

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

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

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

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

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

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

As such, it is also in 3NF.

ExecutiveMember:

R(memberNumber, position)

FDs: memberNumber → 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

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