**CSCI 4333.1 Design of Database Systems  
Fall 2016**

**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:  Highest NF: |
| 2 | Caretaker(CT\_Id, FName, LName, Phone, Email) | |
| Candidate Keys | | [1] CT\_Id |
| Foreign Keys | |  |
| Nullable Attributes | |  |
| Notes | |  |
| Normalization Analysis | | FD:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 6 | Coach(CoachId, FName, LName, Phone, Email) | |
| Candidate Keys | | (1) CoachId |
| Foreign Keys | |  |
| Nullable Attributes | |  |
| Notes | |  |
| Normalization Analysis | | FD:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |
| 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:  Highest NF: |