

Database Systems

Fall 2025

Suggested Solution for Homework #3

This is a sample design. Other reasonable designs are acceptable.

The relation schema:

1	GMMember(GMId, LName, FName, Email, Since)
Candidate Keys	[1] GMId
Foreign Keys	
Nullable Attributes	
Non-nullable Attributes	MemberId, LName, FName, Email, Since
Notes	
2	Group(GroupId, Name, Description)
Candidate Keys	[1] GroupId, [2] Name
Foreign Keys	
Nullable Attributes	Description
Non-nullable Attributes	GroupId, Name
Notes	
3	GroupMembership(GMM_Id, GMId, GroupId, JoinTime, Nickname, IsAdmin, AdminPhone)
Candidate Keys	[1] GMM_Id, [2] GMId, GroupId
Foreign Keys	[1] GMId references GMMember(GMId), [2] GroupId references Group(GroupId)
Nullable Attributes	AdminPhone, Nickname
Non-nullable Attributes	GMM_Id, MemberId, GroupId, JoinTime, IsAdmin
Notes	[1] A surrogate key, GMM_Id, is created as the primary key. [2] In this design, the three inheritance classes, GroupMembership, RegularMember, and Admin are transformed to a single relation. Other designs are possible. [3] Since there are only two kinds of members, IsAdmin is created as a Boolean attribute to specify the subclass. When it is false, it indicates a regular member. Other designs are possible. [4] As a result, AdminPhone is optional. It is only required when IsAdmin is true.
4	Category(CategoryId, Category, Description)
Candidate Keys	[1] CategoryId, [2] Category
Foreign Keys	
Nullable Attributes	Description
Non-nullable Attributes	CategoryId, Category
Notes	
5	GroupCategory(GC_Id, GroupId, CategoryId)
Candidate Keys	[1] GC_Id, [2] GroupId, CategoryId
Foreign Keys	[1] GroupId references Group(GroupId), [2] CategoryId references Category(CategoryId)
Nullable Attributes	
Non-nullable Attributes	GC_Id, GroupId, CategoryId

Notes	[1] A surrogate key, GC_Id, is created as the primary key.
6	Recommend(RecommendId, Recommendation, Description, DisplayLink)
Candidate Keys	[1] RecommendId
Foreign Keys	
Nullable Attributes	Description
Non-nullable Attributes	RecommendId, Recommendation, DisplayLink
Notes	[1] A surrogate key, RecommendId, is created as the primary key.
7	Event(EventId, EventName, Place, Time, Description, GroupId)
Candidate Keys	[1] EventId
Foreign Keys	[1] GroupId references Group(GroupId)
Nullable Attributes	Description
Non-nullable Attributes	EventId, EventName, Place, Time, GroupId
Notes	
8	Posting(PostingId, PostTime, Subject, Body, Priority, GroupId)
Candidate Keys	[1] PostingId
Foreign Keys	[1] GroupId references Group(GroupId)
Nullable Attributes	
Non-nullable Attributes	PostingId, PostTime, Subject, Body, Priority, GroupId
Notes	[1] A surrogate key, PostingId, is created as the primary key. [2] In this design, this table captures only the class Posting. There are separate tables for the subclasses. This provides more flexibility for other functions. Other designs are possible.
9	EP_Type(EP_TypeId, EP_Type)
Candidate Keys	[1] EP_TypeId, [2] EP_Type
Foreign Keys	
Nullable Attributes	
Non-nullable Attributes	EP_TypeId, EP_Type
Notes	
10	EventPosting(EP_Id, PostingId, EP_TypeId, AdminId)
Candidate Keys	[1] EP_Id, [2] PostingId
Foreign Keys	[1] PostingId references Posting(PostingId), [2] AdminId references GroupMembership(GMM_Id), [3] EP_TypeId references EP_Type(EP_TypeId)
Nullable Attributes	
Non-nullable Attributes	EP_Id, PostingId, EP_TypeId, AdminId
Notes	[1] A surrogate key, EP_Id, is created as the primary key. [2] Note that AdminId references GMM_Id, not GMId.
11	RegularPosting(RP_Id, PostingId, MembershipId)
Candidate Keys	[1] RP_Id; [2] PostingId
Foreign Keys	[1] PostingId references Posting(PostingId), [2] MembershipId references GroupMembership(GMM_Id)
Nullable Attributes	
Non-nullable Attributes	RP_Id, PostingId, MembershipId
Notes	[1] A surrogate key, RP_Id, is created as the primary key.
12	Comment(CommentId, CommTime, Comment, PostingId, ParentCommentId, GMMemberId)
Candidate Keys	[1] CommentId

Foreign Keys	[1] PostingId references Posting(PostingId), [2] ParentCommentId references Comment(CommentId), [3] GMMemberId references GMMember(GMId)
Nullable Attributes	ParentCommentId, PostingId
Non-nullable Attributes	CommentId, CommTime, Comment, GMId
Notes	[1] A surrogate key, CommentId, is created as the primary key.
13	
Candidate Keys	
Foreign Keys	
Nullable Attributes	
Non-nullable Attributes	
Notes	