ASSIGNMENT-4

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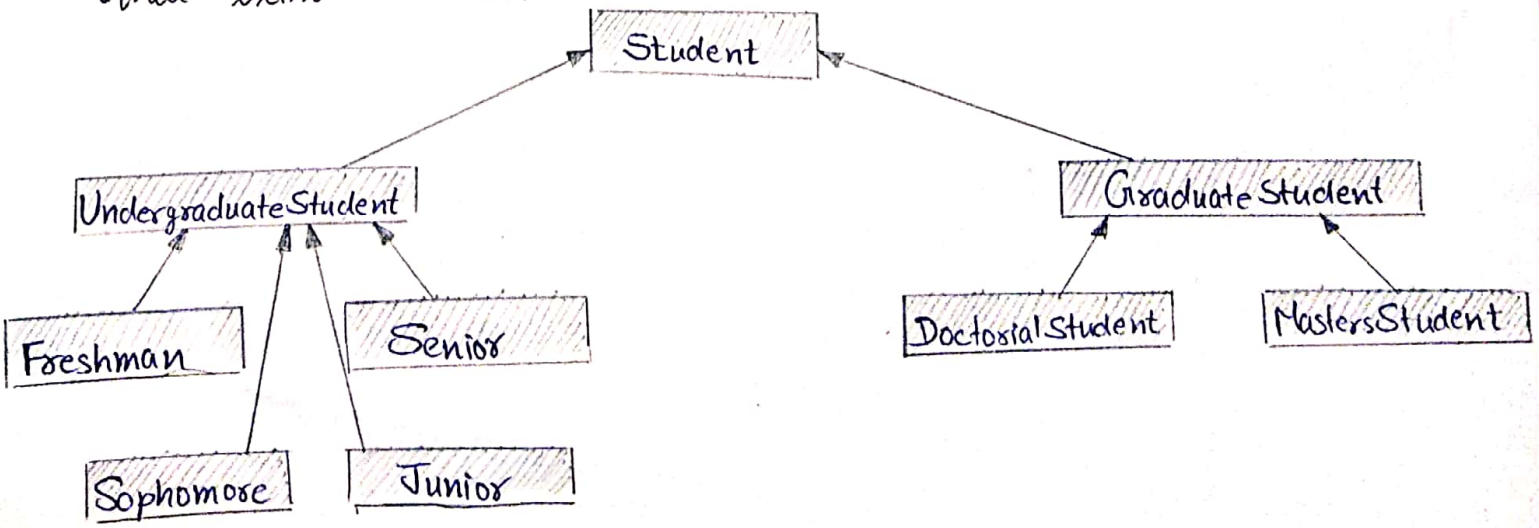
Q.1. Discuss the ways using suitable examples in which inheritance promotes software reuse, saves times during program development and helps prevent errors.

Soln: Inheritance allows developers to create subclasses that reuse code declared already in a superclass. Avoiding the duplication of common functionality between several classes by building a class inheritance hierarchy can save developers a considerable amount of time. Similarly placing common functionality in a single super class rather than duplicating the code in multiple unrelated classes, helps prevent the same errors from appearing in multiple source code file. If errors occur in the common functionality of the superclass, the software developer needs to modify only the superclasses.

Q.2. Draw an inheritance hierarchy for students at a university similar to the hierarchy shown in . Use student as the superclass of the hierarchy, then extend Student with class under-graduateStudent and GraduateStudent. Continue to extend the hierarchy as deep (i.e., as many levels) as possible. For example, Freshman, Sophomore, Junior and Senior might extend UndergraduateStudent, and DoctoralStudent and MasterStudent might be subclasses of GraduateStudent. After drawing the hierarchy, discuss the relationships and that exist between the classes.



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This hierarchy contains many is-a (inheritance) relationships. An UndergraduateStudent is a Student. A GraduateStudent is a Student, too. Each of class Freshman, Sophomore, Junior and Senior is an UnderGraduateStudent and is a Student. Each of the classes DoctoralStudent and MasterStudent is a GraduateStudent and is a Student. Note that there could be many more classes. For example, GraduateStudent could have subclasses like LawStudent, BusinessStudent, MedicalStudent etc.

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