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**TITLE: Game Zone**

**Group ID: S5 Team 7**

**Subject: Database Management System (DBMS)**

**Subject code: IT214**

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**Year: 2019**

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# **Section1: Final version of SRS.**

## **1.Introduction**

### **1.1      Purpose**

- To efficiently update, erase, retrieve various customers' records like personal details, membership details, number of points earned, etc. in the scenario where many customers visit the game zone on a daily basis.
- To avoid any kind of potential disputes.
- For easy retrieval of customer details when any unforeseen incident happens.
- Authentication purpose, so that certain privileges are available to only those who have taken membership.
- Helps the administrator and instructor to keep track of the detailed information of the Game zone.
- Assists in the smooth interaction between different types of users(gamers).
- Proper maintenance of available Resources.
- Speed up the Activities to overcome the problems associated with the game zone.

### **1.2      Intended Audience and Reading Suggestions**

- The audience going to play games online/offline is assumed to have basic knowledge of accessing a website or game zone equipment, surfing and knowing about its controls.
- Developers who can review a project's capabilities and more easily understand where their efforts should be targeted to improve or add more features to it.
- Game zone staff and owner.

### **1.3      Product Scope**

The purpose of the online and offline game zone management system is to ease game zone / online gaming management and to create a convenient and easy-to-use place and application for customers, trying to buy balance in a debit card (provided by game zone only) or in an online pocket . The system is based on a relational database with its game zone management and reservation functions. We will have a database server supporting hundreds of major games as well as thousands of games by various gaming companies. Above all, we hope to provide a comfortable user experience along with the best pricing available.

### **1.4      Description**

In a Game Zone, customers register at our system and get a debit card from the game zone.A game zone database system stores the following information.

- **Game details:**

It includes various game details,along with the game price, eligibility criteria, waiting time etc.

- **Customer description:**

It includes the customer name, address, height, weight and phone number. This information may be used for keeping the records of the customer for any other kind of information.

- **Credit card description:**

It includes customer details, card number, date of buying, date of expiry, balance, payment history, authentication of user.

## 1.5 Description (Extended)

In a Game Zone, customers register at our system and get a debit card from the game zone. A game zone database system stores the following information. There is a database for customers with all records, playing games, register for that game, price of a game, eligible age/height, timing, waiting list etc in real-time with history for each game. For certain games winners may be awarded prizes. Different teams can take up different types of games including online & offline games which need additional equipment.

- **Game details:**

It includes various game details, along with the game price, eligibility criteria, waiting time etc.

- When a manager wants to add a game, the facility of adding a new game is also given. Manager must add the new game's price, eligibility criteria, waiting time etc details.
- In certain situations, if the manager wants to delete games, this facility is also given.
- If a customer wants to know certain game details, he/she can access game details. Customers can only see game details, modification, insertion or deletion is not allowed.

- **Customer description:**

It includes the customer name, address, height, weight and phone number.

- This information may be used for keeping the records of the customer for any other kind of information.
- It includes a dynamic list of customers visiting the game zone.
- Whenever the customer will come and its details are not available in the database, then staff will add new customer details.
- Also, safety is to be ensured by keeping record of vaccination status of customers.

- **Credit card description:**

It includes customer details, card number, date of buying, date of expiry, balance, payment history, authentication of user.

- When a new customer comes, a new credit card will be given to him/her. Money will be added to the customer's credit card.
  - Also existing customer's credit card validity will be checked when he/she visits the game zone.
  - When a customer plays any game, credit card balance will be modified. When the customer's card balance is less than the required balance for the game, he/she can't play that game.
- **Reward system description**
    - To attract customers, exciting gifts for different games are given to customers who score the required points.
    - Information of the gift's id, name, and required points to get that gift is stored in the database.
    - Also, the information of available stock of the gift is included.
  - **Game playing history**
    - To be updated each time a game is accessed by a customer, with proper details like time, the game, points won, any damage caused, malpractices/cheating,etc.
  - **Transaction Episode**
    - The corresponding table needs to be updated with any payment transaction, reward transaction, etc. Also, the changes should be reflected in the database in a manner that integrity is maintained.
  - **Staff Details**
    - We include a table of staff which contains information about them like the name of the staff member, age, phone number, their ongoing health issues, blood group, date of joining, etc. This information helps the owner to keep track of staff.
  - **High score information**
    - By this entity set, we can keep track of the highest score achieved in each game and details of who earned that score. These details will push customers to score more.

## 2. Requirements collection/Fact finding phase

### 2.1 Background Reading/s

References :

- A. iCafeCloud
  - Link to the original work
    - [Welcome to iCafeCloud - All in one Cafe Billing and Game Management Software](#)
  - iCafeCloud is one such platform which is used to manage game zone, cyber cafe-like environment by giving a database management facility. It is a proprietary software
  - iCafeCloud is a simple billing and game management program to manage customers accounts and billing for cafe users as well as game updates and license management. Each day the game zone has hundreds of users and game updates, keeping track of them all can be hard. So, iCafeCloud simplified the task.
  - Facilities offered:
    - Keeps track of members
    - Generate reports
    - Give user more value by giving bonuses and prizes
    - Manage your PC'S and Consoles by data storage facility ICafeCloud functions allow you to turn on/off PC's and devices when user sessions are started and finished. Allowing you to focus on making money.
    - System to rewards prize
  - Functionalities and privileges- How the above facilities are offered?(Working flow, features)
  - Given below are the functionalities, features provided by the platform to implement the above facilities
    - [iCafeCloud: Server installation](#)
    - [iCafeCloud: Client installation](#)
    - [iCafeCloud: Server settings](#)
    - [iCafeCloud: How to download and add games](#)
    - [iCafeCloud: How to add product and restock](#)
    - [iCafeCloud: How to cancel orders on shop](#)
    - [iCafeCloud: How to place orders from iCafeCloud client PC](#)
    - [iCafeCloud: How to set full screen mode | iCafeCloud client](#)
    - [iCafeCloud: How to add license to license pool](#)
    - [iCafeCloud: How to create offers and add offer to members](#)
    - [iCafeCloud: Set price for PC group and member group](#)
    - [iCafeCloud: How to set price buttons](#)
    - [iCafeCloud: How to use bonus function](#)
    - [iCafeCloud: How to create guest account](#)
    - [iCafeCloud: How to use points function](#)
    - [iCafeCloud: How to add members](#)
    - [iCafeCloud: How to book PC time](#)
    - [iCafeCloud: How to add local steam game](#)
  - Flaws
    - The game update takes too much time.
    - Lack of privacy and security of the functional system, certain privileges related to user relation should be evoked from staff.

- The software is quite costly.

B.

[Cyber Café Management System Using PHP & MySQL , Cyber Café Management System Project \(phpgurukul.com\)](http://phpgurukul.com)

- **Query language used:** MySQL
- In this Cyber Café Management System, PHP and Mysql databases are used.
- This is the project which keeps records of daily users of cyber cafes.
- **Cyber Café Management System has one module i.e admin.**
- **Features provided include:**
  1. Dashboard
  2. Computer
  3. Users
  4. Search
  5. Report
  6. Profile
  7. Change Password
  8. Logout
  9. Admin can also recover his/her password.
- **Note:** In this project MD5 encryption method is used.
- Flaws
  - System maintenance is too poor.
  - Too less functionalities available.
  - Low quality of system equipment, technology used.
  - Users' privacy and security is taken less seriously.
  - Not robust enough to stand technical errors.
- List the combined Requirements gathered from Background Reading/s.
  - Need for a system that can handle concurrent access in a better way.
  - A system that is immune to sudden power cuts, should atomically execute requests, transitions and be fair to diverse classes of users.
  - The need of handling privilege distribution more carefully to better preserve customers' privacy and security.
  - Systems should be more generalized for easy maintenance.
  - Latest technology to better handle transactions at low cost.
  - Functionalities to be increased.
  - Time complexity can be made better at software level.

## 2.2 Interviews:

- 1) Owner's interview
- Interview plan

**TIMES Game Zone: (**Role Play**/**Actual**) Interview Plan**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2021/12

**Interviewee:** 1) Ghanshyam Shah (**Role Play**/**Actual**)

**Designation:** Owner at TIMES

**Contact Details:** Email/Phone no. (**Only for Actual**)

**Organization Details:** Name & Address (**Only for Actual**)

**Interviewer:** 1) Radhika Patel      **Designation:** Software developer at  
TIMES

**Date:** 4/10/2021    **Time:** 14:00

**Duration:** Max 45 min    **Place:** Radhika's office

**Purpose of Interview:**

Preliminary meeting to identify problems and requirements of  
database management system for game zone

**Agenda:**

Problems with security and any other concerns  
Privileges held by Owner of the game zone

**Documents to be brought to the interview:**

None

● Interview summary

**TIMES game zone: **Mock** Interview Summary**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2003/12

**Interviewee:** 1) Ghanshyam Shah(**Role Play**)

**Designation:** Owner of game zone

**Interviewer:** 1) Radhika Patel      **Designation:** Software developer at  
TIMES

**Date:** 4/10/2021    **Time:** 14:00

**Duration:** 20 minutes    **Place:** Radhika's office

**Purpose of Interview:**

Preliminary meeting to identify problems and requirements of  
database management system for game zone

1. Some security issues like users can change other users  
information
2. System crash when too many users want to access game
3. Difficult to know which game is more profitable
4. Don't know which games are most favorite in users(no  
track of rating of games)

2) Manager's interview

● Interview plan

**TIMES Game Zone: (**Role Play**/**Actual**) Interview Plan**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2003/12

**Interviewee:** 1) Sandeep Patel (**Role Play**)

**Designation:** manager at game zone

|

**Interviewer:** 1) Dev Vora

**Designation:** Software developer at TIMES

**Date:** 5/10/2021    **Time:** 11:00

**Duration:** Max 45 min    **Place:** Dev's office

**Purpose of Interview:**

Preliminary meeting to identify problems at management level of database and requirements from the management team

**Agenda:**

Problems in management of database

Important requirements

**Documents to be brought to the interview:**

None

● Interview summary

**TIMES game zone: **Mock** Interview Summary**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2003/12

**Interviewee:** 1) Sandeep Patel(**Role Play**)

**Designation:** manager at game zone

**Interviewer:** 1) Dev Vora

**Designation:** Software developer at TIMES

**Date:** 5/10/2021    **Time:** 11:00

**Duration:** 20 minutes    **Place:** Dev' office

**Purpose of Interview:**

Preliminary meeting to identify problems at management level of database and requirements from the management team

1. No feature to check validity of credit card
2. How to remove game which is not much profitable. That functionality is not provided.
3. No feature to add a game when users ask for particular game many times.

3) Operating staff's interview

● Interview Plan

**TIMES Game Zone: (Role Play/Actual) Interview Plan**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2003/12

**Interviewee:** 1) Vraj Vora (**Role Play**)

**Designation:** operator of some games in game zone

2) Pratham nampurkar (Role play)

**Designation:** operator of some games in game zone

**Interviewer:** 1) Harshal Shah

**Designation:** Software developer at TIMES

**Date:** 4/10/2021    **Time:** 15:00

**Duration:** Max 45 min    **Place:** Harshal's office

**Purpose of Interview:**

Preliminary meeting to identify problems in the current database and additional requirements of the operating staff

**Agenda:**

Problems faced by operating staff

Requirements of operating staff

**Documents to be brought to the interview:**

None

● Interview summary

**TIMES game zone: Mock Interview Summary**

**System:** database management system for game zone

**Project Reference:** SF/SJ/2003/12

**Interviewee:** 1) Vraj Vora (**Role Play**)

**Designation:** operator of some games in game zone

2) Pratham Nampurkar (Role play)

**Designation:** operator of some games in game zone

**Interviewer:** 1) Harshal Shah

**Designation:** Software developer at TIMES

**Date:** 4/10/2021    **Time:** 15:00

**Duration:** 25 minutes    **Place:** Harshal' office

**Purpose of Interview:**

Preliminary meeting to identify problems in the current database and additional requirements of the operating staff

1. Updating the winners of game whenever someone plays that game takes long amount of time
2. There is no queue limit and maximum waiting time for a game
3. Database does not have information about user's height, weight. So, it's difficult to decide whom to allow to play a game

List of requirements :

- System should be able to handle crash and operation failures during certain task

- Rating of the game should be included and updates continuously, so we can know which games are popular
- feature to add a new game, when customers demands it
- Updating the highest score and winner of the game should be done on a daily basis. So customers who come in the same week can get correct information about the game.
- Information about the customer's height, weight should be included. So staff can decide if customers should be allowed to play a game or not.
- Concept of queue limit and maximum waiting time
- Validity of credit card should be included.
- There should be a feature to remove a game which has not been used for a long time and is not very profitable.
- Privacy and security of the database should be maintained

## 2.3 Questionnaires

- For manager and staff of game zone

[Google form for staff and manager](#)

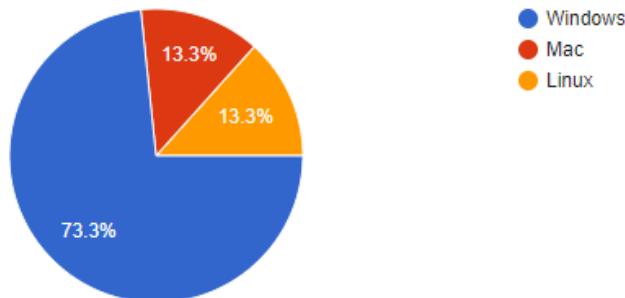
[Excel Sheet](#)

Summary:

Email
15 responses
harshalvrajs2921@gmail.com
201901163@daiict.ac.in
kachhiayasvi@gmail.com
skrathod282001@gmail.com
vandan8154@gmail.com
archishil123@gmail.com
Het119shah@gmail.com
vidhipatel382@gmail.com
201901133@daiict.ac.in

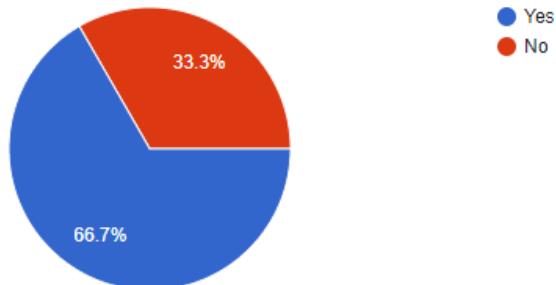
What operating system you are using?

