

## Entities:

- Games
  - Primary Key: Title
  - Other attributes: duration, minPlayer, maxPlayer, rating
- GameInstance
  - Primary Key: Id, Title
  - Foreign Key:
    - Title references Game
  - Other attributes: datePurchased, language
- Publisher
  - Primary Key: Name
  - Other attributes: Email, country, address, phone number
- Genre
  - Primary Key: Name
- Members
  - Primary Key: MemberNumber
  - Other attributes: Name, Email, Phone number, Year
  - ISA (partial coverage)
- Execs
  - Primary Key: MemberNum
  - Foreign Key: MemberNum references Member
  - O: Position
- Events
  - Primary Key: name, date
  - Other attributes: startTime, endTime, location, description
- BorrowRecord
  - Primary Key: recordID
  - Foreign Key: memberNumber references Member, execNumber references Member
  - Other attributes: expectedReturnDate, actualReturnDate, dateBorrowed, timeBorrowed

## Relationships:

- PublishedBy
  - Games are published by at least one publisher
  - Publishers can publish zero or more games
- hasGenre
  - Games have a genre
  - There must be at least one genre for a game
  - There can be many games for genre
- is
  - GameInstances are instances of Games
  - There must be at least and at most one game for a game instance

- There can be many instances of a game
- Has
  - A member has zero or more borrow records
  - A borrow record can only have one member attached to it
- Contains
  - A borrow record contains one or more games
  - A game can be in zero or more borrow records
- Attends
  - Members attend events
  - Members can attend as many events as they want
  - Events can have as many members as they want
- Manages
  - Execs manage the borrow record
  - Execs can manage as many borrow records as they want
  - A borrow record can be managed by exactly 1 exec
- Hosts
  - Execs host an event
  - Execs can host as many events as they want
  - Events have to be hosted by at least one exec
- Uses
  - A game instance can be used for zero or more events
  - An event can use zero or more game instances

Underlined attributes are primary keys, bolded attributes are foreign

## Entities:

### Events:

R(name, date, description, startTime, endTime, location)

FDs: Name, date → description, startTime, endTime, location

In English: The name and date of an event should imply the description, location as well as the start and end time of the event.

Does not violate BCNF, as (name, date) is a key.

As such, it is also in 3NF.

### Game instance:

R(id, borrowed, datePurchased, language, **gameTitle**)

Foreign: gameTitle references Game

FDs: ID, gametitle → borrowed, datePurchased, language

In English: The ID and game title of a physical copy of a game that the club owns should provide information to whether it is currently borrowed, the date it was purchased and the language it is in.

Does not violate BCNF, as (id, title) is a key.

As such, it is also in 3NF.

### Game:

R(title, rating, minPlayer, maxPlayer)

FDs: title → rating, minPlayer, maxPlayer

In English: The title of a game should give information about its rating and player range.

Does not violate BCNF, as (title) is a key.

As such, it is also in 3NF.

**Publisher:**

R(name, phoneNumber, email, country)

FDs: name -> phoneNumber, email, country

In English: The name of a publisher company should imply their phone number, email address and country of origin.

Does not violate BCNF, as (name) is a key.

As such, it is also in 3NF.

**BorrowRecord:**

R(recordID, expectedReturnDate, actualReturnDate, dateBorrowed, timeBorrowed, **memberNumber**, **execNumber**)

Foreign: memberNumber references Member, execNumber references ExecutiveMember

FDs: recordID -> expectedReturnDate, actualReturnDate, dateBorrowed, timeBorrowed, memberNumber, execNumber

In English: The ID of a borrow record should give information to when the game is expected to be returned, when it was actually returned, when it was borrowed, who borrowed it and which exec allowed it to be borrowed.

Does not violate BCNF, as (recordID) is a key.

As such, it is also in 3NF.

**ExecutiveMember:**

R(memberNumber, position)

FDs: memberNumber -> position

In English: The member number of an executive member should imply their position.

Does not violate BCNF, as (memberNumber) is a key.

As such, it is also in 3NF.

**Member:**

R(memberNumber, year, name, phoneNumber, email)

FDs: memberNumber -> name, email, phoneNumber, year

In English: The member number of a member should imply their name, email address, phone number and year level.

Does not violate BCNF, as (memberNumber) is a key.

As such, it is also in 3NF.

**Genre:**

R(name)

Does not violate BCNF as there is only one attribute (the key).  
As such, it is also in 3NF.

**Relationships:****PublishedBy:**

R(publisherName, gameTitle, datePublished)

FDs: gameTitle, publisherName -> datePublished

Does not violate BCNF, as (title, publisherName) is a key.  
As such, it is also in 3NF.

The remainder of the relationship tables have only foreign keys (to the entities that the relationship involves), therefore all of them will be in BCNF, and thus 3NF.

**Attends:**

R(memberNumber, eventName, eventDate)

Foreign: memberNumber references Member, eventName and eventDate references Event

**Hosts:**

R(memberNumber, eventName, eventDate)

Foreign: memberNumber references Member, eventName and eventDate references Event

**HasGenre:**

R(gameTitle, genreName)

Foreign: gameTitle references Game, genreName references Genre

**Uses:**

R(id, gameTitle, eventName, eventDate)

Foreign: id and gameTitle references GameInstance, eventName and eventDate references Event

**Contains:**

R(recordID, gameId, gameTitle)

Foreign: gameId and gameTitle reference GameInstance, recordID references BorrowRecord