FORM 2 (Please put your name, section # (10am- 001/2pm-002, and form # on the scantron!!!!)

CS 161 Exam II:

True (A)/False(B) (2 pts each):

1. It is acceptable to have both call-by-value and call-by-reference parameters in the same function declaration. 
   - T

2. Using the [i] on a string variable does not check for illegal values of i. 
   - T

3. A string variable and a c-string are the same data type. 
   - F

4. The indexed elements (members) of an array must be integers. 
   - F

5. The locations of the various elements (members) in a dynamic 1-d array on the heap can be spread out all over the memory. 
   - F

6. In a function with call-by-reference parameters, the address of the actual arguments are passed to the function. 
   - T

7. When you have a function that expects an integer array, it should also expect the size of the array or the number of indexed elements (members) with valid data. 
   - F

8. The following function declaration guarantees the values in the array argument are not changed. 
   ```
   void function1(int array[], int numElements);
   ```
   - F

9. If a function is expecting a pass by reference parameter, you can pass an indexed element (member) from an array of the same base type to that function. 
   - T

10. The stack is used to control recursion. 
    - T

11. The following declares a c-string variable that will hold up to 10 letters entered by the user. 
    ```
    char str[10];
    ```
    - F

12. Default arguments can be located anywhere in the parameter list of a function. 
    - F

13. You cannot assign an array to a pointer variable. 
    - F

14. The size of static arrays must be declared at compile time. 
    - T

15. Dynamically created variables have no name. 
    - T

16. If p1 and p2 are both pointers that point somewhere in memory, the condition p1==p2 will be true if they point to the same place. 
    - T

17. Not all recursive definitions may be written iteratively. 
    - F
Multiple Choice (3 pts each)

18. Which of the following will print out the value in `str`?
   - `char str[30];
     cin >> str;
     a) cout << str;
     b) for(int i=0;i<30;i++)
          cout << str[i];
     c) int i=0;
          while(i<30 && str[i] != '\0')
             cout << str[i++];
     d) All of the above
     e) A and B
     f) A and C
     ![Code Output]

19. Overloaded functions must have:
   - a) Different parameter lists.
   - b) Different return types.
   - c) The same number of parameters.
   - d) The same number of default arguments.

20. If you want to read into a c-string, you must ensure that the user does not enter more characters than
   - a) The size of the c-string
   - b) The size of the c-string + 1
   - c) The size of the c-string -1
   - d) It doesn't matter.

21. What is wrong with the following code fragment?
     strcpy(str1,str2);
   - a) Nothing
   - b) str2 has white space in it
   - c) str1 does not have enough room
   - d) str2 does not have enough room

22. To declare a c-string and initialize it to the value of "phonebook",
   - a) char s1=phonebook;
   - b) char s1[10]="phonebook";
   - c) c-string phonebook;
   - d) char s1[10]=phonebook;

23. Which of the following correctly declares a dynamic array of strings?
   - a) p1 = new string(13);
   - b) p1 = new string[];
   - c) p1 = new string[13];
   - d) p1 = new stringArray(13);
24. What is the value of choice after the following statements?
```cpp
void getChoice(int &par_choice, int par_count);
int choice=-1, count=3;
getChoice(choice, count);
void getChoice(int &par_choice, int par_count) {
    if(par_count < 0)
        par_choice=0;
    else if(par_count == 0)
        par_choice=-1;
    else
        par_choice=99;
}
```

a) 3  
b) 0  
c) -1  
d) 99

25. What is the output of the following code fragment?
```cpp
int v1=2, v2=-1, *p1, *p2;
p1=&v1;
p2=&v2;
p2=p1;
cout << *p2 << endl;
```

a) 2  
b) -1  
c) -2  
d) 1

26. Given the declaration `int *p1;`, which of the following are legal statements?

a) `p1 = new int;`  
b) `*p1 = new int;`  
c) `p1 = new int[10];`  
d) All of the above  
e) A and C

27. Which of the following function declarations can be passed the following array?
```cpp
char myArray[6][8];
```

a) `void f1(char a[][8], int sizeOfFirst);`  
b) `void f1(char a[[8], int sizeOfFirst);`  
c) `void f1(char& a, int sizeOfFirst);`  
d) `void f1(char a[6][8], int sizeOfFirst);`  
e) B and D  
f) A and D
28. You should make a parameter a reference parameter if:
   a) You need the function to change the value of the argument passed to the function.
   b) You need to be able to change the value of the parameter in the function, but not the value of the argument.
   c) Always.
   d) If any of the other parameters are reference parameters.