15 responses



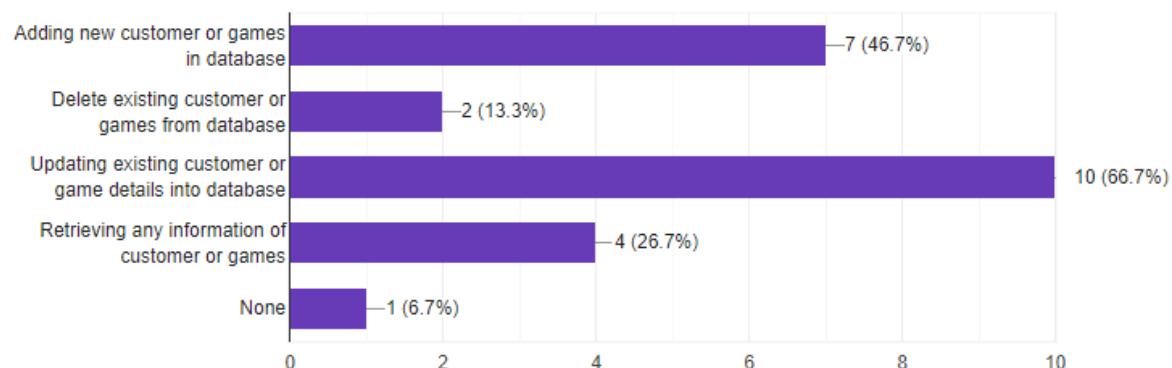
Have you often facing trouble with your system?

15 responses



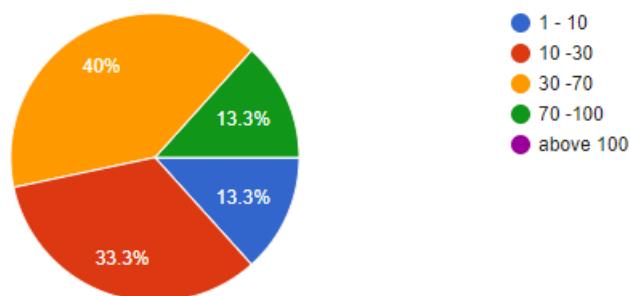
what operations make you more trouble?

15 responses



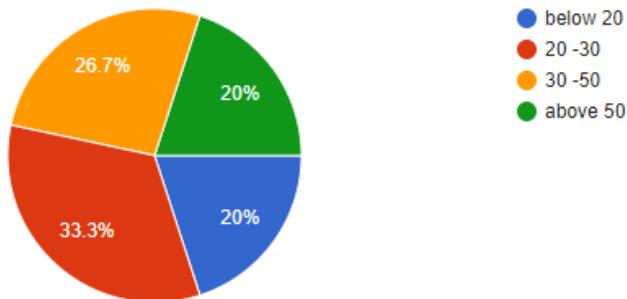
How many customers come to your Game zone on Daily bases?

15 responses



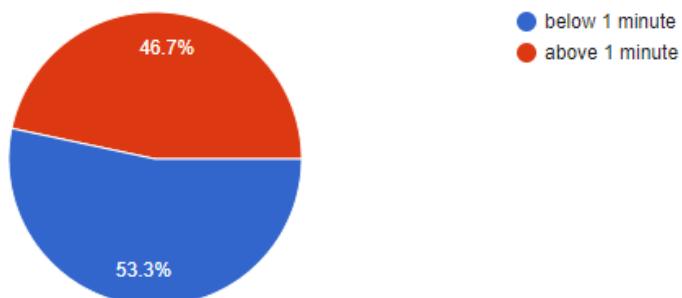
How many games in your Game Zone?

15 responses



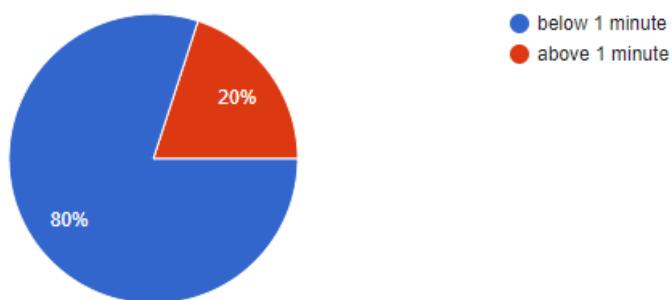
How long it takes to insert new customer details or game details in system ?

15 responses



How long it takes to update customer details or game details in system ?

15 responses



What additional fields (in any section) you require for your system ?

10 responses

Mobile number of customer

Ratings for game

Partner

Nothing

-

Age of customer

Customer Rating

Game Rating

Field which shows current balance of customer

Give any comments or suggestion on existing Database system.

9 responses

Excellent

-

No feature to know which game is more profitable, which game is most popular  
So i need game rating

Updating high scores and winners of the game is done on a weekly or monthly basis. So it is difficult to know high correct game information for the customer who comes in same week or month so it should be of daily basis

Feature of addition of new game which is most demanded or removal of game which is not in demand this operation is provided very slow it should faster.

How to decide credit card which is issued to customer is valid or not so it must contain unique card id

We give customer certain credit point on their every new filling up balance so it should add to their main balance when they need and this is very nice strategy to attract customer

- For customers

[Google form for customers](#)

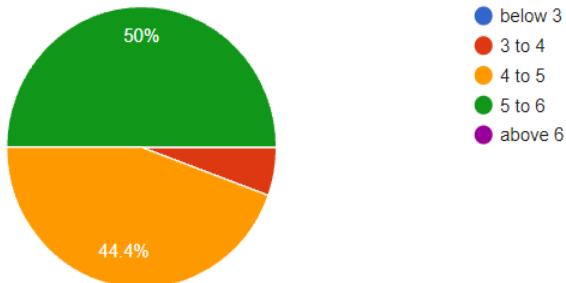
[Excel sheet of responses](#)

Summary:

Name
18 responses
Het shah
Rathod tushar
Prasoon patel
Shivam patel
Yash patel
Nirdesh patel
radhika
Patel dev
Isha kikani

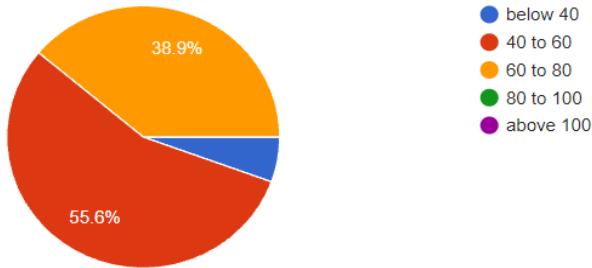
1. what is your height(in feet)?

18 responses



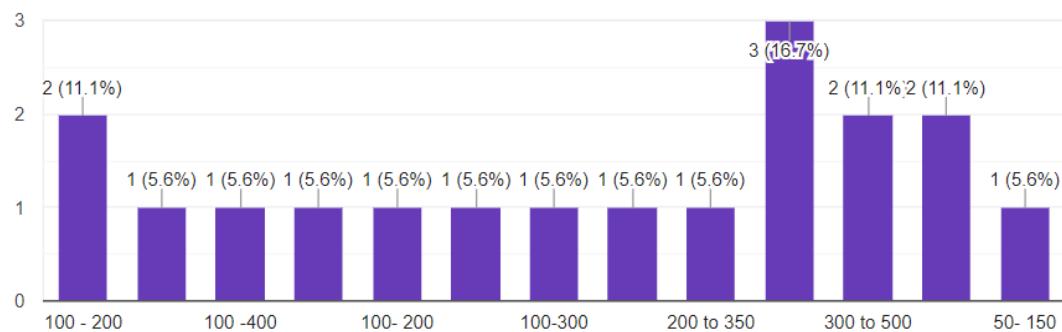
2. What is your weight(in Kg)?

18 responses



### 3. What is your budget range for different games?

18 responses



### Which game would you like to play? Give any comments from your experience.

18 responses

Glow hockey, bowling , car race

Trempling, bike race

VR games, counter strike

VR games, trempling , table football

Redemption games

Bike race , jumping games

glow hockey, car racing

Air hockey,all shooting games

Table tennis, counter strike, chess

Combined Requirements :

- Please make sure that it takes less time to insert and update .
- feature to know which game is more profitable, which game is most popular So need for game rating.
- Updating high scores and winners of the game is done on a weekly or monthly basis. So it is difficult to know high correct game information for the customer who comes in the same week or month so it should be on a daily basis .
- Feature of addition of new game which is most demanded or removal of game which is not in demand this operation is provided very slow it should be faster.
- How to decide credit card which is issued to a customer is valid or not so it must contain a unique card id.
- We give customers certain credit points on every new filling up balance so it should add to their main balance when they need it and this is a very nice strategy to attract customers.
- Mobile number of customer
- Ratings for game
- Partner if any game need
- Age of customer
- Customer Rating
- Game Rating
- Field which shows current balance of customer
- Customer earn point detail

## 2.4 Observations:

**System :** Gamezone Management System

**Observations by :** Vora Dev (Gamezone System - Owner)

**Date :** 08/10/2021

**Time:** 16:54

**Duration:** 45 mins

- Electricity fluctuations are very frequent. Urgent requirement of generators.
- Lack of privacy and security of the functional system. Easy to hack.
- Poor Updatation system. Delay found in updating user's details.
- Poor maintenance of system used.
- Low quality of system equipment used.
- Long waiting time.
- System not able to handle large number of customers.

## 3. Fact Finding Chart

No.	Objective	Technique	Subject(s)	Time
1	To study the existing systems if there exist any and to get a precise idea of designing a database for such a case.	Background reading	Cybercafe management system (software)	0.5 day
2	To know the drawbacks in the existing systems if there exists any	Background reading	iCafeCloud (software), Online reviews	0.5 day
3	To know the requirements from owner	Interview	Owner	20 mins
4	To get knowledge of current problems at management level	Interview	Manager	20 Mins
5	To get understanding about what information needed from customer	Interview	Operating Staff (any 2 staff members)	2 x 25 mins each
6	To know major problems faced by various game zone's staff	Questionnaire	All staff members of different game zone	5 mins per staff member
7	To know about privacy and security	observations	Game zone's database	One week
8	To know storage capacity of database	observations	Game zone's database	4 or 5 days
9	To know number of daily customers	Questionnaire	Game zone staff and manager	5 mins per person

#### 4. List Requirements:

- System should be able to handle crash and operation failures during certain task
- Rating of the game should be included and updates continuously, so we can know which games are popular
- feature to add a new game, when customers demands it
- Updating the highest score and winner of the game should be done on a daily basis. So customers who come in the same week can get correct information about the game.
- Information about the customer's height, weight should be included. So staff can decide if customers should be allowed to play a game or not.
- Validity of credit card should be included and it should be unique.
- Privacy and security of the database should be maintained
- Please make sure that it takes less time to insert and update .

- We give customers certain credit points on their every new filling up balance so it should add to their main balance when they need it and this is a very nice strategy to attract customers.
- Mobile number of customer
- Partner if any game need
- Age of customer
- Customer Rating
- Field which shows current balance of customer
- Customer earn point detail
- Systems should be more generalized for easy maintenance and Functionalities to be increased.
- Latest technology to better handle transactions at low cost.
- Time complexity can be made better at software level.

## 5. User Classes and Characteristics:

*Admin:*

- Can Add/Delete any game
- Can modify existing game's properties (e.g. price, time limit, max\_number of players playing a game simultaneously, game benefits like price discount, winning price).
- Can add/delete/modify card's properties like card price limits, minimum amount for a card, card expiry dates, card types
- Can add/delete/modify staff's properties like income, time shifts, bonuses, uniforms.

