CSCI 4333.1 Design of Database Systems
Spring 2017

Suggested Solution for HW #9 Question 1.

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

The relation schema:

1	Swimmer(SwimmerId, FName, LName, Phone, Email, JoinTime, CurrentLevelId, Main_CT_Id, Main_CT_Since)
Candidate Keys	[1] SwimmerId
Foreign Keys	[1] Main_CT_Id references CareTaker(CT_Id), [2] CurrentLevelId references Level(LevelId).
Nullable Attributes	
Notes	[1] The relationship "Main Caretaker" is implemented as two attributes Main_CT_Id and Main_CT_Since. It is also acceptable to use a separate relation to implement the relationship. [2] CurrentLevelId is a derived column that can be obtained from the table LevelHistory.
Normalization Analysis	FD: (1) SwimmerId -> FName, LName, Phone, Email, JoinTime, CurrentLevelId, Main_CT_Id, Main_CT_Since Highest NF: BCNF
2	Caretaker(CT_Id, FName, LName, Phone, Email)
Candidate Keys	[1] CT_Id
Foreign Keys	
Nullable Attributes	
Notes	
Normalization Analysis	FD: (1) CT_Id -> FName, LName, Phone, Email Highest NF: BCNF
3	OtherCaretaker(OC_Id, SwimmerId, CT_Id, Since)
Candidate Keys	[1] OC_Id, [2] {SwimmerId, CT_Id}
Foreign Keys	
Nullable Attributes	
Notes	[1] A surrogate key, OC_Id, is created as the primary key. This is optional.
Normalization Analysis	FD: (1) OC_Id -> SwimmerId, CT_Id, Since; (2) SwimmerId, CT_Id -> OC_Id Highest NF: BCNF
4	Level(LevelId, Level, Description)
Candidate Keys	[1] LevelId, [2] Level
Foreign Keys	
Nullable Attributes	Possibly Description, depending on assumptions made.
Notes	
Normalization Analysis	FD: (1) LevelId -> Level, Description; (2) Level -> LevelId Highest NF: BCNF
5	LevelHistory(LH_Id, SwimmerId, LevelId, StartDate, Comment)
Candidate Keys	[1] LH_Id, [2] SwimmerId, LevelId
Foreign Keys	[1] SwimmerId references Swimmer(SwimmerId), [2] LevelId references

	Level(LevelId).
Nullable Attributes	Comment
Notes	(1) A surrogate key, LH_Id, is created as the primary key. This is optional.
Normalization Analysis	FD: (1) LH_Id -> SwimmerId, LevelId, StartDate, Comment; (2) SwimmerId, LevelId -> LH_Id} Highest NF: BCNF
6	Coach(CoachId, FName, LName, Phone, Email)
Candidate Keys	(1) CoachId
Foreign Keys	
Nullable Attributes	
Notes	
Normalization Analysis	FD: (1) CoachId -> FName, LName, Phone, Email Highest NF: BCNF
7	Meet(MeetID, Title, Date, StartTime, EndTIme, VenueId, CoachId)
Candidate Keys	[1] MeetId
Foreign Keys	[1] CoachId references Coach(CoachId), [2] VenueId references Venue(VenueId)
Nullable Attributes	
Notes	
Normalization Analysis	FD: (1) MeetID -> Title, Date, StartTime, EndTIme, VenueId, CoachId Highest NF: BCNF
8	Venue(VenueId, Name, Address, City, State, ZipCode, Phone)
Candidate Keys	[1] VenueId, [2] Name (likely), [3] {Address, City, State, ZipCode} (likely)
Foreign Keys	
Nullable Attributes	
Notes	
Normalization Analysis	FD: (1) VenueId -> Name, Address, City, State, ZipCode, Phone; (2) Name -> VenueId (likely), (3) Address, City, State, ZipCode -> VenueId (likely) Highest NF: BCNF
9	Event(EventId, Title, StartTime, EndTime, MeetId, LevelId)
Candidate Keys	[1] EventId
Foreign Keys	[1] MeetId references Meet(MeetId), [2] LevelId references Level(LevelId).
Nullable Attributes	
Notes	
Normalization Analysis	FD: (1) EventId -> Title, StartTime, EndTime, MeetId, LevelId Highest NF: BCNF
10	Participation(ParticipationId, SwimmerId, EventId, Committed, CommitTime, Participated, Result, Comment, CommentCoachId)
Candidate Keys	[1] ParticipationId, [2] SwimmerId, EventId.
Foreign Keys	[1] SwimmerId references Swimmer(SwimmerId), [2] EventId references Event(EventId), [3] CommentCoachId references Coach(CoachId)
Nullable Attributes	Committed, CommitTime, Participated, Result, Comment, CommentCoachId
Notes	(1) A surrogate key, ParticipationId, is created as the primary key. It is optional.
Normalization Analysis	FD: (1) ParticipationId -> SwimmerId, EventId, Committed, CommitTime, Participated, Result, Comment, CommentCoachId, (2) SwimmerId, EventId -

	> ParticipationId Highest NF: BCNF
11 V_TaskList(VTL_Id, MeetId, Required, Description, Penalty, PenaltyAmt)	
Candidate Keys	[1] VTL_Id, [2] MeetId
Foreign Keys	[1] MeetId references Meet(MeetId)
Nullable Attributes	Penalty, PenaltyAmt
Notes	[1] A surrogate key, VTL_Id, is created as the primary key.
Normalization Analysis	FD: (1) VTL_Id -> MeetId, Required, Description, Penalty, PenaltyAmt; (2) MeetId -> VTL_Id Highest NF: BCNF
12 V_Task(VT_Id, VTL_Id, Name, Comment, Num_V)	
Candidate Keys	[1] VT_Id, [2] {VTL_Id, Name} (likely)
Foreign Keys	[1] VTL_Id references V_TaskList(VTL_Id)
Nullable Attributes	Comment (possibly)
Notes	[1] A surrogate key, VT_Id, is created as the primary key. [2] Num_V is not nullable and has a default value of 1.
Normalization Analysis	FD: (1) VT_Id, VTL_Id, Name, Comment, Num_V; (2) VTL_Id, Name -> VT_Id Highest NF: BCNF
13 Commitment(CommitmentId, CT_Id, VT_Id, CommitTime, Rescinded, RescindTime, CarriedOut, Comment, CommentCoachId)	
Candidate Keys	[1] CommitmentId, [2] {CT_ID, VT_Id}
Foreign Keys	[1] CT_Id references Caretaker(CT_Id), [2] VT_Id references V_Task(VT_Id), [3] CommentCoachId references Coach(CoachId)
Nullable Attributes	Rescinded, RescindTime, CarriedOut, Comment, CommentCoachId
Notes	[1] A surrogate key, CommitmentId, is created as the primary key.
Normalization Analysis	FD: (1) CommitmentId –> CT_Id, VT_Id, CommitTime, Rescinded, RescindTime, CarriedOut, Comment, CommentCoachId; (2) CT_Id, VT_Id -> CommitmentId Highest NF: BCNF