What is your name?: ______________________________(0 points)

There are two sections:
I. True / False 60 points; (60 questions, 1 point each)
II. Multiple Choice 40 points; (5 questions, 8 points each)

This test is worth 10% of your final grade. For all problems you must put your answers on the bubble form using a #2 pencil. This test is open book and open notes. You have 50 minutes.

I. True / False Section: (1 pt. each) Select the best answer to each problem below. Be careful - some are tricky.

- If the answer is True, fill in a on your answer form. If the answer is False, fill in b on your answer form.
- Several problems ask you to determine whether something is valid. Something is valid if it would not generate a compiler error and would execute without the program crashing.

T F 1. The UNIX indent program can be used to format your code.
T F 2. Compiling a program means to consolidate it, to make it smaller.
T F 3. Both C++ comments (//) and C-style comments (/* */ ) can be used in the same program.
T F 4. If a loop will always be executed at least once, a while loop is just as good as a do-while loop.
T F 5. A for loop can do anything that a while loop can do.
T F 6. A for loop can be used interchangeably with a while loop. It really comes down to user preference.
T F 7. A while loop is a good choice to use in processing menu options.
T F 8. Nested if-else statements are just as good as a switch statement when it comes to handling menu options.
T F 9. An if-else statement can always be rewritten as two if statements.
T F 10. The continue statement is used to exit the immediately enclosing loop, continuing on to the following code.
T F 11. The flushout statement is useful for debugging, sending the contents of the output buffer to the screen.

For questions 12 through 23 determine if each is a valid identifier.

T F 12. ThisOneIsTooLongToBeValid
T F 13. short one
T F 14. "in quotes"
For questions 24 through 36 assume that \textit{intNum} is an integer, \textit{realNum} is a real (floating point), and \textit{aChar} is a character, and there are no other variables declared. Determine if each is a valid assignment statement.

T F 24. \texttt{aChar} = '+1';
T F 25. \texttt{intNum} = (int)aChar;
T F 26. \texttt{intNum} = aChar;
T F 27. \texttt{intNum} = ++intNum;
T F 28. \texttt{intNum} += ++intNum;
T F 29. \texttt{realNum} = (float) (intNum - - - (int)aChar);
T F 30. \texttt{realNum} = (float) ( (int) 'A');
T F 31. \texttt{aChar} = (intNum < 0) ? '-' : '+';
T F 32. \texttt{aChar} = aChar + ('a' - 'A');
T F 33. '\texttt{aChar}' = (char)intNum;
T F 34. \texttt{aChar} = Z;
T F 35. \texttt{aChar} = 65;
T F 36. \texttt{intNum} + 2 = intNum;

For questions 37 through 48 determine if each is a valid statement or statements.

T F 37. \texttt{char c='A';}
     \hspace{1em} if ( c) printf(" Yes \n");
T F 38. \texttt{cout<<' Hey ...\n';}
T F 39. \texttt{printf<< ' Hey hey ...
';}
T F 40. \texttt{do { printf("Hey hey hey..."); } while ( 10%3 );}
T F 41. \texttt{int y=0;}
     \hspace{1em} for( ; y=1; scanf("%d", y) )
     \hspace{1em} printf("%d", y);
T F 42. \texttt{if ( (0 < x < 5)) printf(" Between 0 and 5");}
43. char pi;
   pi = '3.1415';

44. cout<< A tricky string here... << endl;

45. cout<<"Y"<<e"<<"s";

46. cout<< 'N' << 'o';

47. int z=0;
    for( z%=z; z=1; z+=1) ;

48. cout>>" Info. here";

49. The statement
    scanf( "%d" , &intValue1);
    has the same effect as the statement
    scanf("%d", &intValue1);

50. The statement
    scanf("%c", &charValue1);
    behaves no differently than the statement
    scanf(" %c", &charValue1);

51. To ensure a character stored in variable c is upper case, we could use the following:
    if( (c>='a') && (c<='z')) c -= 'a' - 'A';

52. The output of the program segment below is the text: Was not e!
    c = 'x';
    if ( c != 'e')
      cout<<"Was not e";
    else
      cout<<"No, ";
      cout<<"It is not";
      cout<<" ! ";

53. The output of the program segment below is the text: Was 1 to 3.
    int num = 3;
    switch ( num) {
      case 1:
      case 2:
      case 3: cout<<" Was 1 to 3\n";
      case 4: cout<<" Was 4\n";
      default: printf("Unknown");
    }
    cout<<".";
54. The output of the program segment below is the text: double.

```cpp
float menuOption = 2.0;
switch (menuOption) {
    case 1:  cout<<" single\n";  break;
    case 2:  cout<<" double\n";  break;
}
cout<<"."
```