*Staff:*

- Can Add/delete customers
- Can modify customer details like name, phone number, address, height, weight, disabilities, etc.
- Can modify card details of customers like card balance, card type used

## 6. Operating Environment (for PostgreSQL)

### 6.1 Hardware, Software or Connectivity Requirements

#### Hardware Requirements :

There has been a lot of talk through the years of what the minimum set of hardware requirements are for a PostgreSQL database. Generally speaking the requirements for PostgreSQL are very low, you can even get by on 256 Megs of memory. However you rarely hear or read about what would be considered the minimum production hardware requirements for PostgreSQL.

#### Minimum Production Requirements

- 64 bit CPU
- 64bit Operating System
- 2 Gigabytes of memory
- Dual CPU/Core

## **Software Requirements :**

PostgreSQL and EnterpriseDB Version 9.2 to 13.x

<b>Operating System</b>	<b>Operating System Version</b>	<b>Architecture</b>
AIX	AIX 7.1 64-bit	PowerPC
FreeBSD	FreeBSD 10.x	<ul style="list-style-type: none"> <li>x64</li> <li>Compatible processors</li> </ul>
	FreeBSD 9.x <small>*Supported for PostgreSQL Version 9.2 only</small>	<ul style="list-style-type: none"> <li>x64</li> <li>Compatible processors</li> </ul>
Linux	<b>Debian</b>	
	Debian 9.x	<ul style="list-style-type: none"> <li>x64</li> <li>Compatible processors</li> </ul>

	Debian 8.x	<ul style="list-style-type: none"> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Debian 7.x	<ul style="list-style-type: none"> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Debian 6.x	<ul style="list-style-type: none"> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Debian 5.x	<ul style="list-style-type: none"> <li>- x64</li> <li>- Compatible processors</li> </ul>
<b>Red Hat Enterprise Linux/CentOS</b>		
	<p>Red Hat Enterprise Linux/CentOS 8.x with glib 2.28.x</p> <p>Before you install the Commvault software, you must manually install the libcrypt.x86_64 and libnsl.x86_64 packages on the computer.</p>	<ul style="list-style-type: none"> <li>- x64</li> <li>- Compatible processors</li> </ul>

	Red Hat Enterprise Linux/Oracle Linux Enterprise/CentOS 7.x	<ul style="list-style-type: none"> <li>- x64</li> <li>- PowerPC (little endian)</li> <li>- Compatible processors</li> </ul>
	Red Hat Enterprise Linux/Oracle Linux Enterprise/CentOS 6.x with glibc 2.12.x	Intel Pentium, x64, Power PC (Little endian) or compatible processors
	Red Hat Enterprise Linux/Oracle Linux Enterprise/CentOS 5.x with glibc 2.5.x	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>
	<b>Source Mage Linux</b>	
	Source Mage Linux	x64
	<b>SuSE Linux (SLES)</b>	
	SuSE Linux 12 Initial Release	<ul style="list-style-type: none"> <li>- x64</li> <li>- PowerPC (little endian)</li> <li>- Compatible processors</li> </ul>
	SuSE Linux 11 (Initial Release/SP1 and later SPs) with glibc 2.9.x and higher	Intel Pentium, x64, Power PC (Little endian) or compatible processors

	<b>Ubuntu</b>	
	Ubuntu 20.04 LTS	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Ubuntu 18.04 LTS	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Ubuntu 16.04 LTS	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Ubuntu 14.04 LTS	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>
	Ubuntu 12.04 LTS	<ul style="list-style-type: none"> <li>- Intel Pentium</li> <li>- x64</li> <li>- Compatible processors</li> </ul>

Solaris	Solaris 11.x	x64 Sparc T/M series
	Solaris 10 Update 6 or equivalent	x64 Sparc T/M series
Windows	<b>Windows Server 2019</b>	
	Microsoft Windows Server 2019 Editions	All Windows-compatible processors supported
	<b>Windows 2016</b>	
	Microsoft Windows Server 2016 Editions  Core Editions are not supported.	All Windows-compatible processors supported
	<b>Windows 2012</b>	
	Microsoft Windows Server 2012 R2 Editions  Core Editions are not supported.	All Windows-compatible processors supported
	Microsoft Windows Server 2012 Editions  Server Core installations are not supported.  Core Editions are not supported.	
	<b>Windows 2008</b>	

	Microsoft Windows Server 2008 R2 Editions  Core Editions are not supported.	All Windows-compatible processors supported
	Microsoft Windows Server 2008 Editions  Server Core installations are not supported.	All Windows-compatible processors supported

Connectivity Requirements :

- IP connections must exist between the Delphix Engine and the target environments.
- The Delphix Engine uses an **SSH** connection to each target environment, **NFS** connections from each target environment to the Delphix Engine, and **PostgreSQL client** connections to the virtual databases on the target environment.
- Once connected to a staging target environment through **SSH**, the Delphix Engine initiates a **PostgreSQL replication client** connection from the target environment to the source environment.

## 6.2 External Interface Requirements

Hardware/Software/Third-party APIs & other things taken from other external sources.

There are only two client interfaces included in the base PostgreSQL distribution:

- **libpq** is included because it is the primary C language interface, and because many other client interfaces are built on top of it.
- **ECPG** is included because it depends on the server-side SQL grammar, and is therefore sensitive to changes in PostgreSQL itself.

All other language interfaces are external projects and are distributed separately. **Table H.1** includes a list of some of these projects. Note that some of these packages might not be released under the same license as PostgreSQL. For more information on each language interface, including licensing terms, refer to its website and documentation.

**Table H.1. Externally Maintained Client Interfaces**

Name	Language	Comments	Website
DBD::Pg	Perl	Perl DBI driver	<a href="https://metacpan.org/release/DBD-Pg/">https://metacpan.org/release/DBD-Pg/</a>

JDBC	Java	Type 4 JDBC driver	<a href="https://jdbc.postgresql.org/">https://jdbc.postgresql.org/</a>
libpqxx	C++	C++ interface	<a href="https://pqxx.org/">https://pqxx.org/</a>
node-postgres	JavaScript	Node.js driver	<a href="https://node-postgres.com/">https://node-postgres.com/</a>
Npgsql	.NET	.NET data provider	<a href="https://www.npgsql.org/">https://www.npgsql.org/</a>
pgtcl	Tcl		<a href="https://github.com/flightaware/Pgtcl">https://github.com/flightaware/Pgtcl</a>
pgtclng	Tcl		<a href="http://sourceforge.net/projects/pgtclng/">http://sourceforge.net/projects/pgtclng/</a>
pq	Go	Pure Go driver for Go's database/sql	<a href="https://github.com/lib/pq">https://github.com/lib/pq</a>
psqlODBC	ODBC	ODBC driver	<a href="https://odbc.postgresql.org/">https://odbc.postgresql.org/</a>
psycopg	Python	DB API 2.0-compliant	<a href="https://www.psycopg.org/">https://www.psycopg.org/</a>

## 7. Product Functions

- Add game
  - Add game function will take input game name, price, rating etc.
- Delete game
  - Delete game function will take the input game name and delete all the game details.

- Modifying game details
  - This function will take input game name and corresponding new information we want to update.
- Add/delete/ Modify card details
  - add card details function will take details like- card number, card balance, name of the card holder etc.
  - delete card details function will take details of card number and delete corresponding card information.
  - The Modify card details function will take details like card number and corresponding information we want to modify.
- Add/delete/Modify staff details
- Add/ Delete customer details
  - Add function will take inputs like customer id, name,height,weight, credit card number etc.
  - Delete function will take input of the customer id and name.
  - Modify function will take input of customer id and corresponding information we want to modify.
- Add a payment/reward transaction
  - Whenever a customer takes a membership(purchases card) or pays for a game, or claims a reward in lieu of his tokens/coins earned, there is an event of transaction.
  - The details of the transaction episode are stored in the database.

## 8. Privileges

<b>Functions</b>	<b>Privileged users</b>
Add game	Admin
Delete game	Admin
Modify game details	Admin
Add/delete/modify card details	Admin, staff
Add/delete/modify staff details	Admin
Add/delete customer details	Admin, staff
Add a payment/reward transaction	Admin, staff

## **9. Assumptions**

- Customer details modification doesn't take too much time.
- Modification of game details is instantaneous.
- Card balance modifications don't take much time.
- Up to date system equipment used.
- Only the admin has access to game modification functions.
- The customer's data privacy is maintained.
- The user knows how to operate computers.
- The user knows the English language.
- The user has reliable Internet connection.

## **10. Business constraints**

- An old user must have the card (digital/hardcopy) given to him otherwise he/she will have to consider purchasing a new one.
- The information of all the existing users must be stored appropriately in the database which can be accessed by Admin/Staff.
- The interface is provided in the English language only. Hence users must know how to speak/read/type English.
- The user must be able to access the system from any computer with proper internet functionalities and capabilities.

## Section2: Noun Analysis.

## 1. Noun(& verb) Analysis

### 1.1 Extracted noun and verbs

Noun	Verbs
customers	credit
games	card
description	form
rating	Register
gamezone	management
details	includes
price	game
eligibility	gameplay
information	play
number	includes
card	customer
date	management
credit	customer
balance	get
name	following
age	pay
height	add
weight	update
phone_number	modify
Gaming history	delete

expiry	record
criteria	authentication
address	store
any	waiting
other	buying
kind	used
various	buying
time	warded
user	winning
id	access
player	event
gifts	visits
eligible	vaccination
tournament	transfer
Counter-Strike	attracting
manager	available
dynamic	manages
staff	score
bank	calculation
reflection	earned
integrity	joining
Blood	

Group	
health	
stocks	
points	

## 1.2 Accepted Noun and Verb List

Candidate entity set	Candidate attribute set	Candidate relationship set
Customer	Customer_id Weight Height	Gaming History Customer_payment_info High Scorer
Game	Game_id Game_name Price No_of_player Minimum_height Minimum_weight rating	Gaming History Manages Rewards High_Score calculation
Credit Card	Credit_Card_no Balance Buying_date Expiry_date Total_points	Customer_payment_info
Gifts	Product_id Product_name required_points Avai	Rewards
Person	Phone Number Name Age	
Staff	Staff id Salary Date of Joining Blood Group Health_issue	Manages

High Score	Score (Points_scored) Date	High_Score Calculation High Scorer
------------	-------------------------------	---------------------------------------

### 1.3 Rejected Nouns

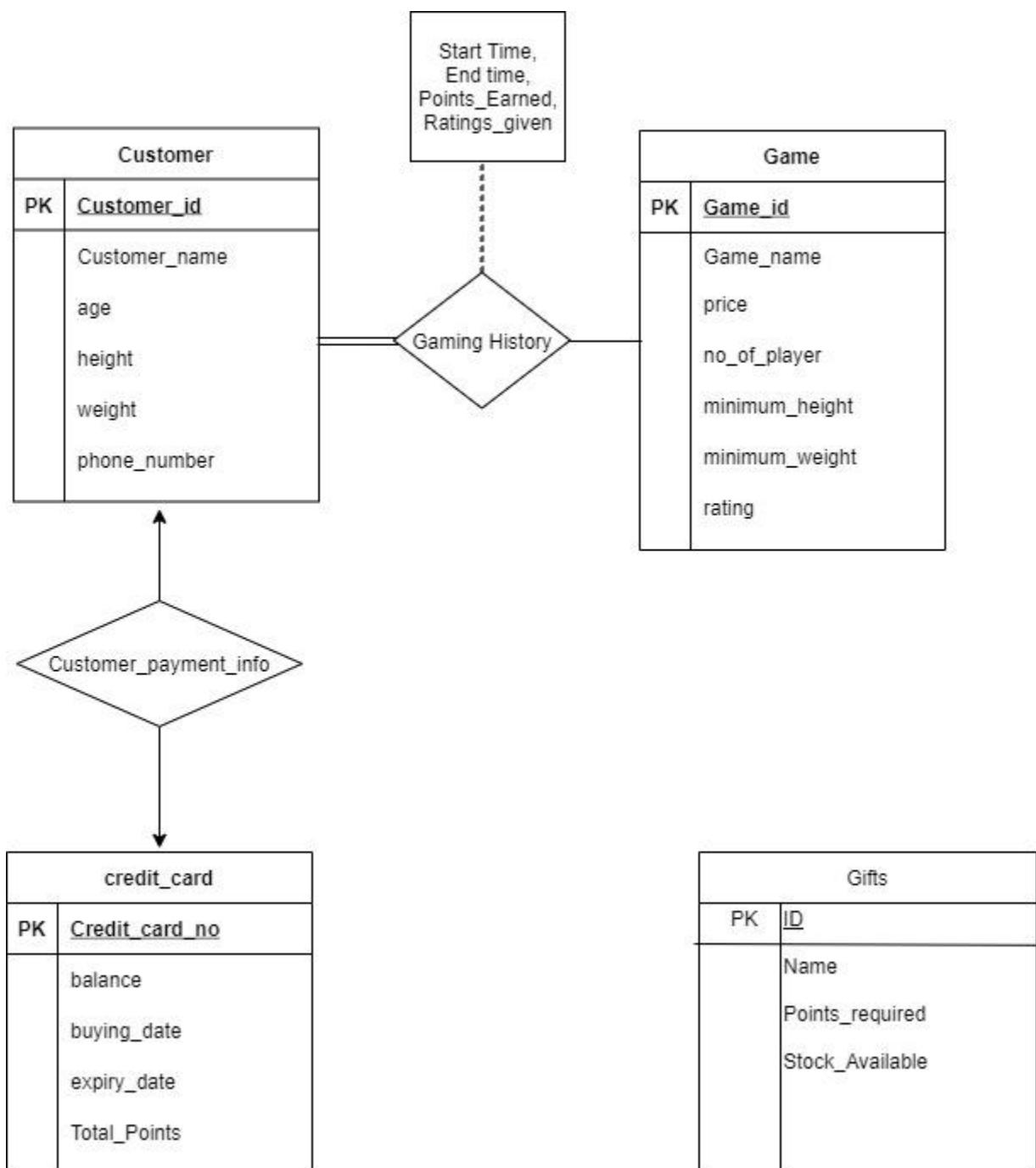
Nouns	Rejected Reason for Nouns
gifts	General
time	Vague
user	duplicates
various	Irrelevant
kind	Irrelevant
other	Irrelevant
any	Irrelevant
criteria	Vague
credit	General
date	General
card	General
number	General
information	Irrelevant
eligibility	Vague
details	Vague
gamezone	Vague
description	Vague
eligible	Vague
tournament	General
Counter-Strike	Irrelevant
manager	Vague
dynamic	Irrelevant
Staff	Vague

