ECE 2036 Test 1 Practice Problems

1. (*5%)* Fill in the typical size (per textbook and slides) in bytes of the following C/C++ variable types:

   char _____ bytes int _____bytes double_____ bytes

   int array[n] _____ bytes String with n characters _____ bytes

2. (*5%)* Write a simple C/C++ statement below that would generate a "pseudo" random number between 1 and 100.

3. (*5%)* What would need to be added to fix compile errors if you left out the "using namespace std;" statement in most C/C++ programs that use "cout" and "cin" ?

4. (*5%)* A _____ is a common memory structure that enables recursion. It is used automatically by compilers to store subroutine or function return addresses along with any local variables.

5. (*5%)* Write a C/C++ for statement using an integer variable "i" starting at zero that would execute a block of code exactly 1000 times.

6. (*5%)* The _____feature in C++ can be used to automatically generate functions or classes that include different types.

7. (*5%)* What happens if one case in the middle of a long switch statement does not end with "break;" ?

8. (*5%)* What is the most common way in C/C++ to pass an entire 1D array as an argument to a function? For an example use "int array[10];" , assume the array size can change, and use "void func1()" as an example function. Show the function prototype and an example function call.

9. (*20%)* Write the output produced by this program exactly as it will appear on the output device.

```
#include <iostream>
using namespace std;

class test
{
public:
     test();
     void x(test y);
public:
     int w;
};
test::test(){
     w = 1;
}
void test::x(test y)
{
     w = y.w + 2 ;
}
int main(int argc, _TCHAR* argv[])
{
     test A;
     for (int i=1; i<9; i++){
          A.x(A);
          cout << A.w << "  ";
          if (i%2==0) cout<< endl;
     }
}
```

10. (*25%)* Write the output that is produced by this C/C++ program.

```
#include <iostream>
using namespace std;

int main(int argc, _TCHAR* argv[])
{
     int a[8]={1,2,3,4,5,6,7,8};
     int *aptr;
     aptr = &a[0];
     a[2] = a[2] + 1;
     a[3] = a[3] + a[4];
     aptr++;
     (*aptr)++;
     (*(++aptr))--;
     cout << a[1] << a[2] << a[3] << a[4] << *aptr << endl;
}
```

11. (*5%)* C++ allows several functions of the same name to be defined, as long as these functions have different sets of parameters. This capability is called:

    _____ _____.

12. (5%) Write a single statement that creates "pseudo" random numbers from the following list: 10, 11, 12, 13, 14, 15.

13. (*5%)* Which of the following is NOT a valid storage class in c++

a. register
b. auto
c. static
d. kernal
e. extern

14. (*5%)* Which of the following is a VALID declaration of an array of TEN double precision floating point numbers in C++?

a. double array(10);
b. double array(1,10);
c. double array[10];
d. double array[] = {1.0, 2.0, 2.71, 3.14, 4.0, 5.0, 6.0, 6.28, 9.9};
e. none of the above are valid

15. (*5%)* A recursive function is one that calls _____.

16. (*5%)* Please indicate the output of the following snippet of code.

```
int main()
{
    int i;
    for (i=0; i<3; i++);
     {
        std::cout << i << std:endl;
     }
   return 0;
}
```

17. (*5%)* Fill in the missing keywords and identifiers in the following *function template* that returns the maximum value of the three arguments of the same type.

```
__________ < _____________ T>
T maximum ( _____ value1,  _______ value2,  ________value3)
{
        T maximumValue = value1;

        if (value2 > maximumValue)
                maximumValue = _________________;

        if (_________________ > maximumValue)
                maximumValue = value3;

        return ____________________________;
}
```

18. (*5%)* When passing the integer variable number to the global function isOdd, is a copy made in memory of this variable as a part of the function call?

```
#include <iostream>
using namespace std;

bool isOdd(int);

int main()
{
int number;
number = 1;
if  (isOdd(number))
     cout << "The number is odd!" << endl;
else
     cout << "The number is even!" << endl;
return 0;
}

bool isOdd(int num)
{
   if (num % 2==0)
     return 0;
  else
  return 1;
}
```

19. (5%) If you change the declaration in the program in problem 8 from

    int number;

    to

    float number;

    will you get a compiler syntax error for this program? Why or why not?

20. Consider the following code that has POSSIBLE syntax and logical errors. The intent of this program is to print of the entire contents of the array listNums.

```
#include <iostream>
using namespace std;

void printArray(int[]);

int main()
{
 int listNums(10) = {1,2,3,4,5,6,7,8,9,10};

  printArray(listNums);
  return 0;
}

void printArray(int nums[] )
{
        for (int i = 1;  i <=10; i++)
                cout << nums[i]<< endl;
}
```

(a) (5%) Please correct any syntax errors that you see in this code.

(b) (5%) Please correct any logical or runtime errors you see in this code.

(c) (5%) When passing the array of integers listNums to the global function printArray, is a copy made of the entire array as a part of the function call?

21. (5%)In C++ are the following bolded statements valid ways (i.e. no compile errors) to use the C++ class. If a statement is valid (i.e. no compile errors) but is poor programming practice also put a star next to the statement.

```
#include <iostream>
#include <string>
using namespace std;

class Game
{
public:
Game(string name)
{   setGameName(name);
  numberOfPlayers = 0; }

void setGameName (string name)
{ gameName = name; }

string getGameName ()
{ return gameName; }

void displayGameMessage()
{  cout << "Welcome to " << getGameName() << "!" <<endl;
  cout << numberOfPlayers << " players!" <<endl; //   valid  or invalid
}
private:
  string gameName;
  int numberOfPlayers;
};

int main()
{

  Game myGame("Round 1");      //   valid  or invalid statement

  myGame.numberOfPlayers = 2;   //   valid  or invalid statement

  myGame.displayGameMessage(); //   valid  or invalid statement

  return 0;

}//end of main
```

22. (*15%)* Write the output produced by this program exactly as it will appear on the output device.

```
#include <iostream>
using namespace std;

void cloudingFunctionsPurpose();

int x = 10;

int main()
{
int x = 500;

x++;
::x--;

cloudingFunctionsPurpose();
x+=10;
cloudingFunctionsPurpose();

cout << x << endl;
cout << ::x << endl;
return 0;
}//end main

void cloudingFunctionsPurpose()
{
  static int x = 1;
  x *= 2;
  cout << x << endl;
}
```

23. (*20%)* Write the output that is produced by this C++ program. If you think there could be a runtime error you may indicate this as well.

```
#include <iostream>
using namespace std;

void cloudingFunctionsPurpose1(int *);
void cloudingFunctionsPurpose2(int *);

int main()
{
  int *firstPtr;
  int firstValue = 42;

  int *secondPtr;
  int secondValue = 72;

  firstPtr = &firstValue;
  secondPtr = &secondValue;

  firstPtr = &(*secondPtr);

  (*firstPtr)++;

  cloudingFunctionsPurpose1( &firstValue);
  cloudingFunctionsPurpose2( secondPtr);

  cout << *firstPtr << *secondPtr << "[][]" << --(*(&firstValue)) << endl;
  cout << (*(&firstValue))++ << endl;

  return 0;
}

void cloudingFunctionsPurpose1 ( int * cloudingVariable)
{  *cloudingVariable  /= 2; }

void cloudingFunctionsPurpose2 ( int * cloudingVariable)
{  cloudingVariable--; }
```