University of British Columbia, Vancouver

Department of Computer Science

CPSC 304 Project Cover Page

Milestone #: 2

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Group Number: 67

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)
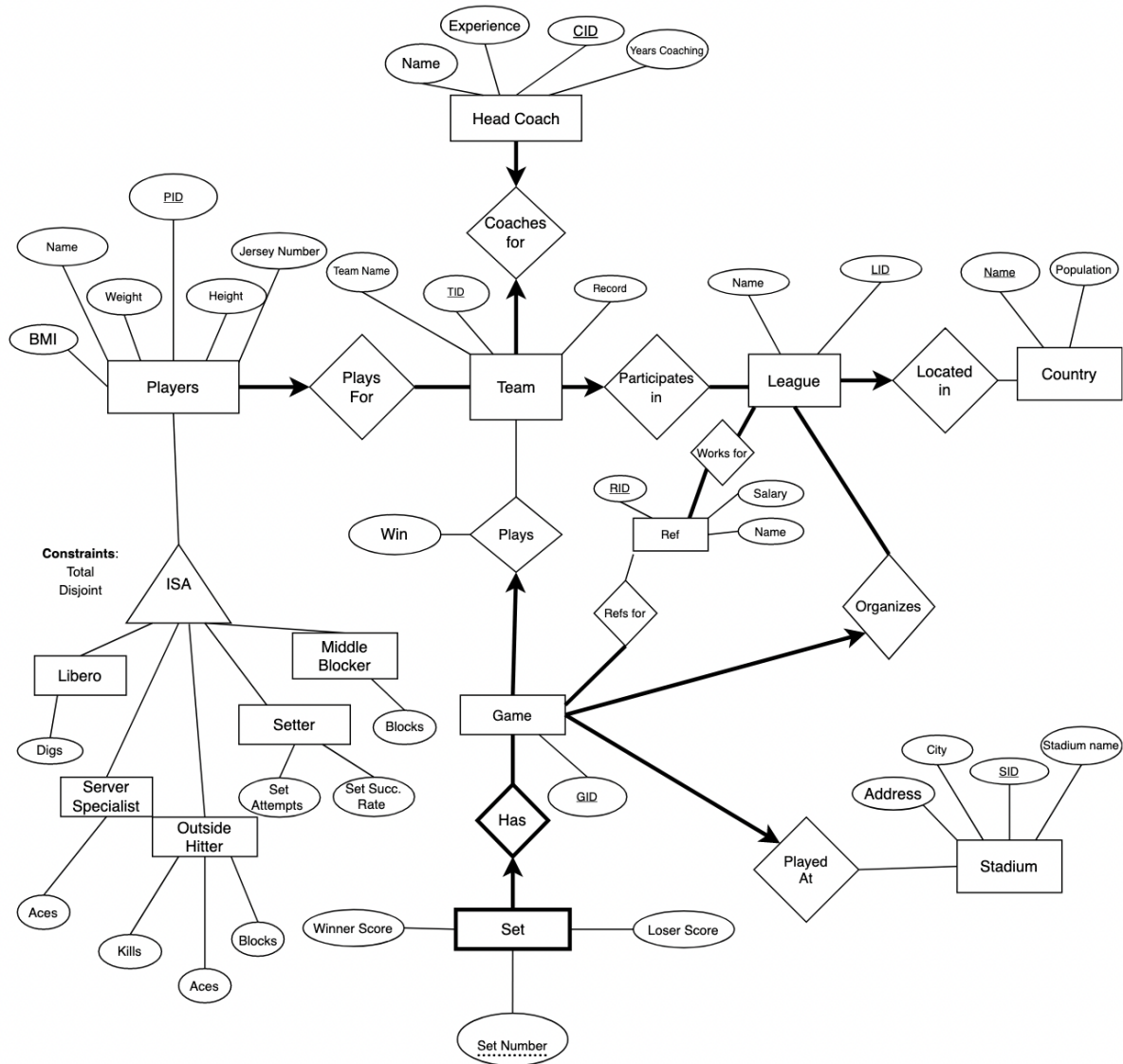
In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

ER Diagram:

ISA: Players ISA Libero, Setter etc
Weak entity: Set
(non-weak) Entities: Head Coach, Ref, Player, Team, League, Country, Stadium, Game

ER Diagram Changes:

- Added interesting attributes to the types of players: Libero, Server Specialist, Outside Hitter, Setter, and Middle Blocker, to make the type of players more distinctive entities
- Added a plays relationship between game and team with a boolean win/loss attribute 'Win' to simplify the relationships between game and team
- Renamed the coach entity to head coach to specify that there is only one head coach per team
- Added BMI attribute to Player that Depends on Height and Weight
- Added Address Attribute to Stadium that allows Stadium Name to be determined from City and Address
- Added Experience attribute to Head Coach that is the number of years they have been coaching

Schemas:

League(LID:Integer, Name:String, CountryName:String)
 PK:LID, FK:CountryName references Country(Cname), CKs: LID
Country(Name:String, Population:Integer)
 PK:Name, CK: Name
Stadium(SID:Integer, StadiumName:String, City:String, Address:String)
 PK:SID, CK: SID
Ref(RID:Integer, Name:String, Salary:Integer)
 PK:RID, CK: RID
HeadCoach(CID:Integer, Name:String, YearsCoaching:Integer, Experience:String)
 PK:CID, CK: CID
Team(TID:Integer, TeamName:String, Record:Integer, LID:Integer, CID:Integer)
 PK:TID, FK:LID, CID, CK: TID
Game(GID:Integer, SID:Integer, LID:Integer)
 PK:GID,SID FK:SID, LID, CK: GID
Set(SetNumber:Integer, WinnerScore:Integer, LoserScore:Integer, GID:Integer)
 PK:{SetNumber,GID}, FK: CK: {SetNumber, GID}
Players(PID:Integer, Name:String, JerseyNumber:Integer, Weight:Integer,
Height:Integer, BMI: Decimal, TID:Integer)
 PK:PID, FK:TID, CK: PID
Libero(PID:Integer, Digs:Integer)
 PK:PID, FK:PID, CK: PID
ServerSpecialist(PID:Integer, Aces:Integer)
 PK:PID, FK:PID, CK: PID
OutsideHitter(PID:Integer, Kills:Integer, Aces:Integer, Blocks:Integer)
 PK:PID, FK:PID, CK: PID

Setter(PID:Integer, SetAttempts:Integer, SetSuccessRate:Decimal)
    PK:PID, FK:PID, CK: PID
MiddleBlocker(PID:Integer, Blocks:Integer)
    PK:PID, FK:PID, CK: PID
WorksFor(RID:Integer, LID:Integer)
    PK:{RID,LID}, FK:RID, LID, CK: {RID, LID}
RefsFor(RID:Integer, GID:Integer)
    PK:{RID,GID}, FK:RID, GID
Plays(GID:Integer, TID:Integer, Win:Boolean)
    PK: {GID,TID}, FK:GID, TID, CK:{GID,TID}, {GID,Win}

Functional Dependencies:

League:
    LID -> Name, CountryName

Country:
    CountryName -> Population

Stadium:
    SID -> City, StadiumName, Address
    City, Address -> StadiumName

Ref:
    RID -> Salary, Name

Head Coach:
    CID -> Name, Years Coaching, Experience
    YearsCoaching -> Experience

Team:
    TID -> Team Name, Record

Game:
    GID SID -> LID

SET:
    SetNumber,GID -> Winner Score, Loser Score

Players:

PID -> Name, Weight, Height, Jersey/Number, BMI
Height, Weight -> BMI

Libero:
PID -> Digs

ServerSpecialist:
PID -> Aces

OutsideHitter:
PID -> Kills, Aces, Blocks

Setter:
PID -> SetAttempts, SetSuccessRate

MiddleBlocker:
PID -> Blocks

Plays:
{GID, TID} -> Win

WorksFor:
{RID, LID} -> RID, LID

RefsFor:
{RID, GID} -> RID, GID

Normalization:

For Stadium:
R(SID, City, StadiumName, Address)
SID -> City
SID -> StadiumName
SID -> Address
City, Address -> StadiumName
Key: SID

R_1(SID, City, Address) R_2(City, Address, StadiumName)
R_3(SID, StadiumName)
R_1 R_2 R_3 is in 3NF

For HeadCoach

        R(CID, Name, YearsCoaching, Experience)

        CID -> Name

        CID -> YearsCoaching

        CID -> Experience

        YearsCoaching -> Experience

        Key: SID

        R_1(CID, Name, YearsCoaching) R_2(YearsCoaching, Experience)

        R_3(CID, Experience)

        R_1 R_2 R_3 is in 3NF

For Players:

        R(PID,Name,Height,Weight,JerseyNumber,BMI,TID)

        PID -> Name

        PID -> Weight

        PID -> Height

        PID -> JerseyNumber

        PID -> BMI

        PID -> TID

        Height, Weight -> BMI

        Key: PID

        R_1(Height,Weight,BMI) R_2(PID,Name,JerseyNumber,Weight,Height,TID)

