Video game digital distribution service

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1. Business description

1.1 Problem domain definition

The goal of this paper is to introduce a database that meets the needs of an online video game digital distribution service store. The database should be able to store all information in proper format, construct associated relationships, ready to be accessed and modified at any time.

2. Requirements

2.1 Customer

Each customer has an unique ID, first name, last name, address, city, state and zip code.

Each customer can have 0 to many accounts.

2.2 Account

Each account has an unique email, username, password and balance.

Each account can make 0 to many payments. Each account can only have 1 owner. Each account can only have 1 friend list. Each account can do 0 to many rating surveys.

2.3 Payment

Each payment has an unique ID, date, subtotal, status. Tax and total information can be obtained from stored data.

Each payment can only be made by 1 account. Each payment can only buy 1 game.

2.4 Game

Each game has an unique ID, title, size, style and publish date.

Each game can have 0 to many player status. Each game can have 0 to many game achievements.

2.5 PlayerStatus

Each player status has an unique ID, description and data.

Each player status can only be added to 1 game.

2.6 Rating

Each rating has an unique ID, game name and satisfaction feedback.

Each rating survey can only be rated once.

2.7 GameAchievement

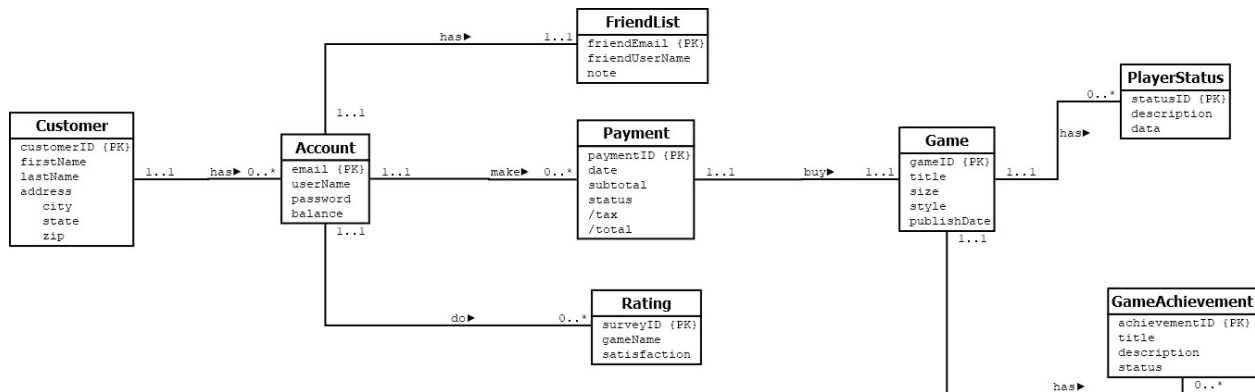Each game achievement has an unique ID, title, description and status.

Each game achievement can only be obtained by 1 account.

2.8 FriendList

Each friend list has an unique email, username and note.

Each friend list can only be obtained by 1 account.

3. ER Model

4. Database Schema

Customer(<u>customerID</u>, firstName, lastName, address, addressCity, addressState, addressZip)
Account(<u>email</u>, userName, password, balance, owner)
FriendList(friend<u>Email</u>, friendUserName, note, belonging)
Payment(<u>paymentID</u>, date, subtotal, status, payer)
Rating(<u>surveyID</u>, gameName, satisfaction, rater)
Game(<u>gameID</u>, title, size, style, publishDate, account)
PlayerStatus(<u>statusID</u>, description, data, gamer)
GameAchievement(<u>achievementID</u>, title, description, status, gamer)

5. Data Dictionary

Customer: Contains information about the customer who registered online video game digital distribution service store.						
Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
CustomerID	Customer id number	Char(9)	000000000-999999999	No	Yes	No
FirstName	Customer first name	Varchar2(25)	All	No	No	No
LastName	Customer last name	Varchar2(25)	All	No	No	No
Address	Customer address	Varchar2(50)	All	No	No	No
AddressCity	Customer address city	Varchar2(25)	All	No	No	No

AddressState	Customer address state	Varchar2(25)	All	No	No	No
AddressZip	Customer address zip code	Char(5)	00000-99999	No	No	No

CustomerAccount: Contains information about the customer account.

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
Email	Account email	Varchar2(25)	All	No	Yes	No
UserName	Account username	Varchar2(25)	All	No	No	No
Pwd	Account password	Varchar2(25)	All	No	No	No
Balance	Account remaining balance	Number(9,2)	0000000.00-9999999.00	No	No	No
AccountOwner	Account owner	Char(9)	000000000-99999999	No	No	Yes

FriendList: Contains information about friends of an account.

