COMP 1406 B/M Quiz 1 (Winter 2015)

Name: _____ **Student #:** _____

Instructions: This is a closed book, 45 minute quiz worth a total of **20 marks**. You may only have a calculator and a pen or pencil/eraser with you. Please remove any study aids, cell phones, etc from your desk.

(1) Describe a specific example from this class where the problem solving technique of "reducing the problem" was applied [**2 marks**]. You can use examples from lectures, assignments, or tutorials.

(2) Consider the "variables as a box" analogy. Extending the box analogy to arrays, explain what is created in memory when an array is declared (`int myArray[3];`) and how we find the right place to put a value when we assign it to an index of the array (`myArray[1] = 5;`) [**3 marks**].

(3) What is the output of the C++ code at right [**2 marks**], and why [**2 marks**]?

```
struct soda
{
    int gramsOfSugar;
    float gramsOfCarbonation;
};

void carbonateSoda(soda cola,
                   float carbonationToAdd)
{
    cola.gramsOfCarbonation +=
       carbonationToAdd;
}

int main()
{
    soda cola = {108, 6.2f};
    carbonateSoda(cola, 1.0f);
    cout << cola.gramsOfSugar << ", ";
    cout << cola.gramsOfCarbonation;
    return 0;
}
```

(4) Assume `soda` is defined as above. The C++ code at right compiles, but has two bugs. Identify the bugs and explain how to fix them [**3 marks**].

```
int totalSugar(soda sodas[], int numSodas)
{
    int total;
    for (int i=0; i < numSodas; i++)
    {
        total += sodas[i].gramsOfSugar;
    }
    return total;
}

int main()
{
    soda drinks[3] = {
        {100, 5.4f},
        {107, 5.9f},
        {98,  6.1f}
    };
    cout << totalSugar(drinks, 4);
    return 0;
}
```

(5) Write C++ code to accomplish the following. You do not need to worry about "include" or "using" statements, but your code should include a `main()` function. You may use the back of the page if needed.

Define a struct that represents a cell phone contract. A contract will have a start year, end year, and cost per month [**1 mark**]. In `main()`, create and populate a statically declared array of 3 contracts [**2 marks**]. Write a function that takes two contracts and the current year, and transfers the remaining years from one contract to the other [**2 marks**]. Write another function that takes an array of contracts and calculates the average cost per month [**2 marks**]. Demonstrate both functions in `main()` by calling them with your example array (or items therein) [**1 mark**].