        R_3(PID,BMI)

        R_1 R_2 R_3 is in 3NF

HeadCoach(CID, Name, YearsCoaching)

        PK:CID, CK:CID

Experience(YearsCoaching, Experience)

        PK:YearsCoaching, CK:YearsCoaching

CoachExperience(CID, Experience)

        PK:CID, CK:CID

StadiumAddress(SID, City, Address)

        PK: SID, CK:SID

StadiumName(City, Address, StadiumName)

        PK: {City,Address}, CK: {City,Address}

Stadium(SID, StadiumName)

        PK: SID, CK:SID

Players(PID:Integer,Name:String,JerseyNumber:Integer,Weight:Integer,Height:Integer, TID:Integer)

      PK: PID, CK:PID

PlayerBMI(PID:Integer, BMI:Decimal)

      PK: PID, CK:PID

BMI(Height:Integer,Weight:Integer,BMI:Decimal)

      PK: {Height, Weight}, CK: {Height, Weight}

The following relations are all Normalized (all FDs are form: PK -> …):

League(LID:Integer, Name:String, CountryName:String)
Country(Name:String, Population:Integer)
Ref(RID:Integer, Name:String, Salary:Integer)
Team(TID:Integer, TeamName:String, Record:Integer, LID:Integer, CID:Integer)
Game(GID:Integer, SID:Integer, LID:Integer)
Set(SetNumber:Integer, WinnerScore:Integer, LoserScore:Integer, GID:Integer)
Libero(PID:Integer, Digs:Integer)
ServerSpecialist(PID:Integer, Aces:Integer)
OutsideHitter(PID:Integer, Kills:Integer, Aces:Integer, Blocks:Integer)
Setter(PID:Integer, SetAttempts:Integer, SetSuccessRate:Decimal)
MiddleBlocker(PID:Integer, Blocks:Integer)
WorksFor(RID:Integer, LID:Integer)
RefsFor(RID:Integer, GID:Integer)
Plays(GID:Integer, TID:Integer, Win:Boolean)

SQL DDL Statements:

CREATE TABLE League
      (LID INTEGER **PRIMARY KEY**,
      CountryName CHAR(20)**,**
      Name CHAR(20),
      FOREIGN KEY CountryName
          REFERENCES Country(CName)
          ON DELETE CASCADE)

CREATE TABLE Country
      (CName CHAR(20) **PRIMARY KEY**,
      Population INTEGER)

```
CREATE TABLE StadiumAddress
        (SID INTEGER PRIMARY KEY,
        City CHAR(20),
        Address CHAR(20))

CREATE TABLE StadiumName
        (City CHAR(20),
        Address CHAR(20),
        StadiumName CHAR(20),
        PRIMARY KEY (City,Address))

CREATE TABLE Stadium
        (SID INTEGER PRIMARY KEY,
        StadiumName CHAR(20))

CREATE TABLE Ref
        (RID INTEGER PRIMARY KEY,
        Name CHAR(20),
        Salary INTEGER)

CREATE TABLE HeadCoach
        (CID INTEGER PRIMARY KEY,
        Name CHAR(20),
        YearsCoaching INTEGER)

CREATE TABLE Experience
        (YearsCoaching INTEGER PRIMARY KEY,
        Experience CHAR(20))

CREATE TABLE CoachExperience
        (CID INTEGER PRIMARY KEY,
        Experience CHAR(20))

CREATE TABLE Team
        (TID INTEGER PRIMARY KEY,
        TeamName CHAR(20),
        Record INTEGER,
        LID INTEGER,
        CID INTEGER,
        FOREIGN KEY (LID)
```

REFERENCES League(LID)
    ON DELETE CASCADE,
FOREIGN KEY (CID)
    REFERENCES HeadCoach(CID)
    ON DELETE CASCADE)

CREATE TABLE Game
    (GID INTEGER **PRIMARY KEY**,
    SID INTEGER **PRIMARY KEY**,
    LID INTEGER,
    FOREIGN KEY (SID)
        REFERENCES Stadium(SID)
        ON DELETE CASCADE
    FOREIGN KEY (LID)
        REFERENCES League(LID)
        ON DELETE CASCADE)

CREATE TABLE Set
    (SetNumber INTEGER ,
    WinnerScore INTEGER,
    LoserScore INTEGER,
    GID INTEGER,
    PRIMARY KEY (SetNumber, GID),
    FOREIGN KEY (GID)
        REFERENCES Game(GID)
        ON DELETE CASCADE)

