

Spring 2018, MIS 102 – COMPUTER PROGRAMMING

Homework 2

姓名 : _____ 學號 : _____ Email: _____

Graded out of 120 points. Due on 6/12. Typeset your homework. Submit your source code with comments (file name: yourStudentID_HW2.c) to NSYSU Cyber University. Also notice that your code must follow the suggested programming styles discussed in the class.

1. [20 pts] The following is a C struct definition of a *Linked List*.

// self-referential structure

```
typedef struct list{  
    char data; // each node contains a character  
    struct list *nextPtr; // pointer to next node  
} List; //end structure "List"
```

Please use the above definition to write a C function `void printRevList(List*)` that prints the data of the whole linked list in reverse order. For example, given a list with 3 nodes that contains “a”, “b”, and “c” in order respectively as below:

$a \rightarrow b \rightarrow c \rightarrow \text{NULL}$

your function must be able to print the list in reverse order, as

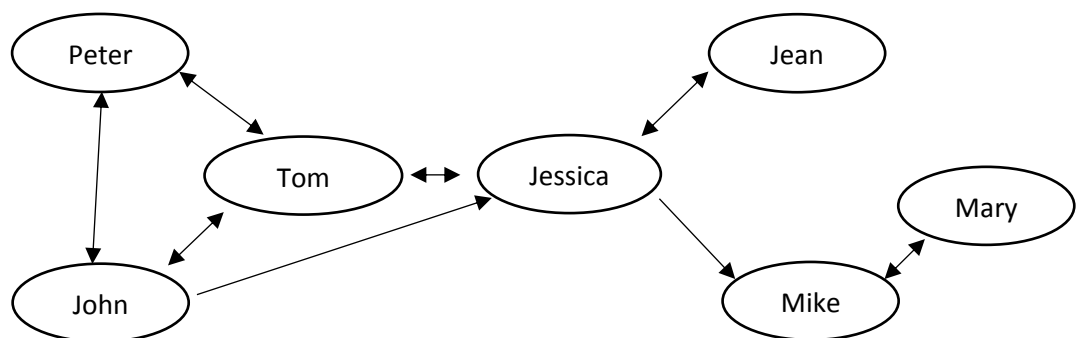
$\text{NULL} \leftarrow c \leftarrow b \leftarrow a$

Write the function in recursive form if you find it easier.

2. [20 pts] Below is a small social network represented by nodes and edges as people and the kinds of connections, respectively, where

“ $A \rightarrow B$ ” denotes “A knows B, but B does not know A”.

“ $A \leftrightarrow B$ ” denotes “A and B know each other”.



Assume that one person can only have at most five friends. Please define your own self-referential C structure that represents the node with edges/links in the network.

3. [30 pts] In the above network, do you think that Mary has chance to know John via this network? Please write a C function *would_A_know_B(A,B)* to check whether A would know B.
4. [20 pts] Please write a bank customer data management program of that provides us functions to
a) *list all existing customer(s)*. b) *add a new customer*. Note that the program must be able to store a customer's ID, name, and balance.
5. [10 pts] Please write a simple C function *printTextFile(const char fileName)* that prints the contents of a given plain text file in the console. For example, suppose "file1.txt" contains sentence "I am a good student". Enter the following command

```
> printTextFile.exe file1.txt
```

will print "I am a good student" on the screen.

6. [20 pts] Please write a C function *listSumOfConNum(int z)* that determines whether z can be expressed as a sum of consecutive positive integer numbers, as:

$$z = x + (x + 1) + (x + 2) + \cdots + (y - 1) + y$$

where $z > 0$, $x > 0$, $y > 0$, and $x < y$. For example, 14 can be expressed as the sum of 2 to 5, as $14 = 2 + 3 + 4 + 5$. Please print all possible sets of numbers. If not found, print a message "Not found!". Here are examples:

```
listSumOfConNum (123456)
```

will print

```
Sum of 130 to 513 is 123456.
```

```
Sum of 901 to 1028 is 123456.
```

```
Sum of 41151 to 41153 is 123456.
```

```
listSumOfConNum (8192)
```

will print

```
Not Found!
```