University of British Columbia, Vancouver
Department of Computer Science

CPSC 304 Project Cover Page

Milestone #: ____2____

Date: ___Oct 20, 2023____

Group Number: ___5___
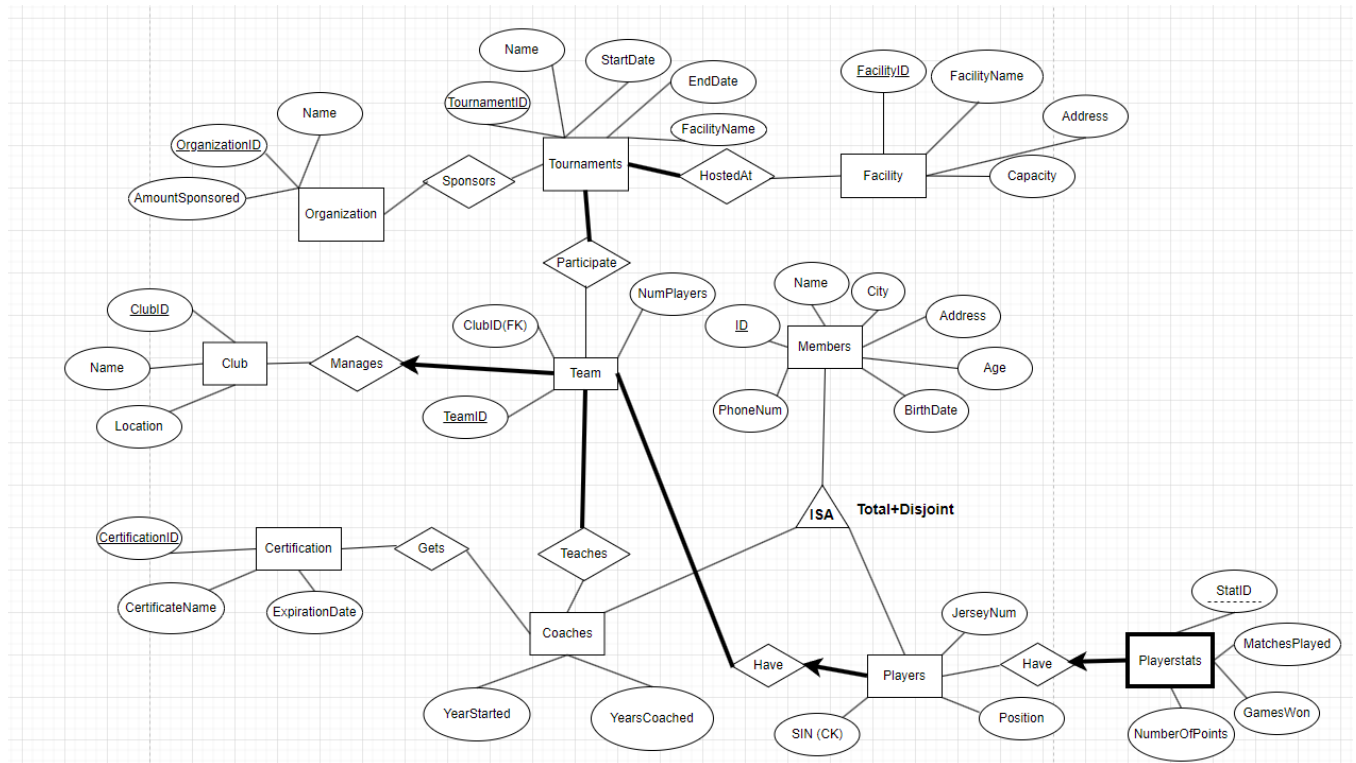
Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Serra Choi	31507149	q0u9q	serrachoi@gmail.com
Eric Zhang	13115150	e0c1b	ericzzhang96@gmail.com
Varneega Theva	84819218	k1z8s	varneega.theva10@gmail.com

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

Deliverables

1. **Cover page**
2. **Summary of project:** This database includes information about the competitive volleyball scene in BC, such as players, coaches, clubs, facilities, and tournaments. It is designed to serve as a centralized hub for various users within the volleybal community to keep track and have access to any information they desire.