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
FriendEmail	Email address of the friend	Varchar2(25)	All	No	Yes	No
FriendUserName	User name of the friend	Varchar2(25)	All	No	No	No
Note	Friend note	Varchar2(50)	All	No	No	No
Belonging	Belongs to the account	Varchar2(25)	All	No	No	Yes

Payment: Contains information about payment transaction

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
PaymentID	Payment id number	Char(9)	00000000-999999999	No	Yes	No
Paydate	Payment date	Date	>1/1/1900	No	No	No
Subtotal	Payment subtotal	Number(9,2)	000000.00-	No	No	No

			999999.99			
Status	Payment status	Varchar2(25)	All	No	No	No
Payer	Payer	Varchar2(25)	All	No	No	Yes

Rating: Contains information about the rating survey data.

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
SurveyID	Survey id number	Varchar2(25)	All	No	Yes	No
GameName	Game name	Varchar2(25)	All	No	No	No
Satisfaction	Client satisfaction	Number(2,1)	0.0-10.0	No	No	No
Rater	Rater of the survey	Varchar2(25)	All	No	No	Yes

Game: Contains information about the game.

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
GameID	Game id number	Char(9)	000000000-999999999	No	Yes	No
Title	Game title	Varchar2(25)	All	No	No	No
InstallSize	Game size	Varchar2(25)	All	No	No	No
GameStyle	Game style	Varchar2(25)	All	No	No	No
PublishDate	Game publish date	Date	>1/1/1900	No	No	No
GameOrder	Payment id number	Char(9)	00000000-999999999	No	No	Yes

PlayerStatus: Contains information about player's game performance status.

Attribute Name	Description	Datatype	Domain	Nullable	PK	FK
StatusID	Status id	Char(9)	000000000-	No	Yes	No

			999999999			
StatusDescription	Status description	Varchar2(50)	All	No	No	No
PlayerData	Status recorded data	Varchar2(25)	All	No	No	No
Gamer	Game information	Char(9)	000000000 - 999999999	No	No	Yes

GameAchievement: Contains information about game achievement systems.						
Attribute Name	Description	Datatype	Domain	Null able	PK	FK
AchievementID	Achievement id number	Char(9)	000000000 - 999999999	No	Yes	No
Title	Achievement title	Varchar2(25)	All	No	No	No
AchievementDescription	Achievement description	Varchar2(50)	All	No	No	No
AchievementStatus	Achievement status	Varchar2(25)	All	No	No	No
Gamer	Game information	Char(9)	000000000 - 999999999	No	No	Yes

6. DDL

Create TABLE Customer
(
CustomerID CHAR(9) CONSTRAINT customer_pk PRIMARY KEY,
FirstName VARCHAR2(25) NOT NULL,
LastName VARCHAR2(25) NOT NULL,
Address VARCHAR2(50) NOT NULL,
AddressCity VARCHAR2(25) NOT NULL,
AddressState VARCHAR2(25) NOT NULL,
AddressZip CHAR(5) NOT NULL
);

Create TABLE CustomerAccount

```sql
(
Email VARCHAR2(25) CONSTRAINT customerAccount_pk PRIMARY KEY,
UserName VARCHAR2(25) NOT NULL,
Pwd VARCHAR2(25) NOT NULL,
Balance NUMBER(9,2) NOT NULL,
AccountOwner CHAR(9) NOT NULL CONSTRAINT customerAccount_fk_customer  REFERENCES
Customer(CustomerID)
);

Create TABLE FriendList
(
FriendEmail VARCHAR2(25) CONSTRAINT friendList_pk PRIMARY KEY,
FriendUserName VARCHAR2(25) NOT NULL,
Note VARCHAR2(50) NOT NULL,
Belonging VARCHAR2(25) NOT NULL CONSTRAINT friendList_fk_customerAccount
REFERENCES CustomerAccount(Email)
);

Create TABLE Payment
(
PaymentID CHAR(9) CONSTRAINT payment_pk PRIMARY KEY,
Paydate DATE NOT NULL,
Subtotal NUMBER(9,2) NOT NULL,
Status VARCHAR2(25) NOT NULL,
Payer VARCHAR2(25) NOT NULL CONSTRAINT payment_fk_customerAccount REFERENCES
CustomerAccount(Email)
);

Create TABLE Rating
(
SurveyID CHAR(9) CONSTRAINT rating_pk PRIMARY KEY,
GameName VARCHAR2(25) NOT NULL,
Satisfaction NUMBER(2,1) NOT NULL,
Rater VARCHAR2(25) NOT NULL CONSTRAINT rating_fk_customerAccount REFERENCES
CustomerAccount(Email)
);

Create TABLE Game
(
GameID CHAR(9) CONSTRAINT game_pk PRIMARY KEY,
Title VARCHAR2(25) NOT NULL,
InstallSize VARCHAR2(25) NOT NULL,
GameStyle VARCHAR2(25) NOT NULL,
PublishDate Date NOT NULL,
```

