

EE209 Spring 2018 C++ Sample Exam Answers

1. Access control

Suppose we have the following C++ code.

```
#include <iostream>
using namespace std;

class Parent {
    virtual void print()
    {
        cout << "Parent name " << _name << endl;
    }

protected:
    char* _name;
};

class Child : public Parent {

public:
    Child(char* name = "KIM")
        : _name(name) {}

    void print()
    {
        cout << "Child name " << _name << endl;
    }
};

int main() {
    Parent* myRecord = new Child();
    myRecord->print();
    delete myRecord;
    return 0;
}
```

(a) Find all the bugs in this code.

- The Parent class print() function must be specified as public.
- In the Child constructor, the initialization list should call a constructor of Parent (i.e., _name(name) should be Parent(name)).
- The Parent class should have a constructor that receives a name.

(b) Once the bugs are fixed, what is the output of the code?

Child name KIM

(c) Suppose we fixed the bugs, but now want to add the line

```
cout << myRecord->_name << endl;
```

in the main() function. What change in the above classes can we make to avoid introducing a new error?

Add main() as a friend function in the Parent class.

2. Function overloading

What is the output of the following C++ code?

```
#include <iostream>
using namespace std;

class Animal {};

class Fish : public Animal {};

class JellyFish : public Fish {};

class Squid : public Fish {};

void whichone(Animal animal) {
    cout << "Animal" << endl;
}

void whichone(Squid squid) {
    cout << "Squid" << endl;
}

int main() {
    Squid squid;
    whichone(squid);

    Fish fish;
    whichone(fish);

    JellyFish jellyfish;
    whichone(jellyfish);

    whichone(*(Squid*)&jellyfish);

    return 0;
}
```

Output:

```
Squid
Animal
Animal
Squid
```