3. **ER diagram**

Changes from milestone 1:
1) Corrected the ISA relationship between Coaches/Players/Members. Now it makes sense that both coaches and players have the attributes possessed by Members
2) Changed the relationship so that Players cannot directly participate in Tournaments themselves, only teams can.
3) Coaches and Certification have a many to many relationship

4. **Schema**
Primary key = underlined, Foreign key = **bolded**, Candidate key = *italic*

Organization (OrganizationID: Integer, Name: varchar [50], AmountSponsored: Integer) (AmountSponsored cannot be negative)

Tournament (<u>TounamentID</u>: Integer, **SponsorID(FK referencing Organization table (OrganizationID))**: Integer, Name: varchar [50], StartDate: Date, EndDate: Date, **FacilityID(FK referencing Facility table)**: Integer) (FacilityName cannot be null, EndDate must be > StartDate)

Facility (<u>FacilityID</u>: Integer, FacilityName: Varchar[50], Address: varchar [50], Capacity: Integer)

Club (<u>ClubID</u>: Integer, Name: varchar [50], Location: varchar[50]) (ClubID cannot be null)

Team (<u>TeamID</u>: Integer, **ClubID(FK referencing Club):** varchar [50], **CoachID(FK referencing Coaches)**: Integer, NumPlayers: Integer) (Club cannot be null)

Players (*SIN*: integer, **TeamID(FK referencing Team)**: Integer, JerseyNum: Integer, Position: Varchar[50]) (TeamID cannot be null, SIN must be unique)

PlayerStats (**StatID(FK referencing Players)**: Integer, MatchesPlayed: Integer, GamesWon: Integer, NumofPoints: Integer) (StatID must be unique)

Certification (<u>CertificationID</u>: Integer, CertificateName: varchar [50], ExpirationDate: Date)

Coaches (**CertificateID(FK referencing Certification)**: Integer, YearStarted*:* Integer, YearsCoached: Integer) (YearsCoached cannot be negative)

Member (<u>ID</u>: Integer, Name: varchar[50], PhoneNum: Integer, Address: varchar [50], City: varchar[50], Birthday: Date) (Name cannot be null)

5. **Functional Dependencies (FDs)**
   Organization(<u>OrganizationID</u>, Name, AmountSponsored):
   - OrganizationID → Name, AmountSponsored

   Tournaments(<u>TournamentID</u>, Name, StartDate, EndDate):
   - TournamentID → Name, StartDate, EndDate
   - Name → StartDate, EndDate

   Facility(FacilityID, FacilityName, Address, Capacity):
   - FacilityID → FacilityName, Address, Capacity

   Club(<u>ClubID</u>, Name, Location):
   - ClubID → Name, Location

   Team(TeamID, NumPlayers):
   - TeamID → ClubID, NumPlayers

Players(SIN, JerseyNum, Position):
- PlayerID → JerseyNum, Position,
- SIN → JerseyNum, Position

PlayerStats(StatID, MatchesPlayed, GamesWon, NumberOfPoints):
- StatID→ PlayerID, MatchesPlayed, GamesWon, NumberOfPoints

Certification(CertificationID, CertificateName, ExpirationDate):
- CertificationID -> CertificateName, ExpirationDate

Coaches(YearStarted, YearsCoached):
- CoachID → YearStarted, YearsCoached
- YearStarted → YearsCoached

Members(ID, Name, PhoneNum, City, Address, Age, BirthDate):
- ID → Name, City, Address, Age, BirthDate, PhoneNum
- BirthDate → Age
- Address → City
- PhoneNum → Name

6. **Normalization**
   We perform a lossless-join decomposition (BCNF) on the following relations:
   - Tournaments:
     Closures:
     - TournamentID+ = {TournamentID, Name, StartDate, EndDate}
     - Name+ = {Name, StartDate, EndDate}
     Decomposition Steps:
     -**Tournaments1**(Name, StartDate, EndDate)
     -**Tournaments2**(Name, TournamentID)
   - Members:
     Closures:
     - ID+ = ID, Name, City, Address, Age, BirthDate, PhoneNum
     - BirthDate+ = BirthDate, Age
     - Address+ = Address, City
     - PhoneNum+ = PhoneNum, Name
     Decomposition Steps:
     - **Members1**(BirthDate, Age)
     - Members2(BirthDate, ID, Name, City, Address, PhoneNum) → decompose
     - **Members3**(Address, City)
     - Members4(ID, Name, Address, PhoneNum) → decompose
     - **Members5**(PhoneNum, Name)
     - **Members6**(PhoneNum, ID, City)

After normalization, we get the following list of tables:
Primary key = <u>underlined</u>, Foreign key = **bolded**, Candidate key = *italic*

