Exam II Instructions

You can use your notes for these codes.
Enter codes from class here (3 pts each): #1___________ #2___________ #3___________

General Instructions:
- Neatness counts!! If the machine cannot read your answer, you will receive no credit.
- This is a closed book/closed notes exam.
- No reference materials of any kind will be permitted.
- No calculators or other portable computing/data storage devices are permitted.
- Any C++ code segments that you write must be syntactically correct or you will lose points.

There is one part to this exam:

Part I  Bubble Sheet – True/False, Multiple Choice, Vocabulary, fill in the blank

Bubble Sheet Instructions:  (Part I)

1) Use a #2 pencil to complete the bubble sheet!
2) Print your name in the Name box as follows:

LASTNAME  FIRSTNAME  MIDDLEINITIAL

Example: Simpson  Homer  J

3) Use your #2 pencil to fill in the corresponding bubbles under each character of your name.
   (Bubble marking instructions are included on Side 2 of the bubble sheet.)

4) For the id number, enter in the following information (do not bubble in the numbers)
   a. For Monday/Wednesday class, enter 02
   b. For Tuesday/Thursday class, enter 01

5) Record your answers to the questions in Part I on Side 1 of the bubble sheet. Neatness Counts!!

Warnings:
- For Part I, answers not recorded on the bubble sheet will receive no credit!!
- Be wary of skipping problems!!
- I recommend that you answer each question in this section in the order presented.
  ➢ Make sure that the answer you record on the bubble sheet for question X corresponds to your selection for question X.
  ➢ You may lose a large number of points if you do not follow this advice!!
Part I  [150 points] – For each problem, select the best answer and record it on the bubble sheet!!

1) True or False? A while loop is executed one or more times?
   A) True       B) False

2) True or False? The state of an input stream can be tested for values of true or false?
   A) True       B) False

3) True or False? While loops can be nested (one loop inside of another loop)?
   A) True       B) False

4) True or False? A compile error occurs when if statements are nested more than six times?
   A) True       B) False

5) True or False? Local variables can be accessed outside of the block in which they are declared?
   A) True       B) False

6) In C++, a function definition cannot be nested within another function definition.
   A) True       B) False

7) Function names have global scope in C++.
   A) True       B) False

8) A switch statement must have at least one case label?
   A) True       B) False

9) The default label in a switch statement is optional?
   A) True       B) False

10) A ______________ loop is a loop that executes a specified number of times.
    A) While       B) Count-Controlled C) Looping       D) Event-Controlled E) None of These

11) A(n) ______________ loop is a loop that terminates when something happens inside the loop body to signal that the loop should be exited.
    A) Sequence       B) Selection C) Looping       D) Sub-program       E) None of These
12) ________________ is an assertion that must be true before a module begins executing.
   A) Postcondition  B) Logical Expression  C) Relational Expression
   D) Precondition  E) None of These

13) ________________ is an assertion that should be true after a module has executed.
   A) Postcondition  B) Logical Expression  C) Relational Expression
   D) Precondition  E) None of These

14) Which of the following is not an example of an Event-Controlled loop?
   A) Sentinel-Controlled  B) End-of-File-Controlled  C) Count-Controlled
   D) Flag-controlled  E) None of these

15) Which of the following is not a phase of loop execution?
   A) Loop Entry  B) Iteration  C) Loop Exit
   D) Loop Test  E) Loop Counter

16) A(n) ________________ counter is a variable that is incremented with each iteration of a loop.
    A) Iteration  B) Event  C) Static
    D) Expression  E) None of These

17) A(n) ________________ counter is a variable that is incremented each time a particular event occurs.
    A) Iteration  B) Event  C) Static
    D) Expression  E) None of These

18) A(n) ________________ is a variable or expression listed in a call to a function.
    A) Function Call  B) Reference  C) Parameter
    D) Argument  E) None of These

19) A(n) ________________ is a variable declared in a function heading.
    A) Function Call  B) Reference  C) Parameter
    D) Argument  E) None of These
20) A __________________ is a statement that transfers control to a function in C++.
   A) Function Call     B) Reference     C) Parameter
   D) Argument         E) None of These