CREATE TABLE Players
    (PID INTEGER **PRIMARY KEY**,
    Name CHAR(20),
    Weight INTEGER,
    Height INTEGER,
    JerseyNumber INTEGER,
    TID INTEGER,
    FOREIGN KEY (TID)
        REFERENCES Team(TID)
        ON DELETE CASCADE)

CREATE TABLE PlayerBMI
    (PID INTEGER **PRIMARY KEY**,

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        BMI DECIMAL(2,2))

CREATE TABLE BMI
        (Height INTEGER,
        Weight INTEGER,
        BMI DECIMAL(2,2))
        PRIMARY KEY (Height, Weight))

CREATE TABLE Libero
        (PID INTEGER PRIMARY,
        Digs INTEGER,
        FOREIGN KEY (PID)
                REFERENCES Player(PID))
                ON DELETE CASCADE))

CREATE TABLE ServerSpecialist
        (PID INTEGER PRIMARY KEY,
        Aces INTEGER,
        FOREIGN KEY (PID)
                REFERENCES Player(PID)
                ON DELETE CASCADE)

CREATE TABLE OutsideHitter
        (PID INTEGER PRIMARY KEY,
        Kills INTEGER
        Aces INTEGER
        Blocks INTEGER
        FOREIGN KEY (PID)
                REFERENCES Player(PID)
                ON DELETE CASCADE)

CREATE TABLE Setter
        (PID INTEGER PRIMARY KEY,
        SetAttempts INTEGER
        SetSuccessRate DECIMAL(2,2)
        FOREIGN KEY (PID)
                REFERENCES Player(PID)
                ON DELETE CASCADE)

CREATE TABLE MiddleBlocker
```

```
        (PID INTEGER PRIMARY KEY,
        Blocks INTEGER)
        FOREIGN KEY (PID)
                REFERENCES Player(PID)
                ON DELETE CASCADE)

CREATE TABLE WorksFor
        (RID INTEGER,
        LID INTEGER,
        PRIMARY KEY (RID, LID)
        FOREIGN KEY (RID)
                REFERENCES Ref(RID)
                ON DELETE CASCADE,
        FOREIGN KEY (LID)
                REFERENCES Ref(LID)
                ON DELETE SET NULL)

CREATE TABLE RefsFor
        (RID INTEGER,
        GID INTEGER,
        PRIMARY KEY (RID, GID)
        FOREIGN KEY (RID)
                REFERENCES Game(RID)
                ON DELETE  CASCADE,
        FOREIGN KEY (GID)
                REFERENCES Team(GID)
                ON DELETE CASCADE)