bank	Irrelevant
reflection	Irrelevant
integrity	Irrelevant

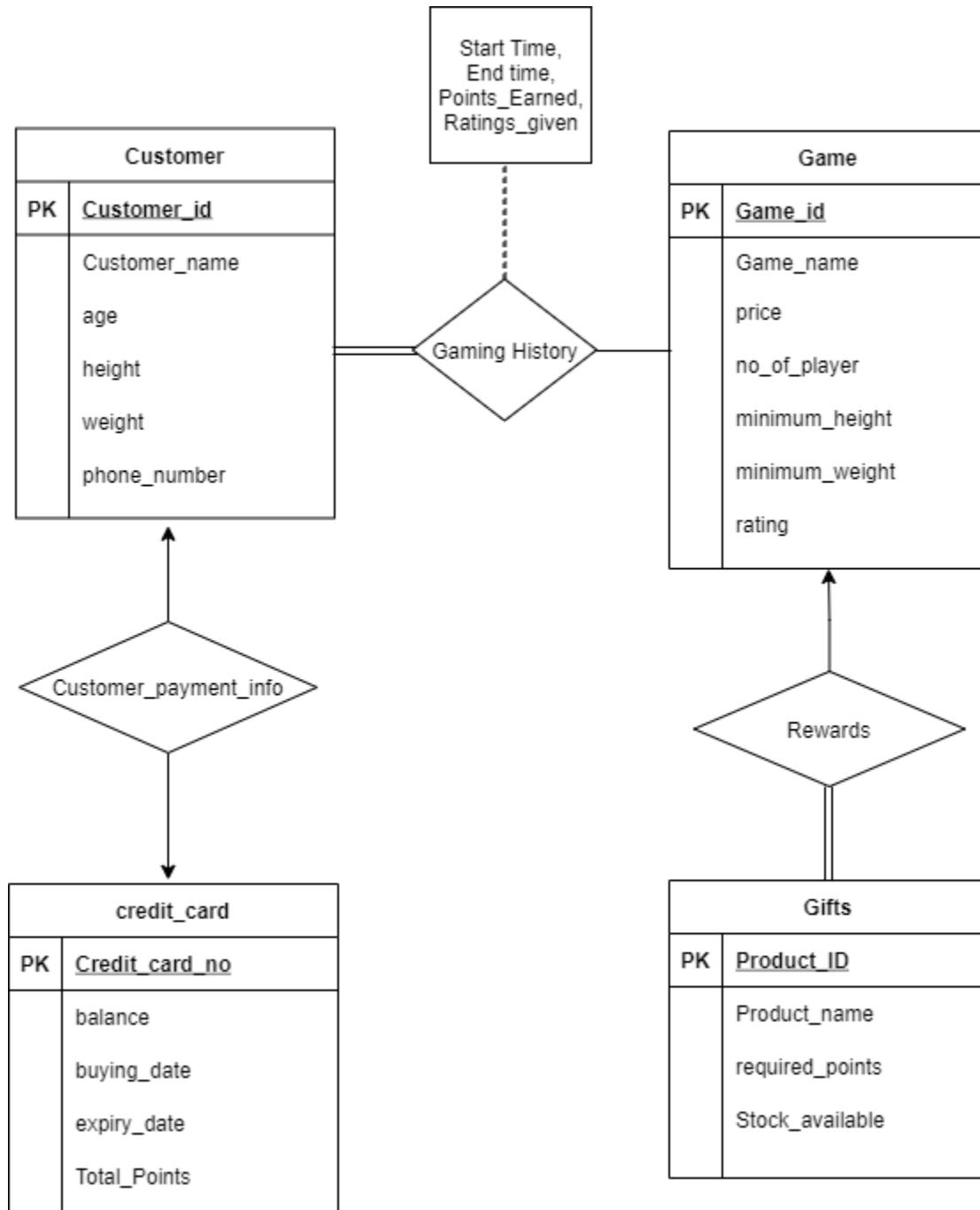
# Section3: ER-Diagrams all versions

## ER Diagram:

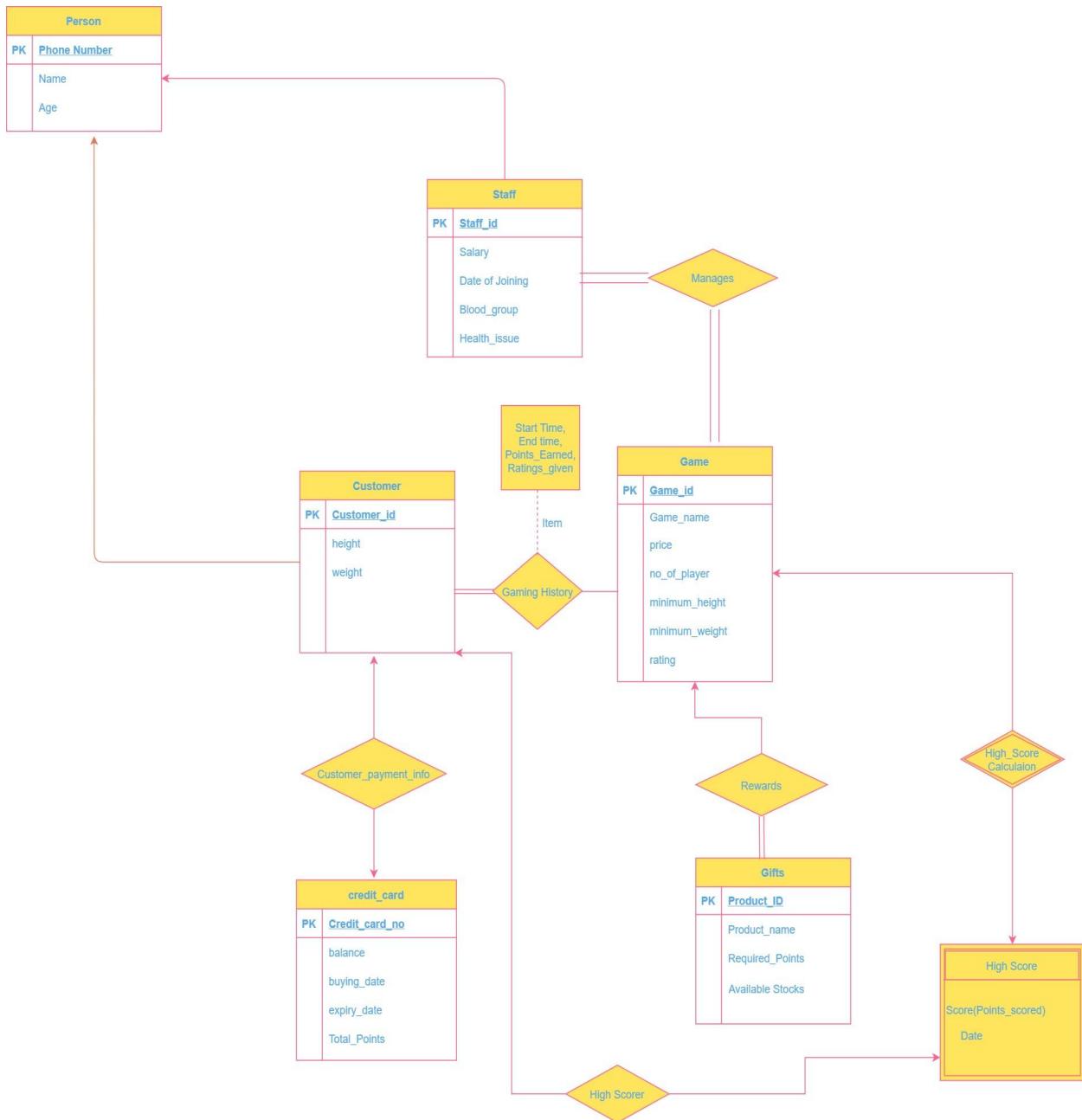
- Version 1



- Version 2:



- Final version



# Section4: Conversion of Final ER-Diagram to Relational Model.

## I. Mapping E-R Model to Relational Model

- Customer(Customer\_ID, Name, Phone\_no, Age, height, weight)
- Game(Game\_ID, Game\_name, price, Players\_required, min\_height, min\_weight, Rating)
- Staff(Staff\_ID, Name, Phone\_no, Age, Salary, Joining Date, Blood\_group, Health\_issue, ManagingGame\_ID)
- Game\_History(Customer\_ID, Game\_ID, Start\_time, End\_time, Points\_Earned, Ratings\_given)
- Management(Staff\_ID, Game\_ID)
- Credit\_Card(Card\_No, Owner\_ID, Balance, Buying\_Date, Expiry\_Date, Total\_Points)
- Gifts(Product\_ID, Product\_Name, Game\_ID, Required\_points, Available\_stocks)
- High\_Score(Game\_ID, Score, Date, Player\_ID)

## Section5: Normalization and Schema Refinement.

## I.Normalization & Schema Refinement

### 1. List all the Relations & Schemas with all details

- Customer(Customer ID, Name, Phone\_no, Age, height, weight)
- Game(Game\_ID, Game\_name, price, Players\_required, min\_height, min\_weight, Rating)
- Staff(Staff\_ID, Name, Phone\_no, Age, Salary, Joining Date, Blood\_group, Health\_issue)
- Game\_History(Customer\_ID, Game\_ID, Start\_time, End\_time, Points\_Earned, Ratings\_given)
- Management(Staff\_ID, Game\_ID)
- Credit\_Card(Card\_No, Customer\_ID, Balance, Buying\_Date, Expiry\_Date, Total\_Points)
- Gifts(Product\_ID, Product\_Name, Game\_ID, Required\_points, Available\_stocks)
- High\_Score(Game\_ID, Score, Date, Customer\_ID)

### 2.Identify and list all types of dependencies ( PK, FK, Functional Dependencies) for each relation

- Customer
  - PK - Customer\_ID
  - Functional Dependencies
    - Customer\_ID ---> Name
    - Customer\_ID ---> Phone\_No
    - Customer\_ID ---> Age
    - Customer\_ID ---> Height
    - Customer\_ID ---> Weight
- Game
  - PK- Game\_ID
  - Functional Dependencies

$\text{Game\_ID} \rightarrowtail \text{Game\_Name}$   
 $\text{Game\_ID} \rightarrowtail \text{Price}$   
 $\text{Game\_ID} \rightarrowtail \text{Players\_required}$   
 $\text{Game\_ID} \rightarrowtail \text{min\_height}$   
 $\text{Game\_ID} \rightarrowtail \text{min\_weight}$   
 $\text{Game\_ID} \rightarrowtail \text{rating}$   
 $\text{Game\_Name} \rightarrowtail \text{Game\_ID}$   
 $\text{Game\_Name} \rightarrowtail \text{Price}$   
 $\text{Game\_Name} \rightarrowtail \text{Players\_required}$   
 $\text{Game\_Name} \rightarrowtail \text{min\_height}$   
 $\text{Game\_Name} \rightarrowtail \text{min\_weight}$   
 $\text{Game\_Name} \rightarrowtail \text{rating}$