55. The program given below needs to have #include <stdlib.h> near the top of the program in order to run.

```cpp
int main()
{
    int x;
    printf(" %d", x);
}
```

56. The output of the program segment below is the text: Was equal

```cpp
x = 0;
if ( x == 1)
    cout<<"Was equal"
else
    cout<<"Not equal ";
cout<<" *** ";
```

57. The output of the program segment below is the text: greater than Done

```cpp
x = 3;
if ( x <= 3)
    if ( x < 3)
        cout << "less than";
    else
        cout<<"greater than ";
cout<<"Done";
```

58. The output of the program segment below is the text: Start 4 Done.

```cpp
cout<< " Start ";
x = 4;
if ( (x <= 3) && (x = 5) )
    cout << x;
cout<< x;
cout<<" Done."
```

59. Decimal value -31 written as an 8-bit twos-complement negative number is 11100001.

60. The 8-bit two’s-complement representation of decimal value -31 (mentioned in the problem above) is the same as the decimal value 225 written as an 8-bit unsigned binary number.
II. Multiple Choice: (8 pts. each) For the following problems, select the best answer for each one and select the appropriate letter on your answer sheet. Be careful - more than one answer may seem to be correct. All of the following programs or program segments do compile and run.

61. Consider the program given below. Its output can best be described as:

```c
#include <iostream.h>
int main()
{
    int x;
    cout<<"Please enter an integer: ";
    cin>> x;
    while (x > 0) {
        cout<< x % 10;
        x /= 10;
    }
    cout<<"\n";
}
```

a) The input digits in reverse order
b) The remainder of the digits after dividing by 10
c) A tenth of the original input
d) The input divided by 10 as many times as there are input digits
e) None of the above

62. Consider the program given below. Its output can best be described as:

```c
#include <iostream.h>
main()
{
    int i, j;
    int w, x, y, z;
    cout<< "Please enter two integers: ";
    cin>> y >> x;
    z = y;
    for (i=1; i<x; i++) {
        w = z;
        for (j=1; j< y; j++)
            z += w;
    }
    if ( x == 0)
        cout<< 1 << "\n";
    else
        cout<< z << "\n";
}
```

a) The product of the two numbers
b) The absolute value of the product of the two numbers
c) The integer part of the first number divided by the second
d) The sum of the input numbers
e) None of the above
63. Consider the program given below. If its output is:

   2  4  6  8
   3  6  9  12

What was the input?

   a) 2 4 3
   b) 3 2 4
   c) 3 4 2
   d) 4 3 2
   e) None of the above

64. Consider the function given below. What does this function do?

   a) Display the digits of the parameter x in reverse order
   b) Determine if the digits of the parameter x are in non-increasing (decreasing or equal) order when read from left to right
   c) Determine if the digits of the parameter x are in increasing order when read from left to right
   d) Determine the rightmost digit of parameter x
   e) None of the above

   int f1( int x)
   {
      int y=0;
      while ( x > 0) {
         if ( (x%10) >= y) {
            y = x%10;
            x = x/10;
            continue;
         } else {
            return ( 1);
         }
      }
      return ( 0);
   }
65. Consider the program given below, which also uses function f1 shown in the previous problem. Input to the program is a 3 digit number. Its output is:

```c++
#include <iostream.h>

void swap( int &x, int &y)
{  // swap the values in x and y
    int temp;
    temp = x;
    x = y;
    y = temp;
}

int f1( int x)
{
    // As shown in above problem
    ...
}

int f2( int x, int y, int z)
{
    return (x * 100 + y * 10 + z * 1);
}

void main()
{
    int number;
    int x,y,z;
    cout<< "Enter a 3 digit number";
    cin>> number;
    x = number % 10;
    y = (number / 10) % 10;
    z = (number / 100) % 10;
    while ( f1( number) ) {
        swap( x, y);
        number = f2( x,y,z);
        if ( f1( number) ) {
            swap ( x, z);
            number = f2( x,y,z);
        }
    }
    cout<< "Result is: " << number;
    cout<< endl;
}
```

a) The input digits, but in reverse order  
b) The input digits, with the first and last digits in reverse order  
c) The input digits in sorted ascending (or equal) order  
d) The input digits in sorted descending (or equal) order  
e) None of the above