple of 128 provided it can be expressed as

$$n = i * 128 \qquad \text{where i is an integer.}$$

       Write a program to accept an integer from the keyboard and use bit operators to
       determine if the integer entered is a multiple of 128.

       (n = i * 128 = i * 2^7

       *That is to say that n must be of the binary form xxx**0000000***
       where x $\in$ {0,1}.)

3.   Let the contents of the file pointed by indata be as shown below.

         indata

| A | B | C | D | E | F | G | H |

       What is the value of **ch** after the following code segment is executed?

```
char ch;
fseek (indata, (long) -3, * sizeof (char), SEEK_END);
fread (&ch, sizeof (char), 1, indata);
```

4. You are the owner of a hardware store and need to keep an inventory that can tell you what tools you have, how many you have, and the cost of each one. Write a program that initializes the file "hardware.dat" to 100 empty records. Write another program to let you input the data concerning each tool, list all your tools, delete a record for a tool that you no longer have, and update any information in the file. The tool identification number should be the record number. Use the following information to start your file:
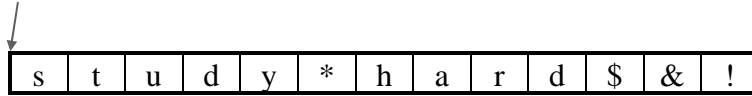
Record #	Tool name	Quantity	Cost
3	Electric sander	7	57.98
17	Hammer	76	11.99
24	Jig saw	21	11.00
39	Lawn mover	3	79.50
56	Power saw	18	99.99
68	Screw driver	106	6.99
77	Sledge hammer	11	21.50
83	Wrench	34	7.50

5. What are the results of the following expressions ?
    (Assume all numbers are in bases 16.)

    (i)   bc & 08
    (ii)   07 | d0
    (iii)   bc ^ 08
    (iv)   80 >> 1
    (v)   8f << 3

6.   A text file contains the following characters. Suppose the file pointer `indata` points at the beginning of the file when we run the program.

indata

s	t	u	d	y	*	h	a	r	d	$	&	!

What are the contents of `ch` after each `fread` instruction is executed in the following program segment ?

```
char ch;

  :
  :
fread (&ch, sizeof (char), 1,indata);

fseek (indata, (long) 6, SEEK_CUR);
fread (&ch, sizeof (char), 1,indata);

fseek (indata, (long) -3, SEEK_CUR);
fread (&ch, sizeof (char), 1,indata);

fseek (indata, (long) -5, SEEK_END);
fread (&ch, sizeof (char), 1,indata);

fseek (indata, (long) 3, SEEK_CUR);
fread (&ch, sizeof (char), 1,indata);

fseek (indata, (long) 4, SEEK_SET);
fread (&ch, sizeof (char), 1,indata);
  :
```