EECE.3220: Data Structures
Spring 2017

Lecture 2: Key Questions
January 20, 2017

1. Describe the key components of the basic C++ program shown below, particularly namespaces and the basic output stream `cout`.

```cpp
#include <iostream>

using namespace std;

int main() {
    cout << "Hello World!\n";
    return 0;
}
```

2. Describe the basic input/output streams in C++.

3. Describe the basics of using `cout` and the stream insertion operator for output.

4. Show the output of the following short programs:

a.

```cpp
#include <iostream>
using std::cout;     // Only include part
                     //  of std namespace
                     //  you actually use

int main() {

    // display message
    cout << "Welcome ";
    cout << "to C++!\n";

    return 0;
}
```

b.

```cpp
#include <iostream>
using std::cout;

int main() {
    cout << "Welcome\nto\n\nC++!\n";
    return 0;
}
```

5. Describe the basics of using `cin` and the stream extraction operator for input.

6. **Example:** Determine the output of the following short programs:

a. Assume the user inputs: `1  2  4.5`

```
#include <iostream>
using std::cout;
using std::cin;
using std::endl;
int main() {
    int i, j;
    double x;
    cin >> i >> j;
    cin >> x;
    cout << "output \n";
    cout << i << ',' << j << endl
         << x << "cm" << endl;
    return 0;
}
```

b. Assume the user inputs: `1  2`
                           `3.4  5`
                           `2  3  3.4  7`

```
#include <iostream>
using std::cout;
using std::cin;
using std::endl;
int main() {
    int i, j;
    double x, y;
    cin >> i >> j >> x >> y;
    cout << "First output " << endl;
    cout << i << ',' << j << ',' << x
         << ',' << y << endl;
    cin >> x >> y >> i >> j;
    cout << "Second output" << endl;
    cout << i << ',' << j << ',' << x
         << ',' << y << endl;
    return 0;
}
```

7. Describe the key details of structures in both C and C++.

8. **Example:** Show the output of the following short program. Assume the user enters the
    following when prompted for input: **−1 1**

```cpp
#include <iostream>

using namespace std;

struct Point {
    double x;
    double y;
};

int main() {
    Point p1 = {3, 5};
    Point p2 = {7.8, 9.1};

    cout << "p1: (" << p1.x << ", " << p1.y << ")\n";
    cout << "p2: (" << p2.x << ", " << p2.y << ")\n";

    cout << "Enter new x, y for p1: ";
    cin >> p1.x >> p1.y;

    p2 = p1;
    p2.x -= 1.2;
    p1.y *= 2;

    cout << "p1: (" << p1.x << ", " << p1.y << ")\n";
    cout << "p2: (" << p2.x << ", " << p2.y << ")\n";

    return 0;
}
```