

The University of Alabama in Huntsville
ECE Department
CPE 197 01
Spring 2001
Test III
March 15, 2001

1) (4 points) When the following code is executed, how many iterations of the loop are performed?

```
number = 2;  
done = false;  
while (!done)  
{  
    number = number + 2;  
    if (number > 20)  
        done = true;  
}
```

2) (6 points) a. What does the following loop print out? (number is of type int) b. By rearranging the order of the statements (don't change the way they are written), make the loop print the numbers from 1 through 10.

```
number = 1;  
while (number < 11)  
{  
    number++;  
    cout << number << endl;  
}
```

3) (12 points) Write a program segment that reads a file of student scores for a class (any size) and finds the class average. If any score falls outside of the range 0 – 100, do not average it in.

4) (12 points) What is the output of this nested loop structure?

```
i = 4;
while (i >= 1)
{
    j = 2;
    while (j >= 1)
    {
        cout << j << ' ';
        j--;
    }
    cout << i << endl;
    i--;
}
```

5) (3 points) Given the function heading

```
void QuickCheck (int& size,
                 float& length,
                 char initial)
```

indicate which parameters are value parameters and which are reference parameters.

6) (6 points) Identify the following items in the program fragment shown below.

```
void Test(int, int, int);

int main()
{
    int a;
    int b;
    int c;
    :
    :
    Test(a, c, b);
    Test(b, a, c);
    :
    :
}

void Test(int d,
          int e,
          int f)
{
    int g;
    int h;
    :
    :
}
```

- a. function prototype
- b. arguments
- c. local variables
- d. function definition
- e. parameters
- f. function call

7) (8 points) For the program in Exercise 8, fill in the blanks below with variable names to show the matching that takes place between the arguments and the parameters in each of the two calls to the Test function.

First call to Test		Second call to Test	
Parameter	Argument	Parameter	Argument
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____

8) (8 points) Show the output of the following program.

```
#include <iostream>

using namespace std;

void Test(int&, int);

int main()
{
    int d;
    int e;

    d = 12;
    e = 14;
    Test(d, e);
    cout << "In the main function after the first call, "
         << "the variables equal " << d << ' ' << e << endl;
    d = 15;
    e = 18;
    Test(e, d);
    cout << "In the main function after the second call, "
         << "the variables equal " << d << ' ' << e << endl;
    return 0;
}

void Test(int& s,
          int t)
{
    s = 3;
    s = s + 2;
    t = 4 + s;
    cout << "In function Test, the variables equal "
         << s << ' ' << t << endl;
}
```

9) (2 points) _____ (True or False) A C++ function must be declared before it can be used in a function call.

10) (2 points) _____ (True or False) Using a reference parameter, the value of a variable can be passed to a function and used for computation there without any modification of the caller's argument.

11) (2 points) _____ (True or False) A loop is a control structure that causes a statement or group of statements to be executed repeatedly.

12) (2 points) _____ (True or False) Loop test is the condition that causes a loop to be exited.

13) (2 points) _____ (True or False) A precondition is an assertion that should be true after a module has executed.

14) (8 points) Write the heading for a void function that corresponds to the following list.

Rocket Simulation Module

Incoming thrust (floating point)

Incoming/Outgoing weight (floating point)

Incoming timeStep (integer)

Incoming totalTime (integer)

Outgoing velocity (floating point)

Outgoing outOfFuel (Boolean)

Document the flow of each parameter with `/* in */`, `/* out */`, or `/* inout */`.

15) (12 points) Write a void function named `CountUpper` that counts the number of uppercase letters on one line of input. The function should return this number to the calling code in a parameter named `upCount`.

16) (6 points) Consider the following function definition.

```
void Rotate(/*inout*/ int& firstValue,
           /*inout*/ int& secondValue,
           /*inout*/ int& thirdValue)
{
    int temp;

    temp = firstValue;
    firstValue = secondValue;
    secondValue = thirdValue;
    thirdValue = temp;
}
```

Modify the function to perform the same sort of operation on four values.

17) (5 points) Number the marked statements in the following program to show the order in which they are executed (the logical order of execution).

```
#include <iostream>

using namespace std;

void DoThis(int&, int&);

int main()
{
    int number1;
    int number2;

    _____ cout << "Exercise ";
    _____ DoThis(number1, number2);
    _____ cout << number1 << ' ' << number2 << endl;
    return 0;
}

void DoThis(int& value1,
           int& value2)
{
    int value3;

    _____ cin >> value3 >> value1;
    _____ value2 = value1 + 10;
}
```