C Programming Basic – week 12

Topics of this week

- Recursive functions
- Exercises

Exercise 12.1

- Write a recursive algorithm for dealing a deck of cards. The parameters should be (i) the deck of undealt cards, and (ii) the person who is to receive the next card. Assuming:
  - The players seat around a table
  - Start with the player on the left of the dealer
  - Each step involves dealing one card to a player, then moving to the next player on the left
  - Dealing continues until no card is left in the deck

Hint

```
function dealCards (deck, person)
{
    if (deck is empty)
        return;
    deal top card from deck to person;
    dealCards (rest of deck, personLeftOf(person));
}
```

Exercise 12.2

- Write a recursive function **void recurTriangle (int n, char ch)** which prints out an upside-down triangle. The parameter *ch* is the character to be used for drawing the triangle, and *n* is the number of characters on the first row. For example, if *n* is 7 and *ch* is **’+’**, then the output of the function should be:

```
+++++++
++++++
+++++
++++
+++
++
+
void recurTriangle(int n, char ch)
{
int i;

    if(n > 0)
         {
         for(i = 0; i < n; i++) printf("%c", ch);
         printf("\n");
         recurTriangle(n-1, ch);
         }
}
```

Exercise 12.3

- Write a function “preceding()” to compare two strings in dictionary order

```
int preceding(char *first, char *second)
```

- Return value
  - 1 if *first* is “smaller than” *second*
  - 0 if *first* is equal to *second*
  - -1 if *first* is “greater than” *second*

Exercise 12.4

- Write a function "`setup_nameList()`" to read the names of *n* persons (2 <= n <= 25) from a file and put them into an array "`nameList[]`" of string

```
int setup_nameList(char *namelist[], char
*filename)
```

Exercise 12.5

- Write a function “qsort_name()” to sort an array of strings in dictionary order using Quicksort

Homework 1

- Write a function to sort a singly linked list using Quicksort. Add this function to the linked list library.
- Hint: You should have functions
  - *To get the nth element in the list*
  - *To swap two nodes in the list*

Improving Quicksort

- Change the Pivot Selection strategy:
  - random element
  - median of three strategy