

// You can include any C library.

1. [20pts] Given a char\* str parameter, implement a function 'print' that prints a string by converting uppercase to lowercase and lowercase to uppercase. function prototype: void print(char \*str);

| Input examples | Desirable outputs |
|----------------|-------------------|
| HEllo worLD!!  | heLLO WORld!!     |
| comPuTER       | COMpUter          |

2. [20pts] Write a program that gets 10 integers via the system console and outputs the maximum length of the consecutively increasing numbers.

| Input examples             | Desirable outputs |
|----------------------------|-------------------|
| 7 6 5 4 3 2 <b>1 2 3 4</b> | 4                 |
| 2 4 6 8 5 <b>1 2 7 9 5</b> | 2                 |
| 8 5 <b>3 4 5 2 9 1 2 3</b> | 3                 |

3. [30pts] John defined a Fibonacci-string which is like the Fibonacci sequence. If the 0<sup>th</sup> string is "a" and the 1<sup>st</sup> string is "b", then the n-th string is a concatenation of two preceding strings. In other words, the Fibonacci-string is same with  $F_n = \text{concat}(F_{n-2}, F_{n-1})$  ( $n \geq 2$ ) when  $F_n$  denotes n-th string. The examples are shown in the table. Given two alphabets ( $F_0, F_1$ ) and one integer k ( $0 \leq k \leq 10$ ), print the k-th string,  $F_k$ . We recommend you use a recursive call when solving the problem.

| Input examples | Desirable outputs |
|----------------|-------------------|
| a b 0          | a                 |
| a b 1          | b                 |
| a b 2          | ab                |
| a b 3          | bab               |
| c d 5          | dcdcdcd           |

4. [30pts] Implement a stack with a singly linked list. The stack has only one function as follows push\_stk: Inserts a new element (type: int) at the top of the stack, above its current top element. In the main function, initialize a stack, push three elements (1, 2, 3) and de-allocate (free) dynamic memory before the program exits. The program doesn't need to print anything.