- Staff
  - PK- Staff\_ID
  - Functional dependencies-
    - $\text{Staff\_ID} \rightarrowtail \text{Name}$
    - $\text{Staff\_ID} \rightarrowtail \text{phone\_no}$
    - $\text{Staff\_ID} \rightarrowtail \text{age}$
    - $\text{Staff\_ID} \rightarrowtail \text{salary}$
    - $\text{Staff\_ID} \rightarrowtail \text{joining\_date}$
    - $\text{Staff\_ID} \rightarrowtail \text{Blood\_group}$
    - $\text{Staff\_ID} \rightarrowtail \text{Health\_Issue}$
    - $\text{Phone\_No} \rightarrowtail \text{Staff\_ID}$
- Game\_History
  - PK- Customer\_id, Start\_time
  - FK- Customer\_id, Game\_id
  - Functional dependencies-
    - $\text{Customer\_id}, \text{Start\_time} \rightarrowtail \text{End\_time}$
    - $\text{Customer\_id}, \text{Start\_time} \rightarrowtail \text{Game\_id}$
    - $\text{Customer\_id}, \text{Start\_time} \rightarrowtail \text{Points\_Earned}$
    - $\text{Customer\_id}, \text{Start\_time} \rightarrowtail \text{Ratings\_Given}$
- Management
  - PK- Staff\_ID, Game\_ID
  - FK - Staff\_ID, Game\_ID
  - Functional Dependencies
    - $\text{Staff\_ID}, \text{Game\_ID} \rightarrowtail \text{Staff\_ID}$
    - $\text{Staff\_ID}, \text{Game\_ID} \rightarrowtail \text{Game\_ID}$
- Credit card
  - PK- Card\_no
  - FK- Customer\_ID
  - Functional Dependencies
    - $\text{Card\_No} \rightarrowtail \text{Customer\_ID}$
    - $\text{Card\_No} \rightarrowtail \text{Balance}$
    - $\text{Card\_No} \rightarrowtail \text{Buying\_Date}$

Card\_No ---> Expiry\_Date  
 Card\_No ---> min\_weight  
 Card\_No ---> total\_points  
 Customer\_ID ---> Balance  
 Customer\_ID---> Buying\_Date  
 Customer\_ID---> Expiry\_Date  
 Customer\_ID---> min\_weight  
 Customer\_ID---> total\_points  
 Customer\_ID---> Card\_No

- Gifts

- PK- Product\_id
- FK- Game\_id
- Functional dependencies-
 

Product\_id---> Required\_Points  
 Product\_id ---> Available Stocks  
 Product\_id ---> Product\_Name  
 Product\_name ---> Required\_Points  
 Product\_Name ---> Available Stocks  
 Product\_Name--->Product\_id

- High\_Score

- PK- Game\_id
- FK- Game\_id,Player\_ID
- Functional dependencies-
 

Game\_id ---> Score  
 Game\_id ---> Date  
 Game\_id ---> customer\_id  
 customer\_id ---> Score  
 customer\_id ---> Date  
 customer\_id---> game\_id

**3) Investigate every schema for the following List of redundancies existing for every schema which is part of the database (document it). List of update, delete, and insert anomalies for every schema (document it)**

- Customer

- Insert anomalies - As we can insert data into the customer table the same information should also be inserted in the credit\_card table so this leads to insert anomalies in the customer table.
- Delete anomalies - Customer\_Id is referenced by game\_history, credit\_card and high\_score table. So there will be delete anomalies when we want to delete some customer information and the database may be inconsistent .
- Update anomalies - Customer\_Id is referenced by game\_history, credit\_card and high\_score table. So there will be update anomalies when we want to update some customer information and the database may be inconsistent .

- Game
  - Insert anomalies - There are no insert anomalies as we can insert data into the game table without any problem.
  - Delete anomalies - Game\_Id is referenced by game\_history, management, gfit and high\_score table. So there will be delete anomalies when we want to delete some game information and the database may be inconsistent .
  - Update anomalies - Game\_Id is referenced by game\_history, management, gfit and high\_score table. So there will be update anomalies when we want to update some game information and the database may be inconsistent .
- Staff
  - Insert anomalies - Staff\_id is referenced by management. So there will be insert anomalies when we want to insert new staff members and the database will be inconsistent.
  - Delete anomalies - Staff\_id is referenced by management. So there will be delete anomalies when we want to delete any staff members and the database will be inconsistent.
  - Update anomalies - There will be no anomalies in the staff table when we update the information of staff members as only staff\_id (primary key) is referenced by management.
- Game\_History
  - Insert Anomalies: Insertion of a game history tuple includes the game played, customer, points\_earned and rating given by the customer at the end. The balance in the customer's credit card should be deducted according to the price of the game played.  
Ratings of the game must be updated and points earned by the customer are to be added to the total points in the customer's card.  
Also, changes in the high score table must be done if the points earned are the highest till date.
  - Delete Anomalies: No delete anomaly will be there as a game history will never be deleted.
  - Update Anomalies: No update anomaly will be there as a game history will never be updated.
- Management
  - Insert Anomalies - When information is inserted in the management table, staff\_id and game\_id should be there in staff and game table. So insert anomalies will arise.
  - Delete Anomalies - Staff\_id and Game\_id are referenced from staff and game tables. So when information is deleted from the management table, delete anomalies will arise and staff, game tables will be in an inconsistent state.
  - Update Anomalies - Staff\_id and Game\_id are referenced from staff and game table. So when information is updated in the management table, this information should also be updated in the corresponding table. Hence update anomalies will be there.

- Credit\_card
  - Insert Anomalies - When information is inserted in the credit\_card table, customer\_id should be there in the customer table. So insert anomalies will arise.
  - Delete Anomalies - customer\_id is referenced from customer table. So when information is deleted from the credit\_card table, delete anomalies will arise and the customer table will be in an inconsistent state.
  - Update Anomalies - No update anomalies will be there.
- Gifts
  - Insert anomalies - when we insert some new gifts in table the games which associated with this new gift must be in the game table so insert anomalies arise.
  - Delete anomalies - No delete anomaly will be there as we delete some gifts there will be no problem in another table .
  - Update anomalies - No update anomaly will be there as we delete some gifts there will be no problem in another table .
- High\_score
  - Insert anomalies - when some game's high score is inserted, the corresponding game\_id should be there in the game table. So insert anomalies will arise.
  - Delete anomalies - no delete anomalies.
  - Update anomalies - no update anomalies.

#### **4) Normalize the database up to 1NF (scalar values)**

- Customer
  - Name is a composite attribute. So not in 1NF.
  - Customer(Customer ID, First\_Name,Middle\_Name, Last\_Name, Phone\_no, Age, height, weight)
- Game
  - Already in 1NF
- Staff
  - Name is a composite attribute. So not in 1NF.
  - Staff(Staff ID, First\_Name,Middle\_Name, Last\_Name, Phone\_no, Age, Salary, Joining Date, Blood\_group, Health\_issue)
- Game\_History
  - All the attributes are atomic.Hence,in 1NF

- Management
  - All the attributes are atomic.Hence,in 1NF
- Credit\_Card
  - All the attributes are atomic.Hence,in 1NF
- Gifts
  - All the attributes are atomic.Hence,in 1NF
- High\_Score
  - All the attributes are atomic.Hence,in 1NF

## 5) Normalize the database further to 2NF (Remove Partial Dependencies)

- Customer
  - There is only one candidate key, which is Customer\_ID. Customer\_ID is determining all other non-prime attributes.
  - No proper subset of candidate key is determining non prime attributes.
  - So the customer table is already in 2NF.
- Game
  - Candidate keys are Game\_ID and Game\_Name. There are no proper subsets for these keys to leave scope for any partial dependencies, so the relation is in 2NF.
- Game\_History
  - Candidate keys can be (Customer\_id, Start\_time), (Customer\_id, End\_time).
  - It can be proved that any proper subset of any of the candidate keys doesn't determine any non-prime attribute.
  - So, the relation is in 2NF.
- Management
  - Candidate key is (staff\_id,game\_id)
  - There is no prime attribute
  - Here any proper subset of candidate key doesn't determine any non prime attribute.
  - So the relation is in 2NF.
- Credit\_Card
  - Candidate keys are card\_no, owner\_id
  - Here no proper subset of candidate key is determining non prime attributes.
  - So the relation is in 2NF.

- Gifts
  - Candidate keys are product\_id, product\_name
  - Here no proper subset of candidate key is determining non prime attributes.
  - So the relation is in 2NF.
  
- High\_score
  - Candidate keys are game\_id, customer\_id
  - Here no proper subset of candidate key is determining non prime attributes.
  - So the relation is in 2NF

**6) Identify (and document) List of redundancies exiting for the schema in 2NF**

- There are no redundancies in schema in 2NF as mentioned above.

**7) Normalize it further to 3NF/BCNF (Remove Transitive Dependencies)**

- In all the schemas, there are no transitive dependencies, which means no non-prime attribute determines any non-prime attribute.
- So all the schemas are in 3NF.
- In all the schemas, determinants in all functional dependencies are candidate keys.

Section6: SQL: Final DDL Scripts,  
Insert statements, 40 SQL Queries  
with Snapshots of output of each  
query.

## 1. Final DDL Scripts.

1) Recreate database by writing all Create Table statements (DDL) to accommodate the new design which is in 3NF/BCNF (removing your original version of relations)

- **Customer**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Customer"
(
    "Customer_ID" bigint NOT NULL,
    "First_Name" character varying NOT NULL,
    "Middle_Name" character varying NOT NULL,
    "Last_Name" character varying NOT NULL,
    "Phone_no" character varying NOT NULL,
    "Age" integer NOT NULL,
    "Height" integer NOT NULL,
    "Weight" integer NOT NULL,
    PRIMARY KEY ("Customer_ID")
);
```

- **Game**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Game"
(
    "Game_ID" bigint NOT NULL,
    "Game_Name" character varying NOT NULL,
    "Price" money,
    "Players_Required" integer,
    "Min_Height" integer,
    "Min_Weight" integer,
    "Rating" integer,
    PRIMARY KEY ("Game_ID")
);
```

- **Staff**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Staff"
(
    "Staff_ID" bigint NOT NULL,
    "First_Name" character varying NOT NULL,
    "Middle_Name" character varying NOT NULL,
    "Last_Name" character varying NOT NULL,
    "Phone_No" character varying NOT NULL,
    "Age" integer,
    "Salary" integer,
    "Joining_Date" date,
    "Blood_Group" character varying,
    "Health_Issue" character varying,
    CONSTRAINT "Staff_Pkey" PRIMARY KEY ("Staff_ID")
);
```

### **Game History Script**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Game_History"
(
    "Customer_ID" bigint NOT NULL,
    "Game_ID" bigint NOT NULL,
    "Start_time" timestamp without time zone NOT NULL,
    "End_time" timestamp without time zone NOT NULL,
    "Points_earned" integer,
    "Ratings_given" integer,
    CONSTRAINT "Game_History_pkey" PRIMARY KEY ("Customer_ID", "Start_time"),
    CONSTRAINT "Customer_fkey" FOREIGN KEY ("Customer_ID")
        REFERENCES "Game_Zone"."Customer" ("Customer_ID") MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE SET NULL,
    CONSTRAINT "game_idkey" FOREIGN KEY ("Game_ID")
        REFERENCES "Game_Zone"."Game" ("Game_ID")
        ON UPDATE NO ACTION
        ON DELETE SET NULL
)
```

- **Management script**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Management"
(
    "Staff_ID" bigint NOT NULL,
    "Game_ID" bigint NOT NULL,
    CONSTRAINT "Manage_pkey" PRIMARY KEY ("Staff_ID", "Game_ID"),
    CONSTRAINT "Staff_fkey" FOREIGN KEY ("Staff_ID")
        REFERENCES "Game_Zone"."Staff" ("Staff_ID") MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Game_fkey" FOREIGN KEY ("Game_ID")
```

```
    REFERENCES "Game_Zone"."Game" ("Game_ID") MATCH SIMPLE
    ON UPDATE NO ACTION
    ON DELETE CASCADE
    NOT VALID
);
```

- **Credit Card Script**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Credit_Card"
(
    "Card_No" bigint,
    "Customer_ID" bigint,
    "Balance" money,
    "Buying_date" date,
    "Expiry_date" date,
    "Total_Points" integer,
    CONSTRAINT "Card_pkey" PRIMARY KEY ("Card_No"),
    CONSTRAINT "Owner_fkey" FOREIGN KEY ("Customer_ID")
        REFERENCES "Game_Zone"."Customer" ("Customer_ID") MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE CASCADE
        NOT VALID
);
```

- **Gifts Script**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."Gifts"
(
    "Product_ID" bigint NOT NULL,
    "Product_name" character varying,
    "Game_ID" bigint,
    "Required_points" integer,
    "Available_Stock" integer,
    CONSTRAINT "Gift_pkey" PRIMARY KEY ("Product_ID"),
    CONSTRAINT "Game_fkey" FOREIGN KEY ("Game_ID")
        REFERENCES "Game_Zone"."Game" ("Game_ID") MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE SET NULL
        NOT VALID
);
```

- **High score Script**

