**Homework 5: C-String Problem**

**Please do this homework at least three problems. Do more as a bonus.**

**(Problem 1 and problem 5 must be included)**

1. Please write a function to process the string s=”0123456789” and print the following output: (suggested problem)

(You should use the functions of the C-string only)

0123456789

1234567890

2345678901

3456789012

4567890123

5678901234

6789012345

7890123456

8901234567

9012345678

2. Please design a function to check whether the string parameter is a

palindrome or not?

A string is a palindrome if it reads forward and backward in the same way. For example, the words: “refer”, “madam” are palindrome.

Bonus(可以不作)

Moreover you can consider one sentence as the input example to check

whether this sentence is palindrome or not.

Case I: Use “character” as one unit.

Example: Was it a cat I saw? (delete all the space character)

Case II: Use “word” as one unit.

Example: Fall leaves as soon as leaves fall.

Case III: 中文sentence:

Example: 一二三來三二一

Case IV: Chinese and English mixed sentence中英文夾雜的句子

Dog 是不是 god ?

1. Please design a function to calculate the binary numbers addition:

Example:

101101110

+ 1011111

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111001101

1. Please design a function translate binary number into corresponding decimal number:

Example:  = 

5. Adding Large Integers: (suggested problem)

In C++, the largest int value is 2147483647. So an integer larger than this

number cannot be stored and processed as an integer. Similarly, if the sum

or product of two positive integers is greater than 2147483647, The result

will be incorrect. One way to store and manipulate large integers is to store

each individual digit of the number in an array.

Write a program that reads two positive integers of at most 40 digits and

prints the sum of the numbers. If the sum of the numbers has more than

40 digits, print the sum with an appropriate message.

4395490521770611790310760823760402

+ 256374183688815996882456477230188

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4651864705459427787193217300990590

Your program must, at least, contain a function to read and store a number

into an array and another function to print the sum of the numbers.

(Hint: Read numbers as strings and store the digits of the number in

the reverse order.)

1. Look and Say: (suggested problem)

The look and say sequence is defined as follows:

Start with any string of digits as the first element in the sequence. Each subsequence element is defined from the previous one by “verbally” describing the previous element. For example, the string 122344111 can be described as “one 1, two’s 2, on 3, two 4’s, three 1’s”. Therefore, the element that comes after 122344111 in the sequence is 1122132431. Similarly, the string 101 comes after 1111111111.

**Input**

The input consists of a number of cases. The first line gives the number of cases to follow. Each case consists of a line of up to 1000 digits.

**Output**

For each test case, print the string that follows the given string

**Sample Input**

3

122344 111

11111111111

12345

**Sample Output**

1122132431

111

1112131415

7. A Universal Product Code (UPC) barcode consists of 12 digits. The last digit is a check digit used for error detection. To calculate its value, we use the first 11 digits, as follows:

a. Add the digits in the odd positions and multiply the result by three.

b. Add the digits in the even positions to the previous result.

c. Divide the result with 10. Subtract the remainder from 10, and that is the

check digit. If the Subtraction gives 10(meaning that the remainder is 0),

use 0 as check digit.

For example, the check digit for the barcode 12345678901 is calculated as follows:

1. 1+3+5+7+9+1=26. Multiplied by 3 gives 26\*3=78.
2. 2+4+6+8+0=20. Added to the previous result gives 98
3. Check digit = 10 – (98 % 10) = 10 – 8 = 2

Write a program that reads a UPC and verifies if the check digit is correct.

The program should force the user to enter a valid UPC, meaning that the

length of the string should be 12 and it must contain digits only.

8. Please design a function, accept one string parameter with length smaller than 40 and the string parameter contains some space characters. Please rifies

(a).Let the length of the string become 40 and

(b).Let both sides of the string all contain one word.

(c).The difference of blank numbers between each word is at most one.( 單字與單字間的空白字元數最多只能差一個)

Original string:

c\_language\_computer\_system\_data\_model\_\_\_

Reorganized string:

c\_\_language\_\_computer\_\_system\_data\_model

Hint on problem 1 :

1.使用字元陣列處理比較安全

2.可能使用下列函數:

strcat(s2,s1); //將s1全部合併給s2 (s2改變, s1不變)

strncat(s2,s1,i); // 將s1前面i個字元合併給s2 (s2改變, s1不變)

strchr(s1, ch);

strcpy(s2, s1); // 將s1全部copy給s2

strncpy(s2,s1,i); // 將s1前面i個字元copy給s2

e.x: char s1[6]="abcde”;

char s2[6]="wxyz";

strncat(s2,s1,3); // 將s1前面3個字元合併給s2

puts(s2); // contents of s2: wxyzabc

e.x: char s1[6]=”abcde”;

char s2[6]=\0”;

strncpy(s2,s1,3); // 將s1前面3個字元copy給s2

puts(s2); // contents of s2: abc