GameOrder CHAR(9) NOT NULL CONSTRAINT game_fk_payment REFERENCES
Payment(PaymentID)
);

Create TABLE PlayerStatus
(
StatusID CHAR(9) CONSTRAINT status_pk PRIMARY KEY,
StatusDescription VARCHAR2(50) NOT NULL,
PlayerData VARCHAR2(25) NOT NULL,
Gamer CHAR(9) NOT NULL CONSTRAINT ststus_fk_game REFERENCES Game(GameID)
);

Create TABLE GameAchievement
(
AchievementID CHAR(9) CONSTRAINT achievement_pk PRIMARY KEY,
Title VARCHAR2(25) NOT NULL,
AchievementDescription VARCHAR2(50) NOT NULL,
AchievementStatus VARCHAR2(25) NOT NULL,
Gamer CHAR(9) NOT NULL CONSTRAINT achievement_fk_game REFERENCES Game(GameID)
);

7. DML

INSERT INTO Customer (CustomerID, FirstName, LastName, Address, AddressCity, AddressState,
AddressZip)
VALUES ('000000561', 'Alex','Bob','3122 Wood Street', 'Philadelphia', 'PA', '19112');
INSERT INTO Customer (CustomerID, FirstName, LastName, Address, AddressCity, AddressState,
AddressZip)
VALUES ('000006666', 'Charlie','David','113 North Garden Street', 'Philadelphia', 'PA', '16775');
INSERT INTO Customer (CustomerID, FirstName, LastName, Address, AddressCity, AddressState,
AddressZip)
VALUES ('000666661', 'Eason','Frank','956 Forest Street', 'Chicago', 'IL', '60666');

INSERT INTO CustomerAccount (Email, UserName, Pwd, Balance, AccountOwner)
VALUES ('a1@gmail.com', 'a1','aaa111','26.61', '000000561');
INSERT INTO CustomerAccount (Email, UserName, Pwd, Balance, AccountOwner)
VALUES ('bbb2@gmail.com', 'bbb2','bbb2222222222bbb','6626.61', '000006666');
INSERT INTO CustomerAccount (Email, UserName, Pwd, Balance, AccountOwner)
VALUES ('cc3@hotmail.com', 'cc3','ccc33333333ccc','0.61', '000666661');

INSERT INTO FriendList (FriendEmail, FriendUserName, Note, Belonging)
VALUES ('fa1@gmail.com', 'fa1','Friend of mine', 'a1@gmail.com');
INSERT INTO FriendList (FriendEmail, FriendUserName, Note, Belonging)
VALUES ('fa2@gmail.com', 'fa2','Friend of A', 'bbb2@gmail.com');

```sql
INSERT INTO FriendList (FriendEmail, FriendUserName, Note, Belonging)
VALUES ('fa3@gmail.com', 'fa3','Friend of B', 'cc3@hotmail.com');

INSERT INTO Payment (PaymentID, Paydate, Subtotal, Status, Payer)
VALUES ('000000001', '01-MAR-2008','5645.48', 'Completed', 'a1@gmail.com');
INSERT INTO Payment (PaymentID, Paydate, Subtotal, Status, Payer)
VALUES ('000000341', '29-JUN-2010','82.52', 'Completed', 'bbb2@gmail.com');
INSERT INTO Payment (PaymentID, Paydate, Subtotal, Status, Payer)
VALUES ('000066661', '27-AUG-2020','1.96', 'Pending', 'cc3@hotmail.com');

INSERT INTO Rating (SurveyID, GameName, Satisfaction, Rater)
VALUES ('1A5121682', 'Super Mario','9.9', 'a1@gmail.com');
INSERT INTO Rating (SurveyID, GameName, Satisfaction, Rater)
VALUES ('2A5122186', 'Super Mario','9.3', 'bbb2@gmail.com');
INSERT INTO Rating (SurveyID, GameName, Satisfaction, Rater)
VALUES ('3B5129684', 'World of Warcraft','9.6', 'cc3@hotmail.com');

INSERT INTO Game (GameID, Title, InstallSize, GameStyle, PublishDate, GameOrder)
VALUES ('000000001', 'Super Mario','50MB', 'Casual', '06-MAY-1996', '000000001');
INSERT INTO Game (GameID, Title, InstallSize, GameStyle, PublishDate, GameOrder)
VALUES ('000000026', 'World of Warcraft','61GB', 'MMORPG', '16-JAN-2000', '000000341');
INSERT INTO Game (GameID, Title, InstallSize, GameStyle, PublishDate, GameOrder)
VALUES ('000000661', 'Cyberpunk','200GB', 'RPG', '06-MAY-2020', '000066661');


INSERT INTO PlayerStatus (StatusID, StatusDescription, PlayerData, Gamer)
VALUES ('000000001', 'Jumped times','853', '000000001');
INSERT INTO PlayerStatus (StatusID, StatusDescription, PlayerData, Gamer)
VALUES ('000000006', 'Rabbit killed','561', '000000026');
INSERT INTO PlayerStatus (StatusID, StatusDescription, PlayerData, Gamer)
VALUES ('000000009', 'Money earned','$19542623', '000000661');

INSERT INTO GameAchievement (AchievementID, Title, AchievementDescription, AchievementStatus, Gamer)
VALUES ('000000001', ' Winner!','Arrive the destination', 'Completed', '000000001');
INSERT INTO GameAchievement (AchievementID, Title, AchievementDescription, AchievementStatus, Gamer)
VALUES ('000000055', ' Rabbit killer','Kill 1000 rabbits', 'In progress', '000000026');
INSERT INTO GameAchievement (AchievementID, Title, AchievementDescription, AchievementStatus, Gamer)
VALUES ('000000166', ' Hunter! Ready!','Pick up a sniper rifle', 'In progress', '000000661');
```

