

DASC 5333 Database Systems for Data Science
CSCI 4333 Design of Database Systems
Spring 2024
Suggested Solution to Homework #4

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

The relation schema:

1	Account(<u>Username</u> , Password)
Candidate Keys	[1] Username
Foreign Keys	
Nullable Attributes	
Non-nullable Attributes	Username, Password
Notes	
2	TRMember(<u>TRMemberId</u> , LName, FName, ScreenName, StartTime, EMail, ReferrerTRMemberId, Username)
Candidate Keys	[1] TRMemberId, [2] ScreenName
Foreign Keys	[1] ReferrerTRMemberId references TRMember(TRMemberId), [2] Username references Account(Username)
Nullable Attributes	TRRefererMemberId, EMail
Non-nullable Attributes	TRMemberId, LName, FName, ScreenName, StartTime
Notes	
3	Team(<u>TeamId</u> , TName, Description, Since, OwnerTRMemberId)
Candidate Keys	[1] TeamId
Foreign Keys	[1] OwnerTRMemberId references TRMember(TRMemberId)
Nullable Attributes	Description
Non-nullable Attributes	TeamId, TName, Since, OwnerTRMemberId
Notes	
4	TeamManager(<u>ManagerId</u> , TRMemberId, TeamId)
Candidate Keys	[1] ManagerId, [2] TRMemberId, TeamId
Foreign Keys	[1] TRMemberId references TRMember(TRMemberId), [2] TeamId references Team(TeamId)
Nullable Attributes	
Non-nullable Attributes	ManagerId, TRMemberId, TeamId
Notes	[1] ManagerId is created as a surrogate primary key.
5	TeamMember(<u>TMId</u> , TRMemberId, TeamId, JointTime)
Candidate Keys	[1] TMId, [2] TRMemberId, TeamId, JointTime
Foreign Keys	[1] TRMemberId references TRMember(TRMemberId), [2] TeamId references Team(TeamId)
Nullable Attributes	
Non-nullable Attributes	TMId, TRMemberId, TeamId, JointTime
Notes	[1] TMId is created as a surrogate primary key.
6	RoleLevel(<u>RLNum</u> , Definition)
Candidate Keys	[1] RLNum
Foreign Keys	

Nullable Attributes	
Non-nullable Attributes	RLNum, Definition
Notes	
7	Role(<u>RoleId</u> , RLNum)
Candidate Keys	[1] RoleId
Foreign Keys	[1] RLNum references RoleLevel(RLNum)
Nullable Attributes	
Non-nullable Attributes	RoleId, RLNum
Notes	[1] RoleId is created as a surrogate primary key. [2] We used three relations to implement the three classes Role, UserDefinedRole and StandardRole. It is possible to use only one relation.
8	TeamSpecificRole(<u>TSRId</u> , TSRName, Description, CTime, RoleId, ManagerId)
Candidate Keys	[1] TSRId, [2] RoleId
Foreign Keys	[1] RoleId references Role(RoleId), [2] ManagerId references TeamManager(ManagerId)
Nullable Attributes	Description
Non-nullable Attributes	TSRId, TSRName, CTime, RoleId, ManagerId
Notes	[1] TSRId is created as a surrogate primary key.
9	StandardRole(<u>SRId</u> , SRName, RoleId)
Candidate Keys	[1] SRId, [2] SRName, [3] RoleId
Foreign Keys	[1] RoleId references Role(RoleId)
Nullable Attributes	
Non-nullable Attributes	SRId, SRName, RoleId
Notes	[1] SRId is created as a surrogate primary key.
10	TeamMemberRole(<u>TMRId</u> , TMId, RoleId)
Candidate Keys	[1] TMRId, [2] TMId, RoleId
Foreign Keys	[1] TMId references TeamMember(TMId), [2] RoleId references Role(RoleId)
Nullable Attributes	
Non-nullable Attributes	TMRId, TMId, RoleId
Notes	[1] TMRId is created as a surrogate primary key.
11	ProjectStatus(<u>PSId</u> , PSName, Description)
Candidate Keys	[1] PSId
Foreign Keys	
Nullable Attributes	Description
Non-nullable Attributes	PSId, PSName
Notes	[1] PSId is created as a surrogate primary key.
12	Project(<u>ProjectId</u> , PName, Description, ExpCompTime, ActCompTime, CurrentStatusId, ParentProjectId, TeamId, CreatorManagerId, AssigneeTMId)
Candidate Keys	[1] ProjectId
Foreign Keys	[1] CurrentStatusId references Status(StatusId), [2] CreatorManagerId references Manger(ManagerId), [3] AssigneeTMId references TeamMember(TMId), [4] ParentProjectId references Project(ProjectId), [5] TeamId references Team(TeamId)
Nullable Attributes	ParentProjectId, AssigneeTMId
Non-nullable Attributes	ProjectId, PName, Description, ExpCompTime, ActCompTime, TeamId, CreatorManagerId, CurrentStatusId

Notes	
13	Status(StatusId, ProjectId, PSId, PSTime)
Candidate Keys	[1] StatusId, [2] ProjectId, PSId, PSTime
Foreign Keys	[1] ProjectId references Project(ProjectId), [2] PSId references ProjectStatus(PSId)
Nullable Attributes	
Non-nullable Attributes	Status, ProjectId, PSId, PSTime
Notes	