21) A(n) __________________ is a function that does not return a function value to its caller and is
    invoked as a complete, stand-alone statement.
   A) Value-returning function     B) Main Function     C) Subprogram
   D) Void Function                E) None of these

22) A(n) __________________ parameter is a parameter that receives a copy of the value of the
    corresponding argument.
   A) Function     B) Value     C) Variable
   D) Reference     E) None of these

23) A(n) __________________ parameter is a parameter that receives the location (memory
    address) of the caller's argument.
   A) Function     B) Value     C) Variable
   D) Reference     E) None of these

24) __________________ is the region of program code where it is legal to reference (use) an
    identifier.
   A) Scope     B) Non-Local Identifier     C) Name Precedence
   D) Local Identifier     E) None of these

25) __________________ is the precedence that a local identifier in a function has over a global
    identifier with the same name.
   A) Scope     B) Non-Local Identifier     C) Name Precedence
   D) Local Identifier     E) None of these

26) With respect to a given block, a ______________ is any identifier declared outside that block.
   A) Scope     B) Non-Local Identifier     C) Name Precedence
   D) Local Identifier     E) None of these
27) ______________ is the period of time during a program execution when an identifier has memory allocated to it.
   A) Execution period          B) Static Variable          C) Local Variable
   D) Automatic Variable        E) Lifetime

28) A __________________ is a variable for which memory remains allocated throughout the execution of the entire program.
   A) Execution period          B) Static Variable          C) Local Variable
   D) Automatic Variable        E) Lifetime

29) Which of the following code segments correctly declares and initializes the Boolean variable named validData with the value true?
   A) boolean  validData;
       validData = true;
   B) bool  validData;
       validData = “true”;
   C) bool  validData = true;
   D) A and C only
   E) B and C only

30) Assume that the Boolean variable X has the value false and that the Boolean variable Y has the value true. What is the value of the following expression?
   (Y && (X || !X))
   A) true       B) false       C) “true”       D) “false”       E) None of the above

31) Assume that the Boolean variables X and Y both have the value true. What is the value of the following expression?
   ( !(X || !Y) && ( X && (Y || !Y)) ) || X
   A) “true”       B) “false”       C) true       D) false       E) None of the above
32) How many times does the body of the following WHILE loop execute?  
(All variables are of type int)

```cpp
sum = 0;
count = 0;
while (count <= 10)
{
    cin >> number;
    sum = sum + number;
    count = count + 1;
}
```

A) 9  B) 10  C) 11  D) 12  E) None of the above

33) What is the output of the following code segment if score has a value of 85.  (All variables are of data type int)

```cpp
if (score > 90)
    score = score –5;
if (score > 80)
    score = score –5;
if (score > 70)
    score = score – 5;
cout << score << endl;
```

A) 85  B) 80  C) 75  D) 70  E) None of These

34) What is the output of the following code segment if score has a value of 85.  (All variables are of data type int)

```cpp
if(score >90)
    score = score –5;
if (score > 80)
    score = score – 5;
else
    score = score +3;
```

A) 88  B) 83  C) 85  D) 80  E) None of These

35) What is the output of the following code segment if score has a value of 95.  (All variables are of data type int)

```cpp
if(score >90)
    score = score –5;
if (score > 80)
    score = score – 5;
else
    score = score +3;
```

A) 88  B) 83  C) 85  D) 80  E) None of These
36) How many times does the body of the following WHILE loop execute? (All variables are of type int)

```
count = 0;
while ( !(count == 3) )
{
    cout << count << endl;
    count++;
}
```

A) 3  D) 6
B) 4  E) None of the above
C) 5

37) How many times does the body of the following WHILE loop execute?
   (All variables are of type int)

```
sum = 0;
count = 1;
while (count > 10)
{
    cin >> number;
    sum = sum + number;
    count = count + 1;
}
```