CREATE TABLE Plays
        (GID INTEGER,
        TID INTEGER,
        Win BOOLEAN,
        PRIMARY KEY (GID, TID),
        UNIQUE (GID, Win),
        FOREIGN KEY (GID)
                REFERENCES Game(GID)
                ON DELETE  CASCADE,
        FOREIGN KEY (TID)
                REFERENCES Team(TID)
                ON DELETE CASCADE)
```

Insertions:

INSERT INTO League(LID, CountryName, Name)
VALUES   ('1', 'Canada', 'The Canadian League')
                ('2', 'USA', 'American Volleyball Open')
                ('3', 'Italy', 'Superlega')
                ('4', 'Brazil', 'Super League')
                ('5', 'France', 'Pro A')

INSERT INTO Country(CName, Population)
VALUES   ('Canada', '38010000')
                ('USA', '329500000')
                ('Italy', '59550000')
                ('Brazil', '212600000')
                ('France', '67390000')

INSERT INTO StadiumAddress(SID, City)
VALUES   ('1', 'Vancouver')
                ('2', 'Sydney')
                ('3', 'Rio de Janeiro')
                ('4', 'Los Angeles')
                ('5', 'Paris')

INSERT INTO StadiumName(City, Address, StadiumName)
VALUES   ('Vancouver', '1234 Numbers Street','Stadium One')
                ('Sydney', 'Driver Ave', 'Sydney Cricket Ground')
                ('Rio de Janeiro', 'Maracana Road', 'Maracana Stadium')
                ('Los Angeles', '1111 S Figueroa Street', 'Staples Center')
                ('Paris', 'Bercy Boulevard', 'Accor Arena')

INSERT INTO Stadium(SID, StadiumName)
VALUES   ('1','Stadium One')
                ('2', 'Sydney Cricket Ground')
                ('3', 'Maracana Stadium')
                ('4', 'Staples Center')
                ('5', 'Accor Arena')

INSERT INTO Ref(RID, Name, Salary)

VALUES   ('1', 'Charlotte Leclerc', '45000')
                ('2', 'Sam Sedin', '67000')
                ('3', 'Michael Jordan', '400000')
                ('4', 'Eric Demko', '23000')
                ('5', 'Pam Fleming', '50000')

INSERT INTO HeadCoach(CID, Name, YearsCoaching)
VALUES   ('1', 'Jason Jenkins', ' 4')
                ('2', 'Mary Smith', '8')
                ('3', 'Geoffrey Green', '17')
                ('4', 'Fletcher Flin', '1')
                ('5', 'Tiffany Thompson', '5')

INSERT INTO Experience(YearsCoaching, Experience)
VALUES   ('4', 'Beginner')
                ('8', 'Veteran')
                ('17', 'Veteran')
                ('1', 'Beginner')
                ('5', 'Intermediate')

INSERT INTO CoachExperience(CID, Experience)
VALUES   ('1', 'Beginner')
                ('2', 'Veteran')
                ('3', 'Veteran')
                ('4', 'Beginner')
                ('5', 'Intermediate')

INSERT INTO Team(TID, TeamName, Record, LID, CID)
VALUES   ('1', 'Dolphins', '5', '2', '2')
                ('2', 'Volley ViKings', '9', '3', '4')
                ('3', 'Dolphins', '3', '1', 2)
                ('4', 'Templeton Titans', '4', '4', '5')
                ('5', 'Apex14U', '1', '1', '1')

INSERT INTO Game(GID, SID, LID)
VALUES   ('1', '1', '1')
                ('1', '2', '1')
                ('2', '3', '2')
                ('2', '4', '2')
                ('2', '5', '2')

INSERT INTO Set(SetNumber, WinnerScore, LoserScore, GID)
VALUES ('1', '25', '20', '1')
('2', '25', '20', '1')
('1,' '25', '19', '2')
('1', '25', '16', '2')
('1', '15', '13', '2')

INSERT INTO Players(PID, Name, JerseyNumber, Weight, Height, TID)
VALUES ('1', 'Steve Matthews', '27', '160', '182', '1')
('2', 'Bob Smith', '180', '140', '1')
('3', 'Frank Herbert', '190', '190', '1')
('4', 'Derek Jeter', '185', '185', '1')
('5', 'Daniel Rodriguez', '170', '170', '1')

INSERT INTO PlayerBMI(PID, BMI)
VALUES ('1', '21.7')
('2', '42.6')
('3', '23.9')
('4', '24.5')
('5', '26.7')

INSERT INTO BMI(Height,Weight,BMI)
VALUES ('182', '160', '21.7')
('140', '180', '42.6')
('190', '190', '23.9')
('185', '185', '24.5')
(170'', '170', '26.7')

INSERT INTO Libero(PID, Digs)
VALUES ('2', '50')
('6', '60')
('11', '55')
('16', '60')
('21', '45')

INSERT INTO ServerSpecialist(PID, Aces)
VALUES ('5', '45')
('7', '40')
('12', '35')

          ('17', '25')
          ('22', '20')

INSERT INTO OutsideHitter(PID, Kills, Aces, Blocks)
VALUES   ('1', '25', '10', '15')
          ('8', '15', '10', '8')
          ('13', '20', '18', '10')
          ('18', '16', '20', '19')
          ('23', '19' ,'23', '18')

INSERT INTO Setter(PID, SetAttempts, SetSuccessRate)
VALUES   ('3', '80', '0.82')
          ('9', '100', '0.71')
          ('14', '70', '0.68')
          ('19', '53', '0.42')
          ('24', '60', '0.81')

INSERT INTO MiddleBlocker(PID, Blocks)
VALUES   ('4',' 26')
          ('10', '25')
          ('15', '24')
          ('20', '12')
          ('25', '19')

INSERT INTO WorksFor(RID, LID)
VALUES   ('1', '1')
          ('2', '2')
          ('4', '5')
          ('4', '2')
          ('3', '2')

INSERT INTO RefsFor(RID, GID)
VALUES   ('1', '1')
          ('2', '2')
          ('4', '2')
          ('3', '2')
          ('4', '2')

INSERT INTO Plays(GID, TID, Win)
VALUES   ('1', '1', 'True')

('1', '3', 'False')
('2', '5', 'False')
('2', '4', 'True')
('3', '2', 'True')