8. Queries

1. Show all customer's names(first name and last name) and account balance.

   SELECT FirstName, LastName, Balance FROM Customer, CustomerAccount WHERE Customer.CustomerID = CustomerAccount.AccountOwner;

   Output:

FIRSTNAME	LASTNAME	BALANCE
Alex	Bob	26.61
Charlie	David	6662.61
Eason	Frank	.61

2. Show all completed payments, with the account's email and username.

   SELECT PaymentID, PayDate,Subtotal, Status, Email, Username FROM Payment, CustomerAccount WHERE Status = 'Completed' AND Payment.Payer = CustomerAccount.Email;

   Output:

PAYMENTID	PAYDATE	SUBTOTAL	STATUS	EMAIL	USERNAME
000000001	01-MAR-08	5645.48	Completed	a1@gmail.com	a1
000000341	29-JUN-10	82.52	Completed	bbb2@gmail.com	bbb2

3. Show all games that are published after 2000.

   SELECT * FROM Game WHERE PublishDate > '01-JAN-2000';

   Output:

GAMEID	TITLE	INSTALLSIZE	GAMESTYLE	PUBLISHDA	GAMEORDER
000000026	World of Warcraft	61GB	MMORPG	16-JAN-00	000000341
000000661	Cyberpunk	200GB	RPG	06-MAY-20	000066661

4. Show all 'In progress' game achievements, with the game title.

   SELECT AchievementID, GameAchievement.Title, AchievementDescription, AchievementStatus, Game.Title FROM GameAchievement, Game WHERE GameAchievement.Gamer = Game.GameID AND AchievementStatus = 'In progress';

Output:
ACHIEVEMENT TITLE   ACHIEVEMENTDESCRIPTION
ACHIEVEMENTSTATUS   TITLE
--------- ------------------------ -- ------------------------ -----
----
000000055 Rabbit killer   Kill 1000 rabbits   In progress   World
of Warcraft
000000166 Hunter! Ready!   Pick up a sniper rifle   In progress
Cyberpunk

5. Show all completed payments, whose subtotal is less than the average expense.

    SELECT * FROM Payment WHERE Subtotal < (SELECT AVG(Subtotal) FROM Payment);

    Output:
    PAYMENTID PAYDATE   SUBTOTAL STATUS   PAYER
    --------- --------- ---------- ------------------------- ------------------------
    000000341 29-JUN-10   82.52 Completed   bbb2@gmail.com
    000066661 27-AUG-20   1.96 Pending   cc3@hotmail.com

6. Show Super Mario's average rating, if there are any surveys exist.

    SELECT GameName, AVG(Satisfaction) FROM Rating WHERE Gamename = 'Super Mario'
    GROUP BY GameName;

    Output:
    GAMENAME   AVG(SATISFACTION)
    ----------- -----------------
    Super Mario   9.6