A) 9  B) 10  C) 11  D) 12  E) None of the above

38) What is the output for the following segment of code, if the numbers entered are 1 3 5 7 9?
   Assume all variables are declared as integers.

```
sum = 0;
cin >> number;
do
{
    sum = sum + number;
    number++;
} while (number < 5);
cout << sum;
```

A) 4  B) 8  C) 9  D) 10  E) None of These

39) What is the output for the following segment of code, if the numbers entered are 1 3 5 7 9?
   Assume all variables are declared as integers.

```
sum = 0;
cin >> number;
do
{
    cin >> number;
    sum = sum + number;
} while (number <= 5);
cout << sum;
```

A) 4  B) 8  C) 9  D) 10  E) None of These
40) What is the output for the following segment of code? Assume all variables are declared as integers.

```c++
sum = 0;
for (j = 0; j < 5; j++)
    sum += j;
cout << j;
```

A) 0   B) 5   C) 10   D) 15   E) Nothing, it is an infinite loop

41) What is the output for the following segment of code? Assume all variables are declared as integers.

```c++
sum = 10;
for (j = 0; j < 5; j++)
    sum += j;
cout << sum;
```

A) 0   B) 5   C) 10   D) 15   E) Nothing, it is an infinite loop

42) What is the output for the following segment of code? Assume all variables are declared as integers.

```c++
sum = 0;
for (j = 1 ; j < 7; j++)
{
    if ( j%3 == 0 )
        continue;
    else
        sum = sum + j;
}
cout << sum;
```

A) 12   B) 21   C) 0   D) 3   E) None of These

43) What is the output for the following segment of code? Assume all variables are declared as integers.

```c++
sum = 0;
for (j = 1 ; j < 7; j++)
{
    if ( j%3 == 0 )
        break;
    else
        sum = sum + j;
}
cout << sum;
```

A) 12   B) 21   C) 0   D) 3   E) None of These
44) What is the output for the following segment of code? Assume all variables are declared as integers.

```cpp
sum = 0;
for (j = 1 ; j <5; j++)
{
    if ( j = 3 )
        sum = 0;
    else
        sum = sum +j;
}
cout << sum;
```

A) 10  B) 15  C) 0  D) 4  E) Nothing, it is an infinite loop

45) For the program listed below, what output is printed to the standard output device?

```cpp
#include <iostream>   void SomeFunc( float c )
using namespace std;  {
    float b;
    b = 2.3;
    cout << “a=” << a << “b=” << b << “c=” << c;
}
int main()
{
    a = 2;
    b = 4;
    c = 6;
    SomeFunc(42.8);
    return 0;
}
```

A) a=17 b=16 c=15  B) a=17 b=2.3 c=15  C) a=17 b=2.3 c=6  D) a=17 b=2.3 c=42.8  E) None of the above

46) The `void` function named `GetNums` has two parameters:

- a pass-by-value parameter named `x` of type `float`
- a pass-by-reference parameter named `num` of type `int`.

Which of the following choices is a valid `function heading` for the function `GetNums`?

A) `void GetNums( float , int&)`  
B) `void GetNums( float x , int num )`  
C) `void GetNums( float x , int& num )`  
D) both A and C  
E) none of the above
47) The void function named GetNums has two parameters:

   a pass-by-value parameter named x of type float
   a pass-by-reference parameter named num of type int.

Which of the following choices is a valid function prototype for the function GetNums?

A) void GetNums( float , int& );
B) void GetNums( float x , int num );
C) void GetNums( float x , int& num );
D) both A and C
E) none of the above

48) A function SomeFunc has two parameters, alpha and beta, of type int. The data flow for alpha is one-way, out of the function. The data flow for beta is two-way, into and out of the function. What is the most appropriate function heading for SomeFunc?

A) void SomeFunc( int alpha, int beta )
B) void SomeFunc( int& alpha, int beta )
C) void SomeFunc( int& alpha, int& beta )
D) void SomeFunc( int alpha, int& beta )
E) None of the above

49) Which of the following is not a logical operator in C++?

A) AND    B) OR     C) NOT     D) ==     E) All of them

50) Which of the following is not a relational operator in C++?