```
CREATE TABLE IF NOT EXISTS "Game_Zone"."High_Score"
(
    "Game_ID" bigint NOT NULL,
    "Highest_score" integer,
    "Date" date,
```

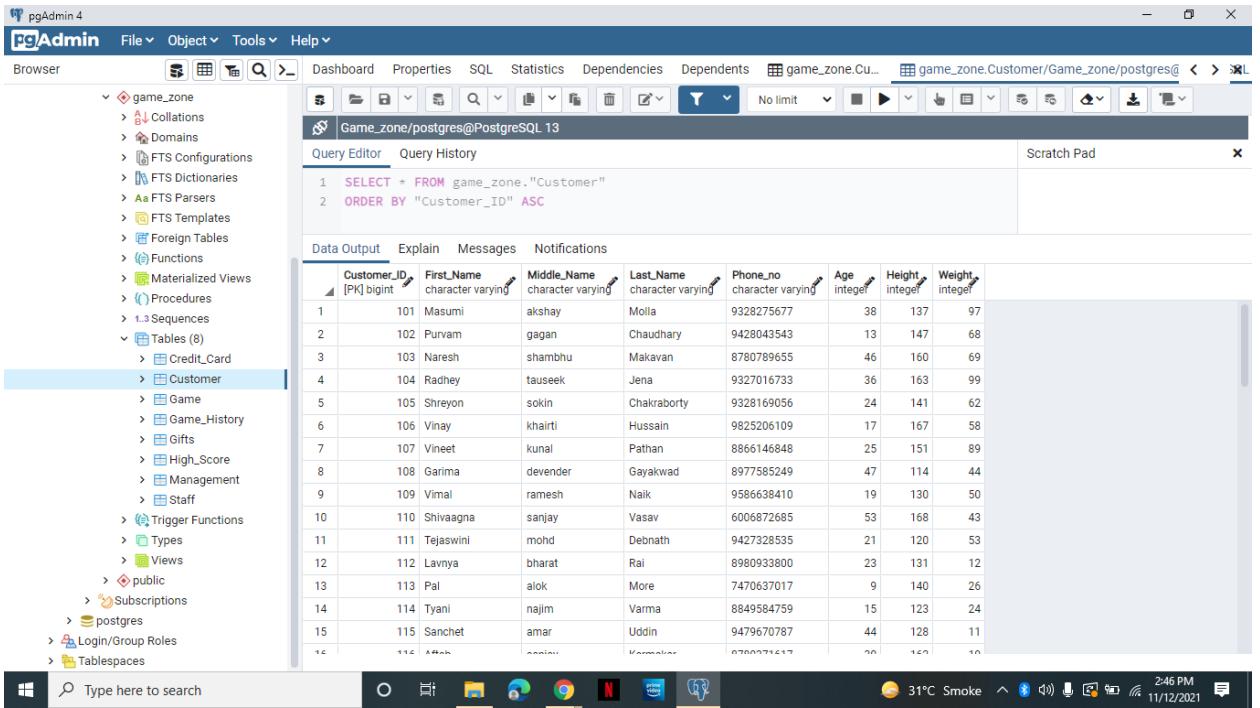
```

"Customer_ID" bigint,
CONSTRAINT high_socre_fkey PRIMARY KEY ("Game_ID"),
CONSTRAINT game_fkey FOREIGN KEY ("Game_ID")
    REFERENCES "Game_Zone"."Game" ("Game_ID") MATCH SIMPLE
    ON UPDATE NO ACTION
    ON DELETE CASCADE
    NOT VALID,
CONSTRAINT player_fkey FOREIGN KEY ("Customer_ID")
    REFERENCES "Game_Zone"."Customer" ("Customer_ID") MATCH SIMPLE
    ON UPDATE NO ACTION
    ON DELETE SET NULL
    NOT VALID
);

```

- 3) Create instances of this new database by populating it using appropriate INSERT INTO statements /using scripts. Make sure that every table has at least 80-100 tuples.

- Customer table



The screenshot shows the pgAdmin 4 interface with the 'Customer' table selected in the left sidebar. The main area displays the table's data output. The table has columns: Customer\_ID [PK] bigint, First\_Name character varying, Middle\_Name character varying, Last\_Name character varying, Phone\_no character varying, Age integer, Height integer, and Weight integer. The data shows 60 rows of customer information.

Customer_ID	First_Name	Middle_Name	Last_Name	Phone_no	Age	Height	Weight
1	101	Masumi	akshay	Molla	9328275677	38	137
2	102	Purvam	gagan	Chaudhary	9428043543	13	147
3	103	Naresh	shambhu	Makavan	8780789655	46	160
4	104	Radhey	tauseek	Jena	9327016733	36	163
5	105	Shreyon	sokin	Chakraborty	9328169056	24	141
6	106	Vinay	khairti	Hussain	9825206109	17	167
7	107	Vineet	kunal	Pathan	8866146848	25	151
8	108	Garima	devender	Gayakwad	8977585249	47	114
9	109	Vimal	ramesh	Naik	9586638410	19	130
10	110	Shivaagna	sanjay	Vasav	6006872685	53	168
11	111	Tejaswini	mohd	Debnath	9427328535	21	120
12	112	Lavnya	bharat	Rai	8980933800	23	131
13	113	Pal	alok	More	7470637017	9	140
14	114	Tyani	najim	Varma	8849584759	15	123
15	115	Sanchet	amar	Uddin	9479670787	44	128
...	...	Aashu	Karmalwar	...	...	...	...

No of Tuples = 60

- Game table

pgAdmin 4

File ▾ Object ▾ Tools ▾ Help ▾

Browser

- game\_zone
  - Collations
  - Domains
  - FTS Configurations
  - FTS Dictionaries
  - FTS Parsers
  - FTS Templates
  - Foreign Tables
  - Functions
  - Materialized Views
  - Procedures
  - Sequences
  - Tables (8)
    - Credit\_Card
    - Customer
    - Game**
    - Game\_History
    - Gifts
    - High\_Score
    - Management
    - Staff
  - Trigger Functions
  - Types
  - Views
  - public
  - Subscriptions
  - postgres
  - Login/Group Roles
  - Tablespaces

Dashboard Properties SQL Statistics Dependencies Dependents game\_zone.Cu... game\_zone.Cu... game\_zone.Ga...

Query Editor Query History

```
1 SELECT * FROM game_zone."Game"
2 ORDER BY "Game_ID" ASC
```

Data Output Explain Messages Notifications

Game_ID	Game_Name	Price	Players_Required	Min_Height	Min_Weight	Rating
1	Glow Hockey	\$50.00	6	135	20	3
2	Counter strike	\$50.00	9	128	21	5
3	Bowling	\$150.00	1	106	36	4
4	Car racing	\$50.00	3	121	31	1
5	Bike racing	\$50.00	4	140	26	4
6	Trampoline	\$100.00	5	139	18	2
7	Table tennis	\$100.00	10	111	11	5
8	Air hockey	\$100.00	8	115	33	3
9	Snooker	\$150.00	2	118	25	1
10	Lost legacy	\$150.00	7	134	34	4
11	Nioh	\$150.00	6	127	27	4
12	GT sport	\$200.00	9	100	40	5
13	Knack2	\$100.00	1	103	14	1
14	Hzd frozen wild lands dlc	\$200.00	3	124	19	2
15	Fifa18	\$200.00	4	133	16	3
...	...	...	...	...	...	...

No of tuples = 20

### Staff table

pgAdmin 4

File ▾ Object ▾ Tools ▾ Help ▾

Browser

- game\_zone
  - Collations
  - Domains
  - FTS Configurations
  - FTS Dictionaries
  - FTS Parsers
  - FTS Templates
  - Foreign Tables
  - Functions
  - Materialized Views
  - Procedures
  - Sequences
  - Tables (8)
    - Credit\_Card
    - Customer
    - Game
    - Game\_History
    - Gifts
    - High\_Score
    - Management
    - Staff**
  - Trigger Functions
  - Types
  - Views
  - public
  - Subscriptions
  - postgres
  - Login/Group Roles
  - Tablespaces

Dashboard Properties SQL Statistics Dependencies Dependents game\_zone.po... game\_zone.Staff/Game\_zone/postgres@Post...

Query Editor Query History

```
1 SELECT * FROM game_zone."Staff"
2 ORDER BY "Staff_ID" ASC
```

Data Output Explain Messages Notifications

Staff_ID	First_Name	Middle_Name	Last_Name	Phone_No	Age	Salary	Joining_Date	Health_Issue
1	Mithila	manish	Kumar	9408720771	50	10000	2010-01-08	Diabetic
2	Tahir	kailash	Lal	6356034467	46	10000	2011-01-09	[null]
3	Alekh	rahul	Sharma	8780796968	45	7000	2011-02-10	blood pressure
4	Raghav	swadesh	Shan	9978622901	37	10000	2019-04-12	asthma
5	Raunak	rajesh	Jai	9727368521	24	8000	2020-01-12	Diabetic
6	Nidhi	shukveer	Pal	9727368521	31	7000	2015-08-13	[null]
7	Tridha	bhusan	Aggarwal	9426632334	48	7000	2014-01-30	TB
8	Nehal	gallya	Raje	9925937240	33	8000	2010-02-15	[null]
9	Jinnie	rajendra	Chande	9723285800	47	7000	2020-01-16	[null]
10	Shiny	satish	Chander	6351254818	38	10000	2019-01-17	[null]
11	Supriya	kishan lal	Nara	8200780984	20	8000	2018-08-18	[null]
12	Irra	javed	Rai	6353229510	34	8000	2012-01-19	[null]
13	Manvi	mohit	Nath	9106709058	18	7000	2010-12-20	[null]
14	Sanni	mithilesh	Goel	9426715599	23	8000	2011-11-21	[null]
15	Hansi	mhod	Bhat	9106954865	42	10000	2016-03-22	[null]
...	...	...	...	...	...	...	...	...

No of tuples = 20

- Credit Card table

The screenshot shows the pgAdmin 4 interface with the following details:

- Schemas:** game\_zone (selected)
- Tables:** Credit\_Card (selected)
- Query Editor:** Contains the SQL query: `SELECT * FROM game_zone."Credit_Card"`
- Data Output:** A table with 15 rows of data.

Card_No	Customer_ID	Balance	Buying_date	Expiry_date	Total_Points
1	101	\$1,000.00	2020-12-01	2021-12-01	11
2	102	\$500.00	2021-01-19	2022-01-19	9
3	103	\$600.00	2019-10-01	2020-10-01	488
4	104	\$650.00	2020-01-01	2021-01-01	136
5	105	\$700.00	2021-02-01	2022-02-01	416
6	106	\$200.00	2018-03-10	2019-03-10	285
7	107	\$400.00	2019-12-12	2020-12-12	235
8	108	\$900.00	2011-02-01	2012-02-01	144
9	109	\$850.00	2012-11-11	2013-11-11	381
10	110	\$250.00	2017-02-23	2018-02-23	388
11	111	\$400.00	2020-12-01	2021-12-01	324
12	112	\$450.00	2021-01-19	2022-01-19	17
13	113	\$300.00	2019-10-01	2020-10-01	262
14	114	\$450.00	2020-01-01	2021-01-01	110
15	115	\$450.00	2021-02-01	2022-02-01	321

No of tuples = 60

- Management table

The screenshot shows the pgAdmin 4 interface with the following details:

- Schemas:** game\_zone (selected)
- Tables:** Management (selected)
- Query Editor:** Contains the SQL query: `SELECT * FROM game_zone."Management"`
- Data Output:** A table with 15 rows of data.

Staff_ID	Game_ID
601	403
601	410
602	405
602	406
603	401
603	407
604	402
604	408
605	404
605	409
606	403
606	410
607	405
607	406
608	401

No of tuple = 40

- Game history table

The screenshot shows the pgAdmin 4 interface with the following details:

- Schemas:** game\_zone (selected)
- Tables:** Game\_History (selected)
- Query Editor:**

