Object-Oriented Programming, Fall 2008

Midterm

2:10pm ∼ 3:50pm, Wednesday, November 26, 2008

INSTRUCTIONS:

1. This is a *closed-book* exam.

2. Try to solve all of the problems.

3. Try to give short answers. (Hint: An answer need not always be longer than the question.)

4. No cheating.

5. Please hand in both the exam sheet and the answer sheet.

6. Please note that unless otherwise stated, all the line numbers for the program listings are for reference only.

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1. (10%) What are the three main characteristics of Object-Oriented Programming, *in English*?

2. (10%) What are the mechanisms used by C++ to pass parameters from caller to callee?

3. (10%) What is the difference between **struct** and **class** in C++.

4. (10%) What is the difference between a pointer and the name of an array in C++?

5. (10%) In C++, is the default constructor automatically generated by the compiler?

6. (20%) Give the definition of the special member functions and their names as we discussed in the classroom that would in some circumstances be implicitly defined by a C++ implementation for a class, say, C, as given below.

```cpp
struct C {
    string s;
};
```

7. (10%) What would be the output of the following C++ program? Why?

Listing 1: macro.cpp

```cpp
#include <iostream>

using std::cout;
using std::endl;

#define SQUARE_M(x) x*x

inline int SQUARE_F(int x)
{
    return x*x;
}

int main()
{
    cout << SQUARE_M(3+1*2)*SQUARE_F(3+1*2) << endl;

    return 0;
}
```

8. (10%) What would be the output of the following C++ program? Why?

```cpp
#include <iostream>

using std::cout;
using std::endl;

class A {
public:
    A(int i) : v(i) { cout << "A::A(" << i << ") called" << endl; }
    ~A() { cout << "A::~A() called" << endl; }
    operator bool() { return v != 0; }
private:
    int v;
};

int main()
{
    int i = 1;

    while (A a = i) {
        i = 0;
    }

    return 0;
}
```

9. (10%) What is the major difference between a reference parameter and a constant reference parameter?