



Dept. of Computer Engineering  
Final Exam, First Semester: 2013/2014

Course Title: Programming Language	Date: 30/1/2014
Course No: (630263)	Time Allowed: 2 hours
Instructors: Dr. Ali Khawaldeh, Eng. Anis Nazer, Eng. Sultan Rushdan	No. of Pages: 5

Please Choose your section:

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Lecture time:  10:10 ح ث خ  13:10 ح ث خ  11:15 ن ر  14:15 ن ر

**Question 1:** (6 points)

Indicate whether the following statements are true or false

Statement	True/False
The variables <code>firstName</code> and <code>FirstName</code> are the same	False
The condition <code>(a &lt; 60)</code> is the same as the condition <code>!(a &gt;= 60)</code>	True
Suppose <code>x = 5</code> . After executing the statement <code>y = x++</code> ; the value of <code>y</code> is 6 and <code>x</code> is 6.	False
A function that changes the value of a reference parameter also changes the value of the actual parameter.	True
Every C++ program has a function called <code>main</code> .	True
Arrays passed as parameters to a function are passed by reference.	True

**Question 2:** (5 points)

Identify the errors (syntax or logical) in the following code segments and correct them

	Wrong Code	Error	Correct code
a)	<pre>int c; do {     c = c + 1;     cout &lt;&lt; "hello"; } while ( c &lt; 10 );</pre>	c is not initialized	<pre>int c=1;</pre>
b)	<pre>int r,c; int sun[3][2] = { {1,2,3},{4,5,6} }; for (r=0; r&lt;3; r++) {     for(c=0; c&lt;2 ; c++)     {         cout &lt;&lt; sun[r][c] &lt;&lt; " ";     }     cout &lt;&lt; endl; }</pre>	wrong initialization of a 2D array	<pre>int sun[3][2] = {{1,2},{3,4}, {5,6}};</pre>
c)	<pre>int cars[5]; for (int i=5; i &gt;= 0; i--) {     cin &gt;&gt; cars[i]; }</pre>	accessing an array element outside the array	<pre>for (int i=4; i &gt;= 0; i--)</pre>
d)	<pre>void triple( double a) {     cout &lt;&lt; a &lt;&lt; " * 3 ";     return 3*a; }</pre>	returning a value for a void function	<pre>int triple( double a)</pre>
e)	<pre>int a=2; while ( a &lt; 5 );     cout &lt;&lt; a++;</pre>	infinite loop	<pre>while ( a &lt; 5 )     cout &lt;&lt; a++;</pre>

**Question 3:****(5 points)**

Write C++ statement(s) to perform the following:

	Task	Code
a)	Store your first name in an array	<code>char S[5] = {'A', 'N', 'I', 'S' };</code>
b)	exchange the contents of variables a and b	<code>t = a; a = b; b = t;</code>
c)	store the following numbers in an array using a loop: 2 , 4 , 8 , 16 , 32 , 64 , 128 , 256 , 512	<code>for (i = 0; i &lt; 8; i++)     cout &lt;&lt; pow(2, i+1) &lt;&lt; endl;</code>
d)	prototype of a function that takes two integers and returns nothing	<code>void func(int x, int y);</code>
e)	rewrite the code using a <u>single</u> if statement <code>if( i &lt; 20)     if(x == 5)         if( y != 0)             cout&lt;&lt;"Help";</code>	<code>if ( i&lt;20 &amp;&amp; x==5 &amp;&amp; y != 0 )     cout &lt;&lt; "help";</code>

**Question 4:****(4 points)**

Consider the following program to answer the questions below (assume all required libraries are included):

```
int main()
{
    int num1;
    int num2;
    cout << "Enter two integers: ";
    cin >> num1 >> num2;
    cout << endl;
    if (num1 != 0 && num2 != 0)
        cout << sqrt(num1 + num2) << endl;
    else if (num2 != 0)
        cout << pow(num2, num1) << endl;
    else if (num1 != 0)
        cout << num1 << endl;
    else
        cout << 0 << endl;
    return 0;
}
```

a) What is the output if the user enters 12 , 4 ?

4

b) what is the output if the user enters 3 , 0 ?

3

c) what is the output if the user enters 0, 49 ?