```
1 SELECT * FROM game_zone."Game_History"
2 ORDER BY "Customer_ID" ASC, "start_time" ASC
```
- Data Output:** A table showing 60 tuples with columns: Customer\_ID, Game\_ID, Start\_time, End\_time, Points\_earned, Ratings\_given.

	Customer_ID	Game_ID	Start_time	End_time	Points_earned	Ratings_given
1	101	401	2020-01-08 01:05:06	2020-08-04 10:06	31	1
2	102	402	2020-01-08 02:05:06	2010-09-08 10:06	1	5
3	103	403	2020-01-08 03:05:06	2019-01-10 04:10:06	36	2
4	104	404	2020-01-08 04:05:06	2021-01-11 05:05:06	58	3
5	105	405	2020-01-08 05:05:06	2020-01-10 03:24:06	5	4
6	106	406	2020-01-08 06:05:06	2021-02-13 04:10:06	65	0
7	107	407	2020-01-08 07:05:06	2020-01-08 10:10:06	91	1
8	108	408	2020-01-08 08:05:06	2020-01-08 08:10:06	43	5
9	109	409	2020-01-08 09:05:06	2020-01-08 09:10:06	17	2
10	110	410	2020-01-08 10:05:06	2020-01-08 10:10:06	35	3
11	111	411	2020-01-09 01:06:00	2020-01-09 01:10:00	81	4
12	112	412	2020-01-09 02:05:06	2020-01-09 02:10:06	16	0
13	113	413	2020-01-09 03:05:06	2020-01-09 03:10:06	8	1
14	114	414	2020-01-09 04:05:06	2020-01-09 04:10:06	4	5
15	115	415	2020-01-09 05:05:06	2020-01-09 05:10:06	79	2
...	...	...	...	...	...	...

No of tuples = 60

- Gift table

The screenshot shows the pgAdmin 4 interface with the following details:

- Schemas:** game\_zone (selected)
- Tables:** Gifts (selected)
- Query Editor:**

```
1 SELECT * FROM game_zone."Gifts"
2 ORDER BY "Product_ID" ASC
```
- Data Output:** A table showing 20 tuples with columns: Product\_ID, Product\_name, Game\_ID, Required\_points, Available\_Stock.

	Product_ID	Product_name	Game_ID	Required_points	Available_Stock
1	301	chocolate	404	139	13
2	302	Table	416	138	11
3	303	Card	405	185	14
4	304	Mug	411	115	16
5	305	Pen Stand	412	159	7
6	306	Cricket Bat	419	181	17
7	307	Lunchbox	406	184	9
8	308	Trophy	410	169	10
9	309	Mouse	418	121	15
10	310	Tennis Ball	420	157	13
11	311	Pen	409	158	19
12	312	Video game	407	105	6
13	313	Bag	403	196	17
14	314	Bottle	402	176	15
15	315	Teddy Bear	401	111	5
...	...	...	...	...	...

No of tuples = 20

- High score table

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under the 'game\_zone' schema, including tables like 'Credit\_Card', 'Customer', and 'Game'. The 'Game' table is selected. The main window shows a query editor with the following SQL code:

```
1 SELECT * FROM game_zone."Game"
2 ORDER BY "Game_ID" ASC
```

The results are displayed in a data grid titled 'Data Output' with the following columns: Game\_ID [PK] bigint, Game\_Name character varying, Price money, Players\_Required integer, Min\_Height integer, Min\_Weight integer, and Rating integer. The data consists of 20 rows of game information.

	Game_ID [PK] bigint	Game_Name character varying	Price money	Players_Required integer	Min_Height integer	Min_Weight integer	Rating integer
1	401	Glow Hockey	\$50.00	6	135	20	3
2	402	Counter strike	\$50.00	9	128	21	5
3	403	Bowling	\$150.00	1	106	36	4
4	404	Car racing	\$50.00	3	121	31	1
5	405	Bike racing	\$50.00	4	140	26	4
6	406	Trampoline	\$100.00	5	139	18	2
7	407	Table tennis	\$100.00	10	111	11	5
8	408	Air hockey	\$100.00	8	115	33	3
9	409	Snooker	\$150.00	2	118	25	1
10	410	Lost legacy	\$150.00	7	134	34	4
11	411	Nioh	\$150.00	6	127	27	4
12	412	GT sport	\$200.00	9	100	40	5
13	413	Knack2	\$100.00	1	103	14	1
14	414	Hzd frozen wild lands dlc	\$200.00	3	124	19	2
15	415	Fifa18	\$200.00	4	133	16	3
16	416	Call of duty black ops	\$150.00	5	119	20	4

No of tuples = 20

- SQL Queries

1. Find staff id and it's salary.

SQL query :

```
select "Staff_ID","Salary"
from "Game_Zone"."Staff"
```

```

pgAdmin 4
File Object Tools Help
Browser final_project/postgres@PostgreSQL 13 * Game_Zone.St...
Dashboard Properties SQL Statistics Dependencies Dependents No limit ▾
Query Editor Query History
Notifications Explain Messages Data Output
1
2 select "Staff_ID","Salary"
3 from "Game_Zone"."Staff"

```

	Staff_ID	Salary
1	601	10000
2	602	10000
3	603	7000
4	604	10000
5	605	8000
6	606	7000
7	607	7000
8	608	8000
9	609	7000
10	610	10000
11	611	8000
12	612	8000
13	613	7000
14	614	8000
15	615	10000
16	616	9000
17	617	10000
18	618	7000
19	619	7000
20	620	7000

Type here to search

No of Tuples = 20

2. Find a customer's name whose age is greater than 20.
- SQL query:

```

select "First_Name","Middle_Name","Last_Name"
      from "Game_Zone"."Customer"
     where "Customer"."Age">>20
  
```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays the database schema with tables like Customer, Game, and Credit\_Card. The main area shows a query editor with the following SQL code:

```

1 select "First_Name","Middle_Name","Last_Name"
2 from "Game_Zone"."Customer"
3 where "Customer"."Age">>20
4

```

The results pane displays the data output for the query, showing 20 rows with columns First\_Name, Middle\_Name, and Last\_Name. The data is as follows:

	First_Name	Middle_Name	Last_Name
1	Masumi	akshay	Molla
2	Naresh	shambhu	Makavan
3	Radhey	tauseek	Jena
4	Shreyon	sokin	Chakraborty
5	Vineet	kunal	Pathan
6	Garima	devender	Gayakwad
7	Shivaagna	sanjay	Vasav
8	Tejaswini	mohd	Debnath
9	Lavnya	bharat	Rai
10	Sanchet	amar	Uddin
11	Aftab	sanjay	Karmakar
12	Zarin	rajkumar	Bag
13	Biren	mohit	Jana
14	Vicky	puneet	Sih
15	Miloni	ravi kumar	Oraon
16	Monali	ramesh	Gamit
17	Sonam	shivji	Lata
18	Akhitar	golu	Kumbhar
19	Prapti	ravi	Mandi
20			

No of Tupels = 40

3. Find the name of games whose price is less than 300.
- SQL query:

```

select "Game_Name"
from "Game_Zone"."Game"
where "Game"."Price" < '$ 300'

```

pgAdmin 4

File Object Tools Help

Browser

final\_project/postgres@PostgreSQL 13 \*

Game\_Zone.St... Game\_Zone.G...

Query Editor Query History

```
1 select "Game_Name"
2 from "Game_Zone"."Game"
3 where "Game"."Price" < ? 300
```

Notifications Explain Messages Data Output

Game_Name	character varying
1 Glow Hockey	
2 Counter strike	
3 Bowling	
4 Car racing	
5 Bike racing	
6 Trampoline	
7 Table tennis	
8 Air hockey	
9 Snooker	
10 Lost legacy	
11 Nioh	
12 GT sport	
13 Knack2	
14 Hzd frozen wild lands dlc	
15 Fifa18	
16 Star wars battle front	
17 Basket ball	
18 UC4	
19 Star wars battle front 2	
20 CS go	

Type here to search

15:33 16-11-2021

No. of Tuples = 20

4. Find a high score for each game.  
SQL query :

```
select "Game_ID", "Highest_score" from "Game_Zone"."High_Score"
```

pgAdmin 4

File Object Tools Help

Browser

final\_project/postgres@PostgreSQL 13 \*

Game\_Zone.St... Game\_Zone.G...

Query Editor Query History

```
1 select "Game_ID", "Highest_score"
2 from "Game_Zone"."High_Score"
```

Notifications Explain Messages Data Output

Game_ID	[PK] bigint	Highest_score	integer
1	401	383	
2	402	416	
3	403	479	
4	404	485	
5	405	122	
6	406	421	
7	407	266	
8	408	346	
9	409	482	
10	410	161	
11	411	363	
12	412	223	
13	413	153	
14	414	384	
15	415	188	
16	416	405	
17	417	183	
18	418	343	
19	419	136	
20	420	182	

Type here to search

15:35 16-11-2021

No. of Tuples = 20

5. Find the games whose rating is at least 3.

SQL Query :

```
select *
from "Game_Zone"."Game"
where "Rating" >= 3
```

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane displays the database schema with tables like 'Customer' and 'Game'. The 'Query Editor' pane contains the SQL query:

```
1 select *
2 from "Game_Zone"."Game"
3 where "Rating" >= 3
4
```

The 'Data Output' pane shows the results of the query:

Game_ID	Game_Name	Price	Players_Required	Min_Height	Min_Weight	Rating
1	Glow Hockey	? 50.00	6	135	20	3
2	Counter strike	? 50.00	9	128	21	5
3	Bowling	? 150.00	1	106	36	4
4	Bike racing	? 50.00	4	140	26	4
5	Table tennis	? 100.00	10	111	11	5
6	Air hockey	? 100.00	8	115	33	3
7	Lost legacy	? 150.00	7	134	34	4
8	Nioh	? 150.00	6	127	27	4
9	GT sport	? 200.00	9	100	40	5
10	Fifa18	? 200.00	4	133	16	3
11	Star wars battle front	? 150.00	5	113	28	5
12	Basket ball	? 100.00	10	117	39	3
13	CS go	? 150.00	7	119	17	4

No. of Tuples = 13

6. Find the balance of each customer's credit card.

SQL query :

```
select "Customer_ID", "Balance"
from "Game_Zone"."Credit_Card"
```

```

    pgAdmin 4
    PgAdmin File Object Tools Help
    Browser Dashboard Properties SQL Statistics Dependencies Dependents final_project/postgres@PostgreSQL 13 * Game_Zone.G... Game_Zone.G...
    > Materialized Views
    > Procedures
    > Sequences
    > Tables (8)
        > Credit_Card
        > Customer
            > Columns (8)
                Customer_ID
                First_Name
                Middle_Name
                Last_Name
                Phone_no
                Age
                Height
                Weight
            > Constraints
            > Indexes
            > RLS Policies
            > Rules
            > Triggers
        > Game
            > Columns (7)
                Game_ID
                Game_Name
                Price
                Players_Require
                Min_Height
                Min_Weight
                Rating
            > Constraints
            > Indexes
            > RLS Policies
            > Rules
    Query Editor Query History
    1 select "Customer_ID", "Balance"
    2 from "Game_Zone"."Credit_Card"
    3
    Notifications Explain Messages Data Output
    Customer_ID Balance
    1          101 71000.00
    2          102 7500.00
    3          103 7600.00
    4          104 7650.00
    5          105 7700.00
    6          106 7200.00
    7          107 7400.00
    8          108 7900.00
    9          109 7850.00
    10         110 7250.00
    11         111 7400.00
    12         112 7450.00
    13         113 7300.00
    14         114 7450.00
    15         115 7450.00
    16         116 7500.00
    17         117 7600.00
    18         118 7650.00
    19         119 7750.00
    20         120 7800.00

```

No of Tuples = 60

7. Find the gifts whose available stock is greater than 10.

SQL query :

```

select *
from "Game_Zone"."Gifts"
where "Available_Stock" > 10

```

```

1 select *
2 from "Game_Zone"."Gifts"
3 where "Available_Stock" > 10
4

```

	Product_ID	Product_Name	Game_ID	Required_points	Available_Stock
1	314	Bottle	402	176	15
2	312	Bag	403	196	17
3	301	chocolate	404	139	13
4	303	Card	405	185	14
5	320	T-shirt	408	112	18
6	311	Pen	409	158	19
7	304	Mug	411	115	16
8	316	Tiffin	413	146	12
9	319	PencilBox	414	147	20
10	302	Table	416	138	11
11	309	Mouse	418	121	15
12	306	Cricket Bat	419	181	17
13	310	Tennis Ball	420	157	13

No. of Tuples = 13

8. Find the customers whose first name starts with 'H'.

SQL query :

```

select *
from "Game_Zone"."Customer"
where "First_Name" like 'H%'

```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under 'final\_project/postgres@PostgreSQL 13'. The 'Customer' table is selected, showing its columns: Customer\_ID, First\_Name, Middle\_Name, Last\_Name, Phone\_no, Age, Height, and Weight. A query editor window contains the following SQL code:

```
1 select *
2 from "Game_Zone"."Customer"
3 where "First_Name" like 'H%'
4
```

The results pane shows one tuple:

Customer_ID	First_Name	Middle_Name	Last_Name	Phone_no	Age	Height	Weight
142	Haresh	suraj	Momin	6353343120	33	109	71

No. of Tuples = 1

9. Find the staff\_id, name, health\_issue of the staff members who have a health issue.

SQL query :

```
select "Staff_ID", "First_Name", "Middle_Name", "Last_Name",
"Health_Issue"
from "Game_Zone"."Staff"
where "Health_Issue" is NOT NULL;
```

