

1. (1) Base-class constructors are not inherited by derived classes.

True

- (2) An is-a relationship is implemented via composition.

False

An **is-a** relationship is implemented via **inheritance**.

An **has-a** relationship is implemented via **composition**.

- (3) A Student class has an is-a relationship with the Faculty and Course classes.

False

A Student class has an **has-a** relationship with the Faculty and Course classes.

Every student **has** their own faculty and course classes, but student **is not** faculty and course classes.

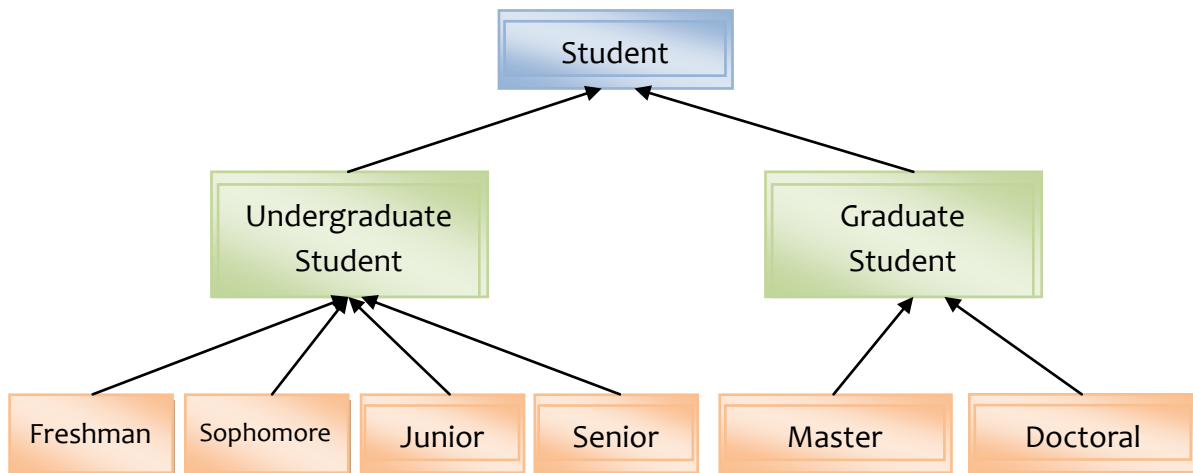
- (4) Private members of a private base class are inaccessible to the derived class.

True

- (5) A base class's protected members can be accessed in the base-class definition, in derived-class definitions and in friends of the base class and its derived classes.

True

2. Draw an inheritance hierarchy for students at a university.



Student

Every student **has** the data: student ID number, Chinese name, major, Advisor and **has** functions: study(), eat(), sleep(), review(), doHomework(), and so on.

Undergraduate Student

Undergraduate Student is derived from Student, because every undergraduate student **is a** student, and has all the basic characteristics of a student. For addition, undergraduate student **has** 28 credits of General Education Courses to complete.

Freshman, Sophomore, Junior, Senior

Either Freshman, Sophomore, Junior, or Senior student **is an** undergraduate student, and thus it is derived from undergraduate student class. Each of them has their own list of required courses to complete, which is different from each other.

Graduate Student

Graduate Student is derived from Student, because every graduate student **is a** student, and has all the basic characteristics of a student. For addition, graduate student has their own research topic and thesis topic.

Master Student, Doctoral Student

Both master student and doctoral student **is a** graduate student, thus they are derived from graduate student class. For addition, master and doctoral student have their own graduation requirement.