

CS 31 Worksheet 6

This worksheet is entirely **optional**, and meant for extra practice. Some problems will be more challenging than others and are designed to have you apply your knowledge beyond the examples presented in lecture, discussion or projects. All exams will be done on paper, so it is in your best interest to practice these problems by hand and not rely on a compiler.

Concepts: Class, Public/Private, Simple constructors, Methods and Data Members

1. Find the **four** errors in the following code, and write the fixes.

```
class Cat {
    int m_age;
    string m_name;
    string m_type;
    Cat(int age, string name, string type) {
        m_age = age;
        m_name = name;
        type = type;
    }
    void introduce() {
        cout << "Hi! I am a " + type + " cat" << endl;
    }
};

class Sheep {
    string m_name;
    int m_age;
    Sheep(int age) {
        m_age = age;
    }
    void introduce() {
        cout << "Hi! I am " + m_name + " the sheep" << endl;
    }
};

int main() {
    Cat schrodinger(5, "Schrodinger's cat", "Korat");
    Schrodinger.introduce();
    cout << schrodinger.m_age << endl;
    Sheep dolly(6);
    dolly.introduce();
}
```

```
}
```

What will the program above successfully print once all the fixes have been made?

2. Convert the following struct into a class.

```
struct ZooAnimal
{
    string name;
    int cageNumber;
    int weightDate;
    int weight;
};
```

At first, make the class you create operate identically to the way this structure behaves.

Then make a second version which hides all the data members from driver code access and define and create a constructor to initialize all your class' data members.

3. Complete the class Clock below by implementing each of its member functions as designed.

```
class Clock
{
private:
    //declarations of data members that are private
    int hour;           //an hour in the range 1 - 12
    int minute,         //a minute in the range 0 - 59
    int second;         //a second in the range 0 - 59
    bool isAM;          //is the time AM or PM

public:
    // publically accessible methods

    //Set the clock to the specified time
    Clock (int desiredHour, int desiredMinute,
           int desiredSecond, string ampmValue );

    //Return it in standard notation as in "5:01 PM"
    string displayStandard();

    //Return it in military notation as in "17:01" for 5:01 PM
    string displayMilitary();
};
```

Be sure the constructor only allows values to be set within the valid range of values shown above.

If code is faulty and tries to set it outside the range, please throw `logic_error`.

Create driver code with asserts to test that you have implemented your code correctly.