***Ques1. Discuss the ways in which inheritance promotes software reuse, saves time 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 superclass, rather than duplicating the code in multiple unrelated classes, helps prevent the same errors from appearing in multiple source-code files. If errors occur in the common functionality of the superclass, the software developer needs to modify only the superclass’s.*

***Ques2. Draw an inheritance hierarchy for students at a university. Use Student as the base class of the hierarchy, then include classes UndergraduateStudent and GraduateStudent that derive from Student . Continue to extend the hierarchy as deep (i.e., as many levels) as possible. For example, Freshman, Junior and Senior might derive from UndergraduateStudent , and DoctoralStudent and MastersStudent might derive from GraduateStudent . After drawing the hierarchy, discuss the relationships that exist between the classes. Also, implement the above hierarchy using C++ code.***

*class student*

*{--}*

*class undergraduate:public student*

*{--}*

*class graduate:public student*

*{--}*

*class freshman:public undergraduate*

*{--}*

**Senior**

**Freshman   
Junior**

***Student***

**Doctoral  
Student**

**Masters Student**

*Graduate  
Student*

*Undergraduate  
Student*