1

d) what should be the input for the program to display 0 ?

0, 0

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**Question 5:****(10 points)**

what is the output of the following code segments?

	Code	Output
a)	<pre>cout &lt;&lt; ( (3 + 4) * 2 + 15 / 3 );</pre>	19
b)	<pre>int a=0, s=0; do {     if ( a % 5 == 1)         s +=a;     else         s--;     a+=3; } while(s &lt;= 11); cout &lt;&lt; s ;</pre>	21
c)	<pre>int x = 1 , s = 0; while ( x &lt;= 45 ) {     s += 3;     x++; } cout &lt;&lt; s;</pre>	135
d)	<pre>void A(); int c = 13; int main() {     A();     A();     c = c * 2;     cout &lt;&lt; c &lt;&lt;endl;     return 0; } void A() { c = c + 2; }</pre>	34
e)	<pre>char c = 'd'; switch( c ) {     case 'c' : cout &lt;&lt; 'a';     case 'd' : cout &lt;&lt; 'b';     case 'e' : cout &lt;&lt; 'c'; }</pre>	bc
f)	<pre>int temp[5]; for (int i = 0; i &lt; 5; i++) { temp[i] = 2 * i - 3; } temp[0] = temp[4]; temp[4] = temp[1]; temp[2] = temp[3] + temp[0]; for (int i = 0; i &lt; 5; i++) { cout &lt;&lt; temp[i] &lt;&lt; " "; } cout &lt;&lt; endl;</pre>	5 -1 8 3 -1
g)	<pre>int AR[4][7] , r, c; for ( r = 0; r &lt; 4 ; r++) {     for ( c = 0 ; c &lt; 7 ; c++ )         AR[r][c] = r + c + 1; } cout &lt;&lt; AR[2][5];</pre>	8
h)	<pre>int done( int x ) {     return 3*x; } int gone( int x ) {     return 2*done(x+1); } int main() {     cout &lt;&lt; gone(5);     return 0; }</pre>	36
i)	<pre>int soa( int b[], int size ) {     if ( size == 1 )         return b[ 0 ];     else         return b[ size - 1 ] + soa( b, size - 1 ); } int main() {     int a[ 6 ] = { 1, 2, 3, 4, 5, 6 };     cout &lt;&lt; soa( a, 6 );     return 0; }</pre>	21

j)	<pre>int t = 0 , i = 0; int S[10] = { -1, 2, 8, -3, -5, 7, 3, 4, -2, 6}; for ( i = 1; i &lt; 9 ; i+=2 )     t += S[i]; cout &lt;&lt; t;</pre>	10
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**Question 6:**

**(4 points)**

Write a **function** that takes three parameters:

- 1) an array of integers,
- 2) the size of the array,
- 3) an integer value.

The function returns the number of times the value is found in the array.

```
int count( int A[] , int size, int key)
{
    int i, c=0;
    for ( i = 0 ; i < size ; i++ )
    {
        if ( i == key )
        {
            c++;
        }
    }
    return c;
}
```

**Question 7:****(6 points)**Write a **single** program that:

- reads 16 **positive** numbers and stores them in a 4x4 array, in case the user enters a negative number, display an error message and read the value again.
- displays the average of the odd numbers in the array.
- displays the main diagonal elements in the array

```
int main()
{
    int r, c, N;
    int A[4][4];

    // read 16 positive integers
    cout << "Enter 16 positive integers please: " << endl;
    for ( r = 0; r < 4 ; r++ )
    {
        for ( c = 0; c < 4 ; c++ )
        {
            cin >> A[r][c];
            if ( A[r][c] < 0 )
            {
                cout << "The number should be positive." << endl;
                c--;
            }
        }
    }

    // sum the odd numbers
    int sum=0, count=0;
    for ( r = 0; r < 4 ; r++ )
    {
        for ( c = 0; c < 4 ; c++ )
        {
            if ( A[r][c] % 2 == 1 )
            {
                sum += A[r][c];
                count++;
            }
        }
    }

    cout << "Average of odd numbers = " << (double)sum / count << endl;

    // display the main diagonal
    cout <<"Elements on the main diagonal: " << endl;
    for ( r = 0; r < 4 ; r++ )
        cout << A[r][r] << endl;

    return 0;
}
```