A) <      B) >=     C) !=     D) =      E) >

51) Assuming that T stands for true and F stands for false, the following truth table describes the behavior of which C++ operator? The answer takes the place of the shaded block (□)

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>

A) (X && Y)   B) (X || Y)   C) ! (X || Y)   D) ! (X && Y)   E) None of the above
52) Assuming that \( T \) stands for true and \( F \) stands for false, the following truth table describes the behavior of which C++ operator? The answer takes the place of the shaded block (□)

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>

A) \((X && Y)\)  B) \((X || Y)\)  C) \(! (X || Y)\)  D) \(! (X && Y)\)  E) None of the above

53) Which of the following are logical operators in C++?

A) \&\&  B) ||  C) !  D) All of These  E) None of These

54) Assume that the Boolean variable \( X \) has the value false and that the Boolean variable \( Y \) has the value true. What is the value of the following expression?

\( Y || X && !X \)

A) true  B) false  C) “true”  D) “false”  E) None of the above

55) Assume that the Boolean variables \( X \) and \( Y \) both have the value false. What is the value of the following expression?

\( !(X || !Y) && ( !X && Y) || X \)

A) true  B) false  C) “true”  D) “false”  E) None of the above

56) Which of the following is not a valid logical expression?

A) An expression followed by a relational operator followed by an expression
B) A Boolean variable or constant
C) A logical expression followed by a logical operator followed by a logical expression
D) A and B are not valid logical expressions
E) A, B, and C are all valid logical expressions
Problems 57 – 59: a C++ value-returning function named *SumOfSquares* will sum the squares of the integers from 1 through N inclusive and return the integer sum via the function value (i.e. return value type int). (Preconditions: N assigned a value and N >= 1)

N will be an arbitrary value of type int supplied by the calling program via an argument.

57) Based on the description above, which of the following choices is the most appropriate function prototype for the function *SumOfSquares*?

A) void SumOfSquares(int, int);
B) void SumOfSquares(int&, int);
C) int SumOfSquares(int&);
D) int SumOfSquares(int);
E) None of the above

58) Based on the description above, which of the following choices is the most appropriate function call for the function *SumOfSquares*? (Assume all variables are integers and N has a value >= 1)

A) SumOfSquares(N);
B) SumOfSquares(N, 25);
C) sum = SumOfSquares(N, 25);
D) sum = SumOfSquares(N);
E) None of the above

59) Based on the description above, which of the following choices is the most appropriate function heading for the function *SumOfSquares*?

A) void SumOfSquares(int sum, int N);
B) void SumOfSquares(int& sum, int N)
C) int SumOfSquares(int N)
D) int SumOfSquares(int& N);
E) None of the above

60) What is the output of the following code segment if num has a value of 1? Assume all variables are integers.

```cpp
switch(num)
{
    case 1: cout << “a”;
    case 2: cout << “b”;
    break;
    case 3: cout << “c”;
    default: cout “end”;
}
```

A) ababcd B) abc C) ab D) a E) None of These
61) What is the output of the following code segment if value has a value of 2? Assume all variables are integers.

```c++
switch(num)
{
    case 1: cout << "a";
    case 2: cout << "b";
        break;
    case 3: cout << "c";
    default: cout "end";
}
```

A) ab       B) b       C) bcend       D) bc       E) None of These

62) What is the output of the following code segment if value has a value of 3? Assume all variables are integers.

```c++
switch(num)
{
    case 1: cout << "a";
    case 2: cout << "b";
    case 3: cout << "c";
    default: cout "end";
}
```

A) bcend       B) c       C) abcend       D) end       E) None of These
Problems 63-67  Complete the following function definition using the possible answers listed on the next page. The function does not return a function value.

```cpp
// function to open an input file
// This function prompts for and opens a file for input. It does not return a
// function value, and the user is continually prompted for a filename until a
// valid filename is entered or the sentinel -Quit is entered

63) Possible Answers: OpenInputFile(/* In/Out */ inputFile,
                          /* Out */ string& filename)
                        A) int    B) void    C) float    D) ifstream    E) None of the above

64) Possible Answers: OpenInputFile(/* In/Out */ inputFile,
                        A) ifstream&    B) ifstream    C) ofstream    D) ofstream&    E) None of the above

65) Possible Answers:
    if (filename "-Quit") // terminate program if user requests it
                        A) >=    B) !=    C) ==    D) =    E) None of These
```
66) Possible Answers:  

