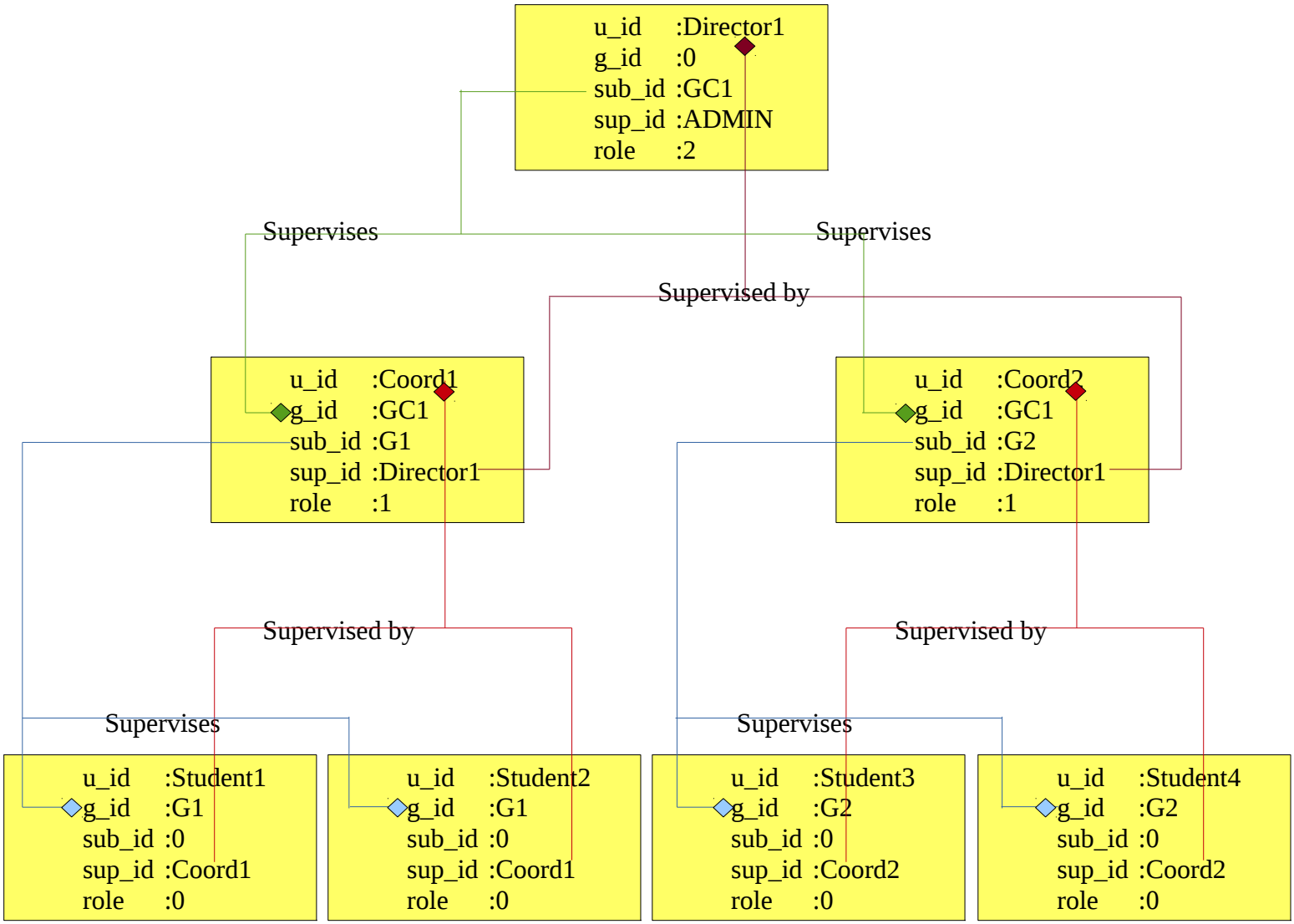
u_id :Director1
g_id :0
sub_id :GC1
sup_id :ADMIN
role :2
Supervises
Supervises
Supervised by
u_id :Coord1
g_id :GC1
sub_id :G1
sup_id :Director1
role :1
u_id :Coord2
g_id :GC1
sub_id :G2
sup_id :Director1
role :1
Supervised by
Supervised by
Supervises
Supervises
u_id :Student1
g_id :G1
sub_id :0
sup_id :Coord1
role :0
u_id :Student2
g_id :G1
sub_id :0
sup_id :Coord1
role :0
u_id :Student3
g_id :G2
sub_id :0
sup_id :Coord2
role :0
u_id :Student4
g_id :G2
sub_id :0
sup_id :Coord2
role :0

