COM S 213 PRELIM EXAMINATION #1
October 12, 2000

Name:

Student ID:

Please answer all questions in the space(s) provided. Each question is worth 4 points. You may leave when you are finished with the exam.

Question 1.

```
float f1 = 13.0;
float f2 = 5.0;
int j = f1/f2;
```

What is the value of `j`? _____

Question 2.

```
char *cStr = "Prelim #1";
```

What is the value of `cStr[5]`? _____

Question 3.

Declare (not define) a function named `increment` which returns a float and takes two floats (`arg1` and `arg2`) as parameters. `arg1` should be passed by reference, and `arg2` should have a default value of 1.

Question 4.

Given the following function definition:

```
void decrement(int &value,int by)
{
   value -= by;
}

void main()
{
  int x = 5;
  int y = 2;

  decrement(x,y);
  cout << "x is : " << x << endl;
  cout << "y is : " << y << endl;
}
```

What are the values that are printed out?

x is : _____

y is : _____

Question 5.

Given the following code:

```
int k = 0;
while (true)
{
  k++;
  switch(k)
  {
    case 1:
      cout << "t";
    case 2:
      cout << "h";
      break;
    case 3:
      cout << "i";
      continue;
    default:
      cout << "s";
      break;
  }
  if (k>=3)
    break;
}
```

What gets printed out? _____

Question 6.

Complete the following `for` loop in the function "findChar" which is used to find the first occurrence of the specified character in the specified string. This function searches sequentially from the start of the string until the end looking for the specified character. Use the variable "j" in the for loop.

```
int findChar(char *aStr,char searchChar)
{
  int length = strlen(aStr);

  for( ________ ; __________________ ; _____________)
  {
     if (aStr[j] == searchChar)
       return j;
  }
  return –1;
}
```

Question 7.

Now, complete the following for loop in the function "findLastChar" which is used to find the *last* occurrence of the specified character in the specified string. This function searches sequentially from the *end* of the string to the beginning looking for the specified character. Use the variable "j" in the for loop.

```
int findLastChar(char *aStr,char searchChar)
{
  int length = strlen(aStr);

  for( ________ ; __________________ ; _____________)
  {
     if (aStr[j] == searchChar)
       return j;
  }
  return –1;
}
```

Question 8.

Given the following main() function:

```
void main()
{
  int x = 5;
  int y = 6;

  {
    int y = 7;
    x = 2;
  }

  cout << "(x,y) is : (" << x << "," << y << ")" << endl;
}
```

What is printed out?

`(x,y) is : ( _____ , _____ )`

Question 9.

Define a class named `Person` which has two private member variables `mName` and `mAddr` (strings) and getters and setters for each (Don't define the getters and setters, just declare them in the class definition)

Question 10.

Given the following partial class definition:

```
class MenuObject
{
public:
  void setName(string argName);
  string getName();
  virtual int select()=0;
  virtual void display()=0;
private:
  string name;
};
```

Please provide the definition of `setName` (assuming it is defined outside of the `MenuObject` class definition)

Question 11.

Given the following line of code:

```
   int *intArray = new int[32];
```

provide the single line of code needed to free the memory pointed at by intArray (assuming the allocation succeeded):

_____

Question 12.

What is wrong with the following function?

```
Student *MakeStudent(string name, string addr)
{
  Student newStudent(name,addr);
  return &newStudent;
}
```

_____

Question 13.

Given the following code:

```
char *label="This is a test";
cout << 5[label] << endl;
```

What value is printed out? _____

Question 14.

Give the single line of code needed to declare a variable of type "array of pointers to type char". The variable's name should be `charPtrArray`, the array size should be 5. The declaration should utilize the following typedef:

```
typedef char *CharStarPtr;
```

Question 15.

Given the following class definitions:

```
class X
{
public:
  int q,r;
protected:
  int s,t;
private:
  int u,v;
};
```

```
class Y : public X
{
public:
  int a,b;
  void foo();
};
```

What member variables of the base class `X` may be accessed from the definition of the member function `Y::foo()`?

Question 16.

Given the following class definitions:

```
class Person
{
public:
  virtual void printName()
  {
    cout << “Name is:   “ << name << endl;
  }
  void setName(string argName)
  {
    name = argName;
  }
protected:
  string name;
};

class Student : public Person
{
  void printName()
  {
    cout << “STUDENT: “ << name << end;
  }
};
```

And the following code…

```
void printIt(Person *aPerson)
{
  aPerson->printName();
}

void main()
{
  Student aStudent;
  aStudent.setName(“John Doe”);
  printIt(&aStudent);
}
```

What output is produced?

Question 17.

```
enum RonsColors {
  ronsBlack,
  ronsRed = 6,
  ronsGreen,
  ronsBlue
};
```

What is the integer value of the constant `ronsBlack`? _____

Question 18.

Given the class definitions provided in Question 16 and the following code:

```
void printIt(Person aPerson)
{
  aPerson.printName();
}

void main()
{
  Student aStudent;
  aStudent.setName("John Doe");
  printIt(aStudent);
}
```

What output is produced?

_____

Question 19.

Given the following code:

```
class TestClass
{
public:
  TestClass()
  {
      cout << “1 ”;
  }
  ~TestClass()
  {
      cout << “2 “;
  }
};

void main()
{
  cout << “3 ”;

  TestClass *testClass = new TestClass();

  cout << “4 ”;
  delete testClass;
}
```

What is the output? _____

Question 20.

What is wrong with the following function declaration?

```
int findLastCharacter(string s, char c, int start,stop=0);
```

_____

Question 21.

A class that has at least one pure virtual function is called:

_____

Question 22.

Given the following code:

```
int doubleIt(int x)
{
  return 2*x;
}

main()
{
  int (*f)(int);
  f = doubleIt;

  // Call f here?
}
```

How do you call the function pointed at by the variable `f` with the value "5" as the sole parameter?

Question 23.

Please complete the following operator overload which allows us to access and assign to individual characters in MyString. You need to supply the return type, the name of the operator to be overloaded and the argument passed to the overloaded operator. The name of the operator will be "`[]`" and the name of the argument passed in will be an integer "`i`". Assume `badVal` is globally defined.

```
_____________  MyString::_____________ (_________________)
{
  if ( (i>=0) && (storagePtr) && (i < stringLength))
    return( storagePtr[i] );
  else
    return badVal;
}
```

Question 24.

An `ofstream` variable type is used to open a file for writing. Provide a declaration of a variable of type `ofstream` named "`outFile`" which opens a file named "`output.dat`":

Question 25.

What's wrong with the following function?

```
void swap(const char *ptr,int j, int k)
{
  char temp = ptr[j];
  ptr[j] = ptr[k];
  ptr[k] = temp;
}
```
