Database Systems Fall 2025 Suggestion Solution for Q1 of Homework #7

Normalization Analysis

1	GMMember(GMId, LName, FName, Email, Since)
Candidate Keys	[1] GMId
Foreign Keys	[1] OMIG
Nullable Attributes	
Non-nullable Attributes	Memberld, LName, FName, Email, Since
Notes	Memberia, Livaine, Frianc, Email, Since
Normalization Analysis	[FD]: GMId -> LName, FName, Email, Since
1 Troiting in a real of the re	[Highest NF]: BCNF
2	Group(GroupId, Name, Description)
Candidate Keys	[1] Groupld, [2] Name
Foreign Keys	[-]
Nullable Attributes	Description
Non-nullable Attributes	Groupld, Name
Notes	P
Normalization Analysis	[FD]: [1] GroupId -> Name, Description; [2] Name -> GroupId
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3	GroupMembership(GMM_Id, GMId, GroupId, JoinTime, Nickname, IsAdmin,
	AdminPhone)
Candidate Keys	[1] GMM_ld, [2] GMld, GroupId
Foreign Keys	[1] GMId references GMMember(GMId), [2] GroupId references
	Group(GroupId)
Nullable Attributes	AdminPhone, Nickname
Non-nullable Attributes	GMM_Id, GMId, 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.
Normalization Analysis	[FD]: [1] GMM_Id -> GMId, GroupId, JoinTime, Nickname, IsAdmin,
	AdminPhone; [2] GMId, GroupId -> GMM_Id
	[Highest NF]: BCNF
4	Category(CategoryId, Category, Description)
Candidate Keys	[1] Categoryld, [2] Category
Foreign Keys	
Nullable Attributes	Description
Non-nullable Attributes	CategoryId, Category
Notes	
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Normalization Analysis	[FD]: CategoryId -> Category, Description; [2] Category -> CategoryId [Highest NF]: BCNF
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.
Normalization Analysis	[FD]: [1] GC_Id -> GroupId, CategoryId; [2] GroupId, CategoryId -> GC_Id [Highest NF]: BCNF
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.
Normalization Analysis	[FD]: [1] RecommendId -> Recommendation, Description, DisplayLink
1401111alizacion 7 (larysis	[Highest NF]: BCNF
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	
Normalization Analysis	[FD]: [1] EventI -> EventName, Place, Time, Description, GroupId [Highest NF]: BCNF
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.
Normalization Analysis	[FD]: [1] PostingId -> PostTime, Subject, Body, Priority, GroupId
	[Highest NF]: BCNF
9	EP_Type(<u>EP_TypeId</u> , EP_Type)
Candidate Keys	[1] EP_TypeId, [2] EP_Type
Foreign Keys	
Nullable Attributes	
Non-nullable Attributes	EP_TypeId, EP_Type
Notes	
Normalization Analysis	[FD]: [1] EP_TypeId -> EP_Type; [2] EP_Type -> EP_TypeId [Highest NF]: BCNF

Candidate Keys [1] FP_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 FP_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. Normalization Analysis [FD]: [1] EP_Id -> PostingId, EP_TypeId, AdminId; [2] PostingId -> EP_Id [Highest NF]: BCNF 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 Normalization Analysis [FD]: [1] RP_Id -> PostingId, MembershipId; [2] PostingId -> RP_Id [Highest NF]: BCNF 12 CommentId CommentId, CommTime, Comment, PostingId, ParentCommentId, GMMemberId) Candidate Keys [1] PostingId references Posting(PostingId), [2] ParentCommentId references Comment(CommentId), [3] GMMemberId references GMMember(GMId) Nullable Attributes Poreign Keys [1] PostingId references Posting(PostingId), [2] ParentCommentId references Comment(CommentId), [3] GMMemberId references GMMember(GMId) Nullable Attributes ParentCommentId, PostingId Non-nullable Attributes ParentCommentId, CommTime, Comment, GMId Notes [1] A surrogate key, CommentId, is created as the primary key. [FD]: CommentId -> CommentId, GMMemberId [Highest NF]: BCNF		
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GWMemberId	Notes	[1] A surrogate key, CommentId, is created as the primary key.
	Normalization Analysis	[FD]: CommentId -> CommTime, Comment, PostingId, ParentCommentId,
[Highest NF]: BCNF		GWMemberld
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