CSCI 2170 Spring 2011
Test 1 (February 14th)

Topics covered in Test 1 include:

- C++ basics
  - Decision statements
  - Loops: for loop, while loop
  - Value and reference parameters
  - Logical expression
  - Evaluation of expression
- 1D array, 2D array and parallel array
  - function with array parameter(s)
  - iteration through array elements
  - searching and sorting in array
  - C-type string and its functions
- struct type
  - define struct type
  - member access
  - function with struct type parameter
  - array of structs
    - access member of an array element
    - iterate through members of an array
    - sort an array of structs
    - pass struct array to function
- enumeration type
  - define enum type
  - input/output involve enum type
  - enum type used with 1D array
- typedef
  - create alias of existing type and user defined type using typedef
- conditional compilation (#ifndef / #define / #endif)
- ADT
  - What is an ADT?
  - What is data abstraction?
  - How is information hiding achieved in data abstraction?
  - Define data and operation of an ADT
- C++ class
  - What is a constructor?
  - What is a destructor?
  - When are constructor and destructor called?
  - What is default constructor?
  - Why are there private and public member functions?
  - How some class members are defined as private while others are public?
  - What is an object? How to create an object?
  - What is data encapsulation?
  - Be able to define and implement a class given description
  - Be able to compile and execute programs using separate header and implementation files
  - Be able to implement an array-based implementation of the ADT list

Sample Questions:

- **struct related**

Define an enumeration type "HouseType" which can be used to represent different types of houses. The type of houses included in this type are : Colonial, Cape Cod, Georgian, Victorian, and Contemporary.
Define a struct type "HouseStruct" that can be used to store information about a house that is currently for sale. Each house record should include the following information:

Price of the house;
Date the house was built; ← define a struct DateStruct for this
Square footage of the house;
Number of bedrooms in the house;
Number of bath rooms in the house;
Type of house; ← use the type defined in question 1

Create an array "AllHouses" of size 2000 of type "HouseStruct"
Write a function "ReadData" that will read information about houses that are on the market from a data file, called "HouseInfo.dat". Each record is stored in the data file one piece of information per line, like this:

210000
5 12 2002
3200
4
2
Colonial

Write a function "SortByPrice" which sorts all house records in ascending order of price.
Write a function "SearchByPrice" which displays all houses that have price between "minPrice" and "maxPrice" supplied by the user.
Write a function "SearchByStyle" which displays all houses that have the same style as the one supplied by the user.

- **class related**

Define a class "randomNumberClass". Show the header file and the implementation file.
The data of the class include:

Random number : a random number in the range [lower, upper]
Lower: lower bound of the random number generated
Upper: upper bound of the random number generated

The member functions of the class include:

Default constructor: Create a random number object that generates random number in the range of [0, RAND_MAX]
Second constructor: Create a random number object that generates random number in the range of [lower, upper], where "lower" and "upper" are supplied by the client program
Draw : Generate and return a random number in the defined range
DisplayRange: Display the range defined for this random number generator
SetRange: Change the range (both lower and upper) values that supplied by the client program.