

CTEC1335/2008F Computer Programming I Quiz #2

ANSWERS

1. Describe the difference in the meaning of `int a[5]`; and the meaning of `a[4]`.
What is the meaning of the `[5]` and `[4]` in each case?

[2 marks]

The `[5]` is the number of elements in the array;

the `[4]` is the fifth (5th and last) element of the array.

2. What is the output of the following code?

```
char symbol [ 3 ] = { 'a', 'b', 'c' } ;  
for ( int index = 0 ; index < 3 ; index++ )  
{  
    cout << symbol [ index ] ;  
}
```

Output: **abc**

3. (a) What is wrong with the following piece of code?

```
int sampleArray [ 10 ] ;  
for ( int index = 1 ; index <= 10 ; index++ )  
{  
    sampleArray[ index ] = 3 * index ;  
}
```

The final value for `index` is 10, which overflows the ten element array by trying to access the eleventh element, which may or may not actually cause a problem (*depends on the rest of the program.*)

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- (b) Suggest one correction (*there are several possible answers here*).

```
for ( int index = 0 ; index < 10 ; index++ )  
{  
    sampleArray[ index ] = 3 * ( index + 1 ) ;  
}
```

OR

```
for ( int index = 1 ; index <= 10 ; index++ )  
{  
    sampleArray[ index - 1 ] = 3 * index ;  
}
```

OR

```
sampleArray[ 0 ] = 0 ;  
for ( int index = 1 ; index <= 10 ; index++ )  
{  
    if ( index < 10 )  
    {  
        sampleArray[ index ] = 3 * index + 3 ;  
    }  
}
```

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4. Suppose you have the following array declaration in your program:

```
int yourArray [ 6 ] ;
```

Assume that variables of type **int** use four bytes of memory.

(a) When you run your program, how much memory with this array consume?

4 bytes per int x 6 ints in array = 24 bytes

(b) Suppose that, when you run your program, the system assigns the memory address 1000 to the indexed variable **yourArray[0]**. What will be the address of the ***fifth*** element of the array?

[2 marks]

The fifth element is yourArray[4], so

$$1000 + 4 \times 4 = 1016$$

Memory map:

1000	1001	1002	1003	yourArray[0]	(1st element)
1004	1005	1006	1007	yourArray[1]	(2nd element)
1008	1009	1010	1011	yourArray[2]	(3rd element)
1012	1013	1014	1015	yourArray[3]	(4th element)
1016	1017	1018	1019	yourArray[4]	(5th element)
1020	1021	1022	1023	yourArray[5]	(6th element)

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5. Consider the following function definition:

```
void tripler( int & n )
{
    n = 3 * n ;
}
```

Which of the following are acceptable function calls? *Check all that apply: 1 mark each, 1 mark penalty for each wrong choice.*

```
int a [ 3 ] = { 4, 5, 6 } ;
int number = 2 ;
```

- tripler(a[3]) ; ***2 is the last valid index***
- tripler(a[2]) ; ***index in range (passes the 6, which is tripled to 18)***
- tripler(1) ; ***reference not allowed to literal (which is considered const)***
- tripler(a) ; ***can't pass the whole array!***
- tripler(a[number]) ; ***index in range (passes the 6, which is tripled to 18)***
- tripler(number) ; ***passes the 2, which is tripled to 6***

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6. Complete the function called **oneMore**, which has a formal parameter for an array of integers and increases the value of each array element by one. Add any other formal parameters that are needed. For example, if I have an array, arr:

```
int arr [ 5 ] = { 1, 2, 3, 4, 5 } ;
```

and I call **oneMore** and pass arr to it, then after the call the array elements will be

```
{ 2, 3, 4, 5, 6 }
```

[5 marks]

```
void
oneMore
(
    int arr [ ],          // array to modify (in-out)
    const int n          // number of elements in arr
                        // (read-only input)
)
{
    for ( int i = 0 ; i < n ; i++ )
    {
        arr[ i ]++ ;    // arr[ i ] = arr[ i ] + 1 ;
                        // or arr[ i ] += 1
    }
}
```

7. Write code that asks the user to enter a list of words, which are to be stored in an array. The program is to **stop accepting words when the array is full or when the user enters a blank line**, whichever comes first. Next, find the longest word in the list, and display it. For example:

```
Enter a word, or simply press Enter to stop:   apple
Enter a word, or simply press Enter to stop:   pear
Enter a word, or simply press Enter to stop:   peach
Enter a word, or simply press Enter to stop:   banana
Enter a word, or simply press Enter to stop:
```

The longest word is 'banana'.

[4 marks]

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You don't have to write `#include`'s or functions, just variable declarations and code.

```
const int MAX = 10 ;           // array of 10 words max.

string list [ MAX ] ;
string word ;                  // current word
int count = 0 ;                // number of words entered
```

Assume that there is a function which returns the longest word from the array:

```
string find_longest_word( const string arr [ MAX ] ) ;

do
{
    cout << "Enter a word, or simply press Enter to stop: " ;
    word.clear( ) ;        // erase previous word, if any
    getline( cin, word ) ;

    if ( word.empty( ) )
    {
        break ;
    }

    list[ count ] = word ;

    count++ ;
}
while ( count < MAX ) ;

cout << "The longest word is '"
    << find_longest_word( list ) << "'."
    << endl ;
```