SMA5202 Tech & Tools, C/C++ Problem Set 1

Due date: Saturday, 12 July 2003

1. For programming, one important point is that one should try to avoid reinventing the wheel. This exercise aims to make you become more familiar with the standard C library (not C++). Besides above, the standard C library is also important to write a portable software.

In this exercise, you're required to find out the header files which contain the functions, data types and global variables et al, listed below. The exact locations are machine-dependent. You also need to give a brief explanation for the usage of the functions.

```
struct tm;
time_t time(time_t* tp);
EOF;
FILE;
int sprintf(char* s, const char* format, ...);
size_t fread(void* ptr, size_t size, size_t nobj, FILE* stream);
int atoi(const char* s);
void* calloc(size_t nobj, size_t size);
int system(const char* s);
size_t strlen(const char* cs);
void* memcpy(void* s, const void* ct, size_t n);
int isdigit(int c);
int toupper(int c);
INT_MAX ;
LONG_MAX ;
double fabs(double x);
int setjmp(jmp_buf env);
void (*signal(int sig, void (*handler)(int)))(int);
```

[Hint: see the book "The Dictionary of Standard C", by Rex Jaeschke. Or search the web. Or man under UNIX.]

2. In exercise 2 and exercise 3, You will do the practice by writing two useful applications.

Dates are commonly printed in several different formats in business correspondence. Two of the many common formats are:

21/07/2001 and July 21, 2001

Write a program (C++, of course) that reads a date in the first format and prints that date in the second format. (Note: you are required to check with the input to guarantee it's a correct date. For the first format of date, the order is day/month/year.)

3. A company has four sales people (1 to 4) who sell five different products (1 to 5). Each salesperson passes in a slip for each different type of product sold. Each slip contains:

- The slip number
- The salesperson number
- The product number
- The total dollar value of that product sold that day.

When it comes to the end of every month, the company wants to make a statistics on the sales information. You're required to read the sales data from **sales.dat** file, print the results in tabular format with each of the columns representing a particular salesperson and each of the rows representing a particular product. Cross total each row to get the total sales of each product for last month; cross total each column to get the total sales by salesperson for last month. Your tabular printout should include these cross totals to the right of the totaled rows and to the bottom of the totaled columns.

[Read C++ lecture note 8, or Chapter 14 regarding file openning in C++.]

4. A rewarding way for learning a computer language is to read a lot of source codes from gurus. In this exercise, you're given a set of source files of "grep" (a well-known utility in Unix world). You may need to read the manual for "grep" to know more about that. Both the source code and the manual can be found online (search at `www.google.com` to find them). You may realize that many of the public domain software are still written in C for maximum portability.

1 You can read the Makefile and have a rough idea of the dependencies.

2 You are required to compile the files by using make in Unix or Linux platform. Run the compiled code and report if it works as expected.

3 You are required to draw a flow chart for the whole application and briefly explain the functions realized in each file.