2015/04/14

Program Design
First Mid-Test - 2014

int strcpy (char *a ; char* b)
int copytimes =0.
{ for (a[i] = b[i] != '\0' ; i++)
copytimes ++;

I. Matching: choose the correct meaning. (20%)

r 1. Zeroth element	t 2. Pointer-offset notation
j 3. Local variable	a 4. static
k 5. Scaling	n 6. Scope
q 7. Subscript	s 8. Off-by-one error
p 9. Rand	d 10. Header file
o 11. Pass-by-value	l 12. Divide-and-conquer
m 13. Null character	e 14. srand
h 15. Search key	i 16. Dereferencing operator
f 17. Function call	g 18. Pass-by-reference
b 19. &	c 20. sizeof operator

a) Signifies that a local variable retains its value after the function in which it was defined is exited.
b) Unary operator that returns the address of its operand.
c) Can be used to determine the size of an array in bytes.
d) Contains function prototypes and definitions of various data types.
e) Seeds the random-number generator.
f) Invokes a function.
g) Technique for reducing the range of values produced by function rand.
h) Value that the program attempts to find by searching.
i) *.
j) Known only in the function in which it is defined.
k) Passes a copy of an argument's value to a function.
l) Technique for constructing a program from smaller, more manageable pieces.
m) String termination character.
n) The portion of a program in which an identifier may be referenced.
o) Provides a called function with the ability to access the caller's data directly.
p) Generates and returns a pseudo-random number.
q) Refers to a particular location or element in an array.
r) First element in an array.
s) Discrepancy between "ith element of the array" and "array element i."
t) ptr + 3 (ptr is a pointer).

II. A **palindrome** is a word, phrase, number, or other sequence of characters which reads the same backward or forward. Famous examples include "Amor, Roma", "stack cats", and "step on no pets". Please complete a recursive function **reverse**, an iterative function **reversei,** and a pointer-based iterative function **reverseptr** that all print a **palindrome** string backward, i.e. from the end to the beginning of a string. Please also write three example call, use any of the strings above, of the three functions. (30%)

III. A pointer array is declared as follows: (total 30%)

```
char *array[3]= { "pointer based", "array is ", "a
troublesome data structure" };
```

a) please draw a diagram to show the array. (5 %)
b) what is the result of each following ***output*** expression. (10 %)

```
int char *aPtr = array[2];
cout << *( aPtr + 2 ) << '\n';
cout << aPtr[2] << '\n';

aPtr = array[0]+1;
cout << *aPtr << '\n';
aPtr+=1;
cout << *(aPtr++) << '\n';
cout << aPtr[2]  << '\n';
```

return copytimes
else
return 1

c) Please rewrite the following function into a **pointer-based** version with pointer arithmetic. (10 %)

```
void strcpy(char s[], char t[])
{
 int i;
 for ( i = 0; (s[i] = t[i])!='\0'; i++) ;
}
```

d) Please your version of **strcpy** to copy the first element to the last element of the **array**. Just write how to call the function with correct parameters. (5%)

IV. Create a class called **Date** that includes three pieces of information as data members—a month (type int), a day (type int) and a year (type int). The class should have a constructor with no parameters that initialize the data members to date 1900/01/01. Provide a member function setDate with three parameters to set month, day and year. Assume the values provided for the year and day are correct, but ensure that the month value is in the range 1–12; if it isn't, set the month to 1. Provide a member function displayDate that displays the month, day and year separated by forward slashes (/), such as 03/27/2012. (20%)

NOTE: The new exercise is 7.16 maze traversal. Due in two weeks.

隨機應變比天才吃香！
愛因斯坦常常到處演講，於是就請了一個司機。
普通的司機通常都在車上休息， 不過，這個司機很有好學之心，
愛因斯坦在講課，他就在下面聽。

過了半年以後，有一天，司機跟愛因斯坦說： 你講的那一套，我都學會了。
愛因斯坦大笑說：「我講的那些都是很專業的，你怎麼學得會？
不然，你說給我聽看看。」

司機就從頭到尾講了一遍給愛因斯坦聽，
講的很好。 愛因斯坦心想：我這麼久才想出來的理論，
你開了半年車，就都給我學去了。愛因斯坦心理很不平衡，於是就說：
「 好，那改天你穿我的衣服上台去演講，
我穿你的衣服在下面當司機，這樣你敢不敢？」
司機就說：「好呀！試試看。」

於是，有一天司機就穿愛因斯坦的衣服上台去演講，
從頭到尾講了一遍，講得很好，聽眾在台下一直鼓掌，
然後，就有一個觀眾問了一個很深入、很專業的問題。
愛因斯坦心想： 呵呵！這下子司機下不了台了。
沒想到司機說：

「你這個問題太簡單了，為了證明它有多簡單，
我叫我的司機給你回答就好了。」