Organization (<u>OrganizationID</u>: Integer, Name: varchar [50], AmountSponsored: Integer)
(AmountSponsored cannot be negative)

Tournaments1(Name: varchar[50], StartDate: Date, EndDate: Date)

Tournaments2(<u>TournamentID</u>: Integer, Name: varchar[50])

Facility (<u>FacilityID</u>: Integer, FacilityName: Varchar[50], Address: varchar [50], Capacity: Integer)

Club (<u>ClubID</u>: Integer, Name: varchar [50], Location: varchar[50]) (ClubID cannot be null)

Team (<u>TeamID</u>: Integer, **ClubID(FK referencing Club):** varchar [50], **CoachID(FK referencing Coaches)**: Integer, NumPlayers: Integer) (Club cannot be null)

Players (*SIN*: integer, **TeamID(FK referencing Team)**: Integer, JerseyNum: Integer, Position: Varchar[50]) (TeamID cannot be null, SIN must be unique)

PlayerStats (**StatID(FK referencing Players)**: Integer, MatchesPlayed: Integer, GamesWon: Integer, NumofPoints: Integer) (StatID must be unique)

Certification (<u>CertificationID</u>: Integer, CertificateName: varchar [50], ExpirationDate: Date)

Coaches (**CertificateID(FK referencing Certification)**: Integer, YearStarted*:* Integer, YearsCoached: Integer) (YearsCoached cannot be negative)

Members1(BirthDate: Date, Age: Integer)

Members3(Address: varchar [50], City: varchar [50])

Members5(PhoneNum: Integer, Name: varchar[50])

Members6(<u>ID</u>: Integer, PhoneNum: Integer, City: varchar [50])

7. **SQL DDL**

```sql
CREATE TABLE Organization (
  OrganizationID INTEGER,
  Name VARCHAR(50),
  AmountSponsored INTEGER,
  PRIMARY KEY(OrganizationID)
)

CREATE TABLE Facility (
  FacilityID INTEGER,
  FacilityName VARCHAR(50),
  Address VARCHAR(50),
  Capacity INTEGER,
  PRIMARY KEY(FacilityID)
)

CREATE TABLE Tournament (
  TournamentID INTEGER,
  Name VARCHAR(50),
  FacilityName VARCHAR(50) NOT NULL,
  SponsorID VARCHAR(50),
  StartDate DATE,
  EndDate DATE,
  PRIMARY KEY(TournamentID),
  FOREIGN KEY(FacilityName) REFERENCES Facility,
  FOREIGN KEY(SponsorID) REFERENCES Organization
)

CREATE TABLE Club (
  ClubID INTEGER,
  Name VARCHAR(50),
  Location VARCHAR(50),
  PRIMARY KEY(ClubID)
)

CREATE TABLE Team (
  TeamID INTEGER,
  ClubID INTEGER,
  CoachID INTEGER,
  NumPlayers INTEGER,
  PRIMARY KEY(TeamID),
  FOREIGN KEY(ClubID) REFERENCES Club,
  FOREIGN KEY(CoachID) REFERENCES Coaches
)
```

```sql
CREATE TABLE Players (
  PlayerID INTEGER,
  MemberID INTEGER,
  JerseyNum INTEGER,
  Position VARCHAR(50),
  TeamID INTEGER,
  SIN INTEGER,
  PRIMARY KEY(PlayerID, MemberID),
  FOREIGN KEY(ID) REFERENCES Members,
  FOREIGN KEY(TeamID) REFERENCES Team,
  UNIQUE(SIN)
)

CREATE TABLE PlayerStats (
  StatID INTEGER,
  PlayerID Integer,
  MatchesPlayed INTEGER,
  GamesWon INTEGER,
  NumofPoints INTEGER,
  PRIMARY KEY(StatID),
  FOREIGN KEY(PlayerID) REFERENCES Players,
    ON DELETE CASCADE)
)

CREATE TABLE Certification (
  CertificationID INTEGER,
  CertificateName VARCHAR(50),
  ExpirationDate DATE,
  PRIMARY KEY(CertificationID)
)

CREATE TABLE Coaches (
  CoachID INTEGER,
  MemberID INTEGER,
  CertificateName VARCHAR(50),
  YearsCoached INTEGER,
  FOREIGN KEY(ID) REFERENCES Members,
  FOREIGN KEY(CertificateName) REFERENCES Certification,
  PRIMARY KEY(MemberID)
)

CREATE TABLE Members (
  MemberID INTEGER,
  Name VARCHAR(50),
  PhoneNum INTEGER,
  Address VARCHAR(50),
  City VARCHAR(50),
  BirthDate DATE,
  Age INTEGER,
  PRIMARY KEY(MemberID)
)
```

