CS 315 Week 2 (Feb 5 and 7) summary and review questions

Topics covered

- Sections 1.3 to 1.6
- Insertion and selection sorting

SUMMARY:

- C++ class syntax, objects, classes and functions
- brief discussion of inheritance vs. containment of one class in relation to another. (“is a” vs. “has a” relationship.)
- Concept of information hiding, private vs. public data and functions
- Accessor, mutator, constructor
- STL vector and string classes
- Parameter passing mechanisms:
  - Call by value
  - Call by reference
    - Call by constant reference
- Constructor, destructor and = operator, default and user defined versions
- Return by reference
- Insertion sorting and selection sorting algorithms and their analysis
  - Both perform ~ n² comparisons
    - Insertion sorting performs only n comparisons in the best case, but selection sorting performs n² operations even in the best case

Review questions:
1) What is the output of the following program?

```cpp
#include <iostream.h>
using namespace std;
class point {
    public:
        point(int p, int q) {
            x = p; y = q;
        }
        point sum(point& p) {
            x+= p.x;
            y+= p.y;
            (p.x)++; (p.y)++; return p;
        }
        int getx() { return x;}
        void setx(int p) { x = p;}
        int gety() { return y;}
    private:
        int x, y;
};

int main()
{
    point p(2,3); point q(4,5);
    cout << p.getx() << " " << p.gety() << " " << endl;
    cout << q.getx() << " " << q.gety() << " " << endl;
    q = p.sum(p);
    cout << q.getx() << " " << q.gety() << " " << endl;
    cout << p.getx() << " " << p.gety() << " " << endl;
    return 0;
}
```

2) In the text, two functions that return the maximum string by const reference are presented. Only one version is claimed to be correct. What is wrong with the other version?

3) In Section 1.7, a matrix class is presented. Write functions for assignment (=) and comparison (==) operators for this class.

4) What is the exact number of key comparisons performed by the insertion sorting and selection sorting comparisons on the following input?
5) Problem 2.7