The 'hierarchy' table:

Under the IITBombayX Blended MOOCs scheme, we have multiple students participating in a course who are supervised by a single course coordinator. The coordinators activties and the performances of the students under them, in turn are supervised by the Director or Head of the Institute. In order to determine this hierarchy and represent it in the databases, we propose the inclusion of an additional table denoted by 'hierarchy' in the existing database of IITBombayX.

The attibutes of the table are defined as follows:

Attribute	**Type**
u_id	integer
g_id	integer
sub_id	integer
super_id	integer
role	Integer (TINYINT)

The fields in the diagram indicate the following table columns in the Hierarchy Table scheme:

u_id : The user id of any user, which is actually the 'id' field in the auth_user table for any registered user. As defined, it is a unique field.

g_id : It is a generic field which indicates the section or group number for a group or collection of entities at a lower level that are being governed by or supervised by a higher level entity. This field is a unique field. It is zero (or null) for an entity that has not yet been collected into a section.

sub_id : For a higher level entity (higher value of level than 0), this indicates the g_id (group_id) for the section that is being supervised by the member. For the student, since he will not be supervising any other members, the value of this field will be 0. It will also be zero if an entity of member does not supervise a section or group of lower level entities (say, a coordinator is not being managing a course being taken by a group of students).

super_id : For a lower level entity (0 or other values of level field), this indicates the u_id of the member that supervises that member. For the highest level member for an organisation (in this case, the director), the value of this field will be zero. It will also be zero if the entity is not being managed by a higher level entity (say, a student is not being managed by a coordinator yet). By default, this will be set to the u_id of the ADMIN, because the administrator can access an the entity, if he/she is not being supervised.

role : This is a foreign key to the role_table, which indicates numerically the roles played by an entity in the heirarchy. This would indicate to the user the roles played by entities in adjacent levels in the hierarchy (say, relation between student and coordinator, and between coordinator and director).

The 'role' table:

In order to specify the roles played by different users, who are otherwise indistinguishable based on their user id-s, we propose the creation of an additional table called the 'role table'. The table ultimately associates the roles of the different users of the Blended MOOC system (student,

coordinator, and director of the institute) together using numbers. The table is actually proposed as an extension to the existing institute_role table in IITBombayX, with an aim to replace it while keeping the functionality same.

Attribute	**Type**
role	Integer (TINYINT)
role_name	varchar

The table columns are described as follows:

role : This is an integer field, which is only an integer code used to specify the roles of the users in the system. It starts from 0 (indicating student) and can accommodate any level of hierarchy desired. Whenever a new level of hierarchy is added (intermediate or otherwise), we add the entry to this table, and a new value is assigned automatically to the level/role added.

role_name : This a character field, which stores the name of the role corresponding to the integer value, as a string of characters.

Currently, since we consider a four tier hierarchy, we have the following entries for the insitute_role table:

role	role_name
0	student
1	coordinator (course in-charge)
2	director (head of the institute)
3	ADMIN (at IITBombayX)

It should be noted here that the ADMIN is a special role, which does not indicate a single person or enitity, but a host of persons at IITBombayX who are in charge of managing the courses, designing and arranging contents and quizzes, and of course, the administrator who oversees the system performance and troubleshooting.