8. **INSERT Statements**

```sql
INSERT INTO Organization(OrganizationID, Name, AmountSponsored)
VALUES (0000001,'OrganizationOne',10000),
(0000002,'OrganizationTwo',10000),
(0000003,'OrganizationThree',20000),
(0000004,'OrganizationFour',3000),
(0000005,'OrganizationFive',5000);

INSERT INTO Facility(FacilityID, FacilityName, Address, Capacity)
VALUES (0000001,'FacilityOne','123 Abc St',500),
(0000002,'FacilityTwo','19030 74 Ave',400),
(0000003,'FacilityThree','3012 Glen Dr',500),
(0000004,'FacilityFour','222 Smith Ave',1000),
(0000005,'FacilityFive','123 Van St',700);

INSERT INTO Tournament(TournamentID, Name, FacilityName, SponsorID, StartDate, EndDate)
VALUES (0000001,'TOne','FacilityOne',0000001,2023-06-28,2023-06-30),
(0000002,'TTwo','FacilityTwo','19030 74 Ave',0000002,2024-03-28,2023-03-30),
(0000003,'TThree','FacilityThree','3012 Glen Dr',0000003,2023-01-18,2023-01-19),
(0000004,'TFour','FacilityFour','222 Smith Ave',0000004,2023-07-28,2023-07-30),
(0000005,'TFive','FacilityFive','123 Van St',0000005,2024-06-25,2024-06-29);

INSERT INTO Club(ClubID, Name, Location)
VALUES (0000001,'ClubOne','333 Sunny Ave'),
(0000002,'ClubTwo','5034 Lock Ave'),
(0000003,'ClubThree','4102 Ocean Dr'),
(0000004,'ClubFour','3032 Bob Ave'),
(0000005,'ClubFive','553 Smith St');

INSERT INTO Team(TeamID, ClubID, CoachID, NumPlayers)
VALUES (000001,0000001,11111,11),
(000002,0000002,22222,15),
(000003,0000003,33333,10),
(000004,0000004,44444,14),
(000005,0000005,55555,10);
```

```sql
INSERT INTO Players(PlayerID, MemberID,JerseyNum, Position, TeamID, SIN)
VALUES (1001,001,00,"Power",000001,665577),
(1015,002,10,"Middle",000001,556633),
(1022,003,16,"Setter",000003,663321),
(1010,004,09,"Power",000005,332244),
(1032,005,99,"Libero",000005,562525S);

INSERT INTO PlayerStats(StatID, PlayerID, MatchesPlayed, GamesWon, NumofPoints)
VALUES (00000001,1001,5,2, 2000),
(00000002,1015,15,8,500),
(00000003,1022,25,10,900),
(00000004,1010,30,10,3000),
(000000005,1032,1,0,100);

INSERT INTO Certification(CertificationID, CertificateName, ExpirationDate)
VALUES (55551,'CertOne',2023-06-12),
(55552,'CertTwo',2023-02-11),
(55553,'CertThree',2024-01-01),
(55554,'CertFour',2023-10-10),
(55555,'CertFive',2023-06-13);

INSERT INTO Coaches(CoachID, MemberID, CertificateName, YearsCoached)
VALUES (00000010,010,'CertOne',2),
(00000011,012,'CertOne',3),
(00000012,013,'CertThree',6),
(00000013,020,'CertTen',12),
(00000014,021,'CertOne',5);

INSERT INTO Member(MemberID, Name, PhoneNum, Address, City, Birthdate, Age)
VALUES (001,'Bob Smith',6045555555,'123 Sunny Ave', 'Vancouver',1996-01-01, 20),
(002,'Joe David',6045557777,'333 Flemings Ave', 'Vancouver',1991-02-01,19),
(003,'Billy Smith',6045555566,'555 Water Ave', 'Burnaby',2000-11-10,19),
(004,'Sue Anderson',6045555353,'6063 Blue Street', 'Richmond',1996-01-01,22),
(005,'Michael Scott',6045555151,'2323 80 Ave', 'Surrey',1996-01-01,24);
```