

**Instructions:** this exam is open book and open notes. The University honor code applies. To receive credit for the exam, you must sign the honor pledge at the end of the exam.

1. (15 pts) Change the following code fragment so that it uses a ``while" instead of a ``for" loop.

```
for ( k=10; k<15; k++ )
{
    if ( k <= 12 )
        cout << "twice k = " << 2*k << endl << endl;
    else
        cout << "k = " << k << endl;
}
```

```
k = 10;
while( k < 15)
{
    if ( k<= 12)
        cout << "twice k = " << 2*k << endl << endl;
    else
        cout << "k = " << k << endl;
    k++;
}
```

What is the output from this code fragment?

```
twice k = 20
twice k = 22
twice k = 24
k = 13
k = 14
```

2. (10 pts) Write a simple C++ program that creates a text file called "problem2.txt" and writes the contents of an integer array "Numbers" into it, each value on a separate line. The array should contain the integers 1 through 25. Your program must contain at least 2 for loops.

```
#include <fstream.h>
void main()
{
    int i;
    fstream Outfile;
    int Numbers[25];

    for ( i=0; i < 25; i++)
        Numbers[i] = i+1;

    Outfile.open( "problem2.txt", os:: out );
    for ( i = 0; i<25; i++)
        Outfile << Numbers[i] << endl;
}
```

3. (10 pts) What is the output of the following code fragment?

```
for( i=3; i<10; i++ )
{
    if ( i == 4 )
        i += 5;
    for( j=4; j>0; j-- )
    {
        cout << j*i << " ";
    }
    cout << endl;
}
```

|

12 9 6 3  
36 27 18 9

4. (20 pts) Answer True/False for each of the following:

- f a) Every valid C++ program must contain the line "void main()"
- f b) Every valid C++ program must contain the line "#include <iostream.h>"
- f c) The value of the C++ expression 5/2 is 2.5.
- t d) The value of the C++ expression pow(2,2) is 4.
- f e) Use of a "while" loop usually indicates that you know how many times the loop will repeat when the loop starts.
- f f) "=" is used in C++ to compare the values of two numbers, as in "if ( a=b )"
- t g) In C++, "!" is the "not" operator.
- t h) ^c can be used to stop an executing program.
- t i) If a C++ program uses the log function, it must include math.h.
- f j) If a C++ program uses setw, it must include iostream.h.

5. (15 pts) Assume the integer variable "a" contains the value 100 and the variable "b" contains 30. Assume "Cint" is an integer and "Cfloat" is a real. Show the output generated by each of the following statements.

a. cout << "The sum of " << a << " and " << b " is " << a+b << endl;

*syntax error, need "<<" after " << b " and before " is "*

b. Cint = a/b;  
cout << (Cint + 10)/2 << endl;

6

c. Cfloat = a/b;  
cout << (Cfloat + 10)/2 << endl;

6.5

d. cout << "The sum of " << setw( 5) << a << " and " << setw(5) << b << " is " << setw( 4) << a+b << endl;

*The sum of 100 and 30 is 130*

e. Cfloat = 1.5;  
cout << floor( Cfloat ) << " " << ceil( Cfloat ) << endl;

1 2

6. (20 pts) Write a C++ program that reads all of the numbers in the file "problem6.txt" into an array, then goes through the array and prints any value that is less than 0. Your program must have two for loops. You may assume the file contains fewer than 500 numbers and contains doubles.

```
#include <fstream.h>
#include <iostream.h>

void main()
{
    double Numbers[500];
    int i, inct;
    fstream Input;
    Input.open( "problem6.txt", ios::in );
    for ( inct=-1; Input>>Numbers[inct]; inct++ )
        ;
    for ( i=0; i < inct; i++ )
        if (Number[i]<0)
            cout << Number[i] << endl;
}
```

7. (10 pts) Correct the likely typing errors in the following C++ program.

<pre>// This is question 7 on the exam.     I hope I find all of the mistakes.  vioid main  {     int sum; value; inct;      int i;      for ( i==0, i &lt;= 10, i++ )         cin &lt;&lt; value;         Sum += value         in ct ++      cout &gt;&gt; The average is &gt;&gt; Sum/inct &gt;&gt; endl;  }</pre>	<pre>// This is question 7 on the exam.     I hope I find all of the mistakes. #include &lt;iostream.h&gt; void main()  {     int sum=0, value, inct=0;      int i;      for ( i=0; i &lt; 10; i++ )         {             cin &gt;&gt; value;             sum += value;             inct++;         }     cout &lt;&lt; "The average is " &lt;&lt; (float)sum/inct &lt;&lt;         endl;  }</pre>
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**Pledged:** I have neither given nor received help on this exam.

Signature: \_\_\_\_\_