1. Why is *protected* scope necessary?

The protected scope is necessary to disallow the client code to modify the variables of the class that are defined within the protected scope, and at the same time it allows the child classes to access the variables defined within the protected scope.

1. Discuss the wisdom, from a software engineering perspective, of using protected members.

The variables defined within the protected scope in a class cannot be modified by the code instances of such class, unless through a public member function (i.e. unless the software developer allows it).

If there occur the case that the software developer needs to create a child class of such class, having protected data members will give the software developer the flexibility of doing so, while being certain that such data members withing the protected scope cannot be modified unless the software developer wants to.

1. When constructing an object of a derived type, is a base class constructor always invoked? Explain.

Yes. Assume there exists two classes, Base and Child where Child inherits from Base. To initialize a Child object, the Base constructor is called first since the protected and public data members need to be initialized in order to be accessible for the Child object.

1. Discuss the veracity of the following statement: For an object of some derived type, the base class constructor is invoked first, then from the constructor the derived class is invoked.

Assume there is Base and Child class. To initialize a Child object, the constructor of the Base class is initialized first, then the constructor of the Child class is invoked.

The argument is true. If the argument were to be False, you could have a Child class without any of the Base class public and protected members, which then would mean that the Child class is independent from the Base class, which is not true.

1. Why doesn't each object that has a virtual function associated with it have its own V-table?

Each class that contains virtual functions will have a V-Table associated with it. This V-table is shared between all the instances (objects) of such class. This saves memory and is more efficient than the compiler creating a V-table for each object created.