   // terminate the program
   A) return 1;   B) exit;   C) leave(1);   D) quit(1);   E) None of These

67) Possible Answers:  

   // loop until a valid input file is given
   A) inputFile   B) !inputFile   C) filename   D) !filename   E) None of These

Problems 68-75 Complete the following program and function definitions using the possible answers listed on the next page. This program consists of two functions. All temperatures entered are assumed to be integer values. Pick the most correct answer based on accepted programming practices.

```cpp
//******************************************************************
// Activity program
// This program inputs any number of INTEGER temperature values and, for
// each temperature, outputs an appropriate activity
//******************************************************************
#include <iostream>
using namespace std;

void GetTemp(/* out */ /*68*/); // obtains temperature and returns it
void PrintActivity(/* in */ /*69*/); // Prints activity based on temperature

int main()
{
    int temperature;    // The outside temperature
    // function call to obtain the temperature
    // While input stream is valid
    {   
        PrintActivity(temperature); // Print out activity for temperature
        // function call to obtain the next temperature
        // same as previous
    }
    return 0;
}

//******************************************************************
// Program continued on next page
```
void GetTemp( /* out */
);

// This function prompts for a temperature to be entered, reads
// the input value, checks to be sure it is in a valid temperature
// range, and echo-prints it

// Postcondition:
// User has been prompted for a temperature value (temp)
// && Error messages and additional prompts have been printed
// in response to invalid data
// && IF no valid data was encountered before EOF
// Value of temp is undefined
// ELSE
// -50 <= temp <= 130 && temp has been printed

{
    cin >> temp;
    while (cin &&
    { // While not EOF and
        cout << "Temperature must be"
        << " -50 through 130." << endl;
        cout << "Enter the outside temperature: ";
        cin >> temp;
    }
    if (cin) // If not EOF...
    
    cout << "The current outside temperature is "
    << temp << endl;
}

//******************************************************************
void PrintActivity( /* in */
);

// Given the value of temp, this function prints a message
// indicating an appropriate activity

{
    cout << "and the recommended activity is: ";
    cout << "swimming." << endl;
    else if (temp > 70)
        cout << "tennis." << endl;
    else if (temp > 32)
        cout << "golf." << endl;
    else if (temp > 0)
        cout << "skiing." << endl;
    else
        cout << "dancing." << endl;
}
68) Possible Answers:
   void GetTemp(/* out */ ___68____); // obtains temperature and returns it
   A) int     B) int&     C) string&     D) string     E) None of These

69) Possible Answers:
   void PrintActivity(/*in*/ ___69____); Prints activity based on temperature
   A) int     B) int&     C) string&     D) string     E) None of These

70) Possible Answers:
    ___70____ // function call to obtain the temperature
    A) temperature = GetTemp();     B) GetTemp(temperature&);
    C) GetTemp(temperature);     D) None of These

71) Possible Answers: while (___71____) // While input stream is valid
    A) InFile     B) cin     C) !InFile     D) !cin     E) None of These

72) Possible Answers:
    void GetTemp( /* out */ ___72____)
    A) int     B) int&     C) int& temp     D) int temp     E) None of These

73) Possible answers: (___73____) // temp is invalid...
    A) temp < -50 && temp > 130    B) temp > -50 && temp < 130    C) temp > -50 || temp < 130
    D) temp < -50 || temp > 130    E) None of These

74) Possible answers: void PrintActivity( /* in */ ___74____)
    A) int&     B) int     C) int temp     D) int& temp     E) None of These

75) Possible answers: ___75____ // start of an if-then-else-if structure
    A) else if (temp < 85)     B) if (temp < 85)     C) else if (temp > 85)
    D) if (temp > 85)     E) None of These