

# Homework 11: Inheritance and Derived Classes

Instructor: Mehmet Emre

CS 32 Fall '21

**Due: 11/2 2pm**

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**Homework buddy (leave blank if you worked alone):**

**Reading:** PS 15.1, 15.2, DS 14.1

## 1

For each statement, indicate if it is True or False by circling T or F. If you need to cross out an answer, be sure that your final answer is clear and unambiguous—otherwise it will receive no credit.

- |         |   |   |
|---------|---|---|
| (3 pts) | An object of a derived class has access to the public methods of its base class         | T |
| (3 pts) | An object of a base class has access to the private helper methods of its derived class | F |
| (3 pts) | Destructors are not inherited by derived classes  | T |
| (3 pts) | An object of a derived class inherits the copy constructor of its base class            | F |
| (3 pts) | Operators are passed down inheritance hierarchies                                       | T |
| (3 pts) | Destructors in derived classes are called after their base class calls its destructor   | F |
| (3 pts) | Constructors of base classes are accessible by derived classes                          | T |

## 2

Assume there is a class called **Student** that has private member variables `string name`, `int perm`. Assume that `Student` has getters and setters for each of these data members `getName`, `setName`, `getPerm` and `setPerm`, and a constructor that takes `name` and `perm` as parameters. Assume that the class is declared in file `student.h`. In other words, you are given the following class definition:

```
class Student {
    std::string name;
    int perm;
public:
    Student(std::string name, int perm) :
        name(name), perm(perm) {}

    const std::string & getName() const {
        return name;
    }

    void setName(std::string name) {
```

```

    this->name = name;
}

int getPerm() const {
    return perm;
}

void setPerm(int perm) {
    this->perm = perm;
}
}

```

1. (8 pts) Write the contents of a .h file for a derived a class called **CmpscStudent** that inherits from **Student** and has additional data members including *\*string\** *ugradDegreeType*, *\*bool\** *graduateStudent*. Include prototypes for a public constructor that initializes all of the data members of **CmpscStudent** as well as getters (but not setters) for the additional data members of CmpscStudent. Do not implement these constructors and methods as inline. Just give the prototypes in the class definition.

**Answer: .**

```

class CmpscStudent: public Student {
    std::string ugradDegreeType;
    bool graduateStudent;
public:
    CmpscStudent(
        string name,
        int perm,
        string ugradDegreeType,
        bool graduateStudent
    );
    string getUgradDegreeType();
    bool isGraduateStudent();
};

```

2. (8 pts) Write the function definition for the constructor **CmpscStudent** that takes as its parameters all of the data members of CmpscStudent, and fully initializes the object being constructed, as it would appear in the .cpp file.

**Answer: .**

```
CmpscStudent::CmpscStudent(  
    string name,  
    int perm,  
    string ugradDegreeType,  
    bool graduateStudent  
) : Student(name, perm) {  
    this->ugradDegreeType = ugradDegreeType;  
    this->graduateStudent = graduateStudent;  
}
```