29. The recursive definition of a Fibonacci Number is $F(n) = F(n-1) + F(n-2)$, where $F(0)=1$ and $F(1)=1$. What is the stopping case in a recursive function that implements this function?
   a) n=0
   b) n=1
   c) n=2
   d) A and B
   e) A and C
   f) A,B and C

30. What is the output of the following code fragment?
```cpp
int f1(int x, int y) {
    if(x<0 || y<0)
        return x-y;
    else
        return f1(x-1,y) + f1(x,y-1);
}
int main() {
    cout << f1(1,2) << endl;
    return 0;
}
```
   a) 0
   b) -1
   c) 5
   d) -5

31. What is wrong with the following code fragment?
```cpp
int *p1, *p2;
p1 = new int;
p2 = new int;
*p1=11;
*p2=0;
p2=p1;
cout << *p1 << " " << *p2 << endl;
delete p1;
delete p2;
```
   a) nothing
   b) p1 and p2 both have the same value, so the delete p2 will cause an error
   c) You have a memory leak.
   d) B and C
32. What are the valid indexes for the array shown below?
   int myArray[25];
   a) 0-25
   b) 0-24
   c) 1-25
   d) 1-24

33. The postcondition of a function
   a) determines how the function will complete its job.
   b) tells what must be true before the function executes.
   c) declares the function for the compiler.
   d) tells what will be true after the function executes

34. Which of the following statements correctly returns the memory of a dynamic array to the heap for reallocation?
   a) delete [] p1;
   b) delete p1[];
   c) delete *p1;
   d) delete p1;

35. If p1 is an integer pointer that is pointing to memory location 1001, and an integer takes 4 bytes, then (p1+3) evaluates to:
   a) 1004
   b) 1005
   c) 1013
   d) Unknown

36. Given an array of integers of size 5, how does the computer know where the 3rd indexed element is located?
   a) It adds 3 to the base address of the array
   b) It adds space for 3 integers to the base address of the array
   c) It remembers where all the indexed variables of the array are located.
   d) None of the above

37. Which of the following declares an array that can hold up to 3 rows of 5 columns of floats?
   a) int array[3][5];
   b) float array[5][3];
   c) float array[3][5];
   d) float array[3,5];

38. Three of the following expressions have the same value. Which of the following expressions has a value different from the others’?
   a) *&ptr
   b) &*ptr
   c) *ptr
   d) ptr
39. If the function \( \text{int volume( int x = 1, int y = 1, int z = 1 );} \) is called by the expression \( \text{volume(3);} \), how many default arguments are used?
   a) None.
   b) One.
   c) Two.
   d) Three.

Extra Credit

40. All of the following can cause a fatal execution-time error except:
   a) Dereferencing a pointer that has not been assigned to point to a specific address.
   b) Dereferencing a pointer that has not been initialized properly.
   c) Dereferencing a null pointer.
   d) Dereferencing a variable that is not a pointer.

41. What is the output of the following code fragment?
   \[
   \text{int f1(int n, int m) \{}
   \text{if(n < m)}
   \text{\quad return 0;}
   \text{else if(n==m)}
   \text{\quad return m+ f1(n-1,m);} \]
   \[
   \text{\quad else}
   \text{\quad return n+ f1(n-2,m-1);} \]
   \[
   \text{\}}
   \text{int main() \{}
   \text{\quad cout << f1(3,2);}
   \text{\quad return 0;}
   \text{\}}
   \]
   a) 0
   b) 2
   c) 4
   d) 8
   e) infinite recursion

42. Given the following declarations, which of the following is legal syntax?
   \[
   \text{string str="Your name";}
   \text{char c_string[20]="My name";}\]
   a) strcpy(str, c_string);
   b) c_string = str;
   c) strcpy(c_string, str.c_str());
   d) strcpy(c_string, str);
   e) B and C
43. Given the following declarations, which of the following is a legal call to this function?

\[
\begin{align*}
\text{int } \text{myFunction} (\text{int } \text{myValue}); \\
\text{int } \text{myArray}[1000];
\end{align*}
\]

a) \(\text{cout } \ll \text{myFunction(myArray)};\)

b) \(\text{cout } \ll \text{myFunction(myArray[0])};\)

c) \(\text{myArray} = \text{myFunction(myArray)};\)

d) A and C

44. Given the function definition

\[
\begin{align*}
\text{void } \text{something} (\text{int } \text{a}, \text{int } &\text{b}) \{ \\
\text{int } \text{c}; \\
\text{c} = \text{a} + 2; \\
\text{a} = \text{a} \times 3; \\
\text{b} = \text{c} + \text{a}; \\
\}
\end{align*}
\]

what is the output of the following code fragment that invokes something?

\[
\begin{align*}
\text{r} = 1; \\
\text{s} = 2; \\
\text{t} = 3; \\
\text{something}\left(\text{r}, \text{s}\right); \\
\text{cout } \ll \text{r} \ll \text{' '} \ll \text{s} \ll \text{' '} \ll \text{t} \ll \text{endl};
\end{align*}
\]

a) 1 14 3

b) 1 10 3

c) 5 14 3

d) 1 14 9

e) none of the above