```

1
2 select "Staff_ID", "First_Name", "Middle_Name", "Last_Name", "Health_Issue"
3   from "Game_Zone"."Staff"
4 where "Health_Issue" is NOT NULL;
5

```

	Staff_ID	First_Name	Middle_Name	Last_Name	Health_Issue
1	601	Mithila	manish	Kumar	Diabetic
2	603	Alekh	rahuL	Sharma	blood pressure
3	604	Raghu	swedeshe	Shan	asthma
4	605	Raunak	rajesh	Jai	Diabetic
5	607	Tridha	bhusan	Aggarwal	TB

Successfully run. Total query runtime: 149 msec. 5 rows affected.

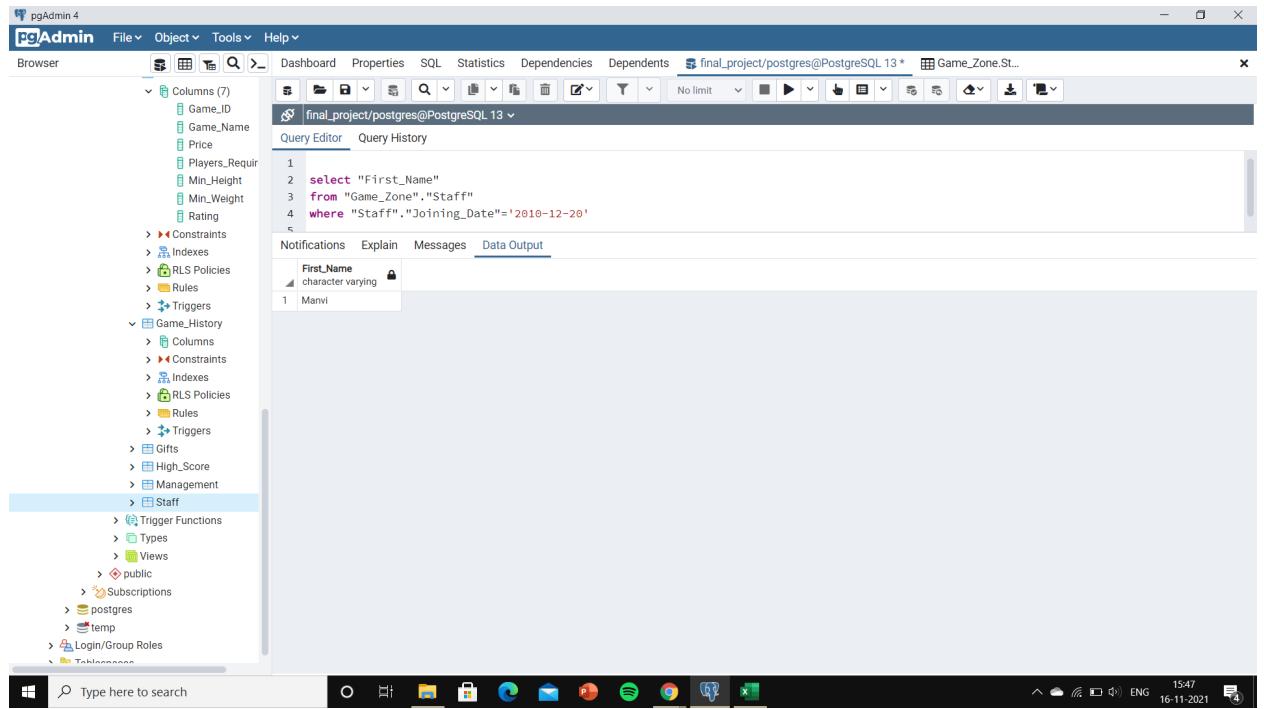
No. of Tuples = 5

10. Find the name of the staff member who joined at 2010-12-20.  
SQL query :

```

select "First_Name", "Middle_Name", "Last_Name"
from "Game_Zone"."Staff"
where "Staff"."Joining_Date"='2010-12-20'

```



NO of Tuples =1

11. Find the games id which is associated with staff id 615.  
SQL query :

```
select "Game_ID"
from "Game_Zone"."Management"
where "Staff_ID" = '605';
```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under the schema "Game\_Zone". The "Staff" node is currently selected. The main pane contains a "Query Editor" tab with the following SQL code:

```

1
2  select "Game_ID"
3  from "Game_Zone"."Management"
4  where "Staff_ID" = '605';
5

```

The results of the query are shown in a "Data Output" table:

	Game_ID	
1	404	
2	409	

A green status bar at the bottom right indicates: "Successfully run. Total query runtime: 184 msec. 2 rows affected."

No. Of Tuples = 2

12. Find all the staff\_id who has the highest salary.

SQL query:

```

select "Staff_ID"
from "Game_Zone"."Staff"
where "Staff"."Salary" = ( select max("Salary") from "Game_Zone"."Staff"
)

```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under the schema 'Game\_Zone'. The 'Staff' node is selected. The main area contains a query editor with the following SQL code:

```

1 select "Staff_ID"
2   from "Game_Zone"."Staff"
3  where "Staff"."Salary" = ( select max("Salary") from "Game_Zone"."Staff" )
4
5

```

Below the query editor is a data grid titled 'Data Output' showing the results of the query:

Staff_ID
1
2
3
4
5
6

No. of Tuples = 6

13. Find the gifts name which available in highest amount.

SQL query:

```

select "Product_name"
from "Game_Zone"."Gifts"
where "Gifts"."Available_Stock"=(select max("Available_Stock") from
"Game_Zone"."Gifts")

```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of the database schema, including the Game\_Zone and Gifts tables. The Query Editor tab contains the following SQL code:

```
1 select "Product_name"
2 from "Game_Zone"."Gifts"
3 where "Gifts"."Available_Stock"=(select max("Available_Stock") from "Game_Zone"."Gifts")
4
5
```

The Data Output tab shows the result of the query:

Product_name
PencilBox

No. of tuples =1

14. Find the required points to win a gift for game id 405.

SQL query:

```
select "Game_ID", "Required_points"
from "Game_Zone"."Gifts"
where "Gifts"."Game_ID"=405
```

The screenshot shows the pgAdmin 4 interface. In the left sidebar, under the 'Game\_Zone' schema, the 'Tables (8)' section is expanded, with 'Gifts' selected. The 'Columns (5)' for 'Gifts' are listed: Product\_ID, Product\_name, Game\_ID, Required\_points, and Available\_Stock. In the main area, the 'Query Editor' tab is active, displaying the following SQL query:

```
1 select "Game_ID", "Required_points"
2 from "Game_Zone"."Gifts"
3 where "Gifts"."Game_ID"=405
```

The 'Data Output' tab shows the result of the query:

Game_ID	Required_points
405	185

No. of tuples: 1

15. Get the number of games handled by each of the staff member.

SQL query :

```
select "Staff_ID", count(*) as Games_Handled from
"Game_Zone"."Management"
group by "Staff_ID"
```

The screenshot shows the pgAdmin 4 interface. In the left sidebar, under the 'Game\_Zone' schema, the 'Tables (8)' section is expanded, with 'Management' selected. The 'Columns (2)' for 'Management' are listed: Staff\_ID and games\_handled. In the main area, the 'Query Editor' tab is active, displaying the following SQL query:

```
1 select "Staff_ID", count(*) as Games_Handled from "Game_Zone"."Management"
2 group by "Staff_ID"
3
```

The 'Data Output' tab shows the result of the query:

Staff_ID	Games_Handled
617	2
607	2
605	2
613	2
615	2
601	2
610	2
602	2
604	2
620	2
616	2
609	2
608	2
603	2
606	2
618	2
614	2
611	2
619	2
612	2

No. of Tuples = 20

16. Find the id, name, rating of game which is least rated.

SQL query :

```
select "Game_ID", "Game_Name", "Rating" from "Game_Zone"."Game"  
where "Rating" <= all(select "Rating" from "Game_Zone"."Game");
```

The screenshot shows the pgAdmin 4 interface. On the left is the Browser pane, which lists various database objects like Game\_Zone, Tables (8), and Game. The main area is the Query Editor, containing the SQL query. Below it is the Data Output pane, which displays a table with four rows of data. A status bar at the bottom right indicates the query was successfully run with a runtime of 103 msec and 4 rows affected.

Game_ID	Game_Name	Rating
404	Car racing	1
409	Snooker	1
413	Knack2	1
418	UC4	1

Successfully run. Total query runtime: 103 msec. 4 rows affected.

No. of tuples = 4

17. Find the game which has highest number of players required.

SQL query :

```
select "Game_Name"  
from "Game_Zone"."Game"  
where "Game"."Players_Required" = (select max("Players_Required")  
from "Game_Zone"."Game")
```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under the schema 'Game\_Zone'. The 'Tables' node is expanded, showing 'Table tennis' and 'Basket ball'. The central area contains a 'Query Editor' window with the following SQL code:

```

1 select "Game_Name"
2 from "Game_Zone"."Game"
3 where "Game"."Players_Required" = (select max("Players_Required") from "Game_Zone"."Game")

```

The 'Data Output' tab is selected, showing the results of the query:

Game.Name
character varying
1 Table tennis
2 Basket ball

A green success message at the bottom right of the editor states: 'Successfully run. Total query runtime: 107 msec. 2 rows affected.'

No. of Tuples = 2

18. Find the customer's name whose surname is 'Kulkarni.'

SQL query:

```

select "First_Name"
from "Game_Zone"."Customer"
where "Last_Name" = 'Kulkarni'

```

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of the database schema under the 'Game\_Zone' schema, including tables like 'Credit\_Card', 'Customer', 'Game', 'Game\_History', and 'Gifts'. The 'Gifts' table is currently selected. The main pane shows a query editor with the following SQL code:

```
1 select "First_Name"
2 from "Game_Zone"."Customer"
3 where "Last_Name" = 'Kulkarni'
```

The results pane shows one row of data:

First_Name
Yogi

No. of tuples = 1

19. Find the credit card number of customer whose expiry date is 2021-10-01.

SQL query:

```
select "Card_No"
from "Game_Zone"."Credit_Card"
where "Expiry_date" = '2021-01-01'
```

pgAdmin 4

File Object Tools Help

Browser

- Game\_Zone
  - > Collations
  - > Domains
  - > FTS Configurations
  - > FTS Dictionaries
  - > FTS Parsers
  - > FTS Templates
  - > Foreign Tables
  - > Functions
  - > Materialized Views
  - > Procedures
  - > Sequences
  - > Tables (8)
    - > Credit\_Card
    - > Customer
    - > Game
    - > Game\_History
    - > Gifts
    - > Columns (5)
      - Product\_ID
      - Product\_name
      - Game\_ID
      - Required\_points
      - Available\_Stock
    - > Constraints
    - > Indexes
    - > RLS Policies
    - > Rules
    - > Triggers
    - > High\_Score
    - > Management
    - > Staff
    - > Trigger Functions
    - > Types

Dashboard Properties SQL Statistics Dependencies Dependents final\_project/postgres@PostgreSQL 13 \* Game\_Zone.G... Game\_Zone.Cr... No limit

Query Editor Query History

```
1 select "Card_No"
2 from "Game_Zone"."Credit_Card"
3 where "Expiry_date" = '2021-01-01'
```

Notifications Explain Messages Data Output

Card_No	
1	201901004
2	201901014
3	201901024
4	201901034
5	201901044
6	201901054

Successfully run. Total query runtime: 316 msec. 6 rows affected.

Type here to search

16:18 16-11-2021 ENG

No. of Tuples = 6

20. Count the number of games whose price is less than or equal to 100.

SQL query :

```
select Count ("Game_ID")
from "Game_Zone"."Game"
where "Price" <= 100
```

pgAdmin 4

File Object Tools Help

Browser

- Game\_Zone
  - > Collations
  - > Domains
  - > FTS Configurations
  - > FTS Dictionaries
  - > FTS Parsers
  - > FTS Templates
  - > Foreign Tables
  - > Functions
  - > Materialized Views
  - > Procedures
  - > Sequences
  - > Tables (8)
    - > Credit\_Card
    - > Customer
    - > Game
    - > Game\_History
    - > Gifts
    - > Columns (5)
      - Product\_ID
      - Product\_name
      - Game\_ID
      - Required\_points
      - Available\_Stock
    - > Constraints
    - > Indexes
    - > RLS Policies
    - > Rules
    - > Triggers
    - > High\_Score
    - > Management
    - > Staff
    - > Trigger Functions
    - > Types

Dashboard Properties SQL Statistics Dependencies Dependents final\_project/postgres@PostgreSQL 13 \* Game\_Zone.G... Game\_Zone.Cr... No limit

Query Editor Query History

```
1 select Count ("Game_ID")
2 from "Game_Zone"."Game"
3 where "Price" <= ? 100
```

Notifications Explain Messages Data Output

count	
1	9

Type here to search

16:20 16-11-2021 ENG

No. of Tuples = 1

21. Find all the names of customers who have achieved the highest score in a game with game\_id = 405.  
SQL query :

```
select "First_Name", "Middle_Name", "Last_Name"
from "Game_Zone"."Customer"
join "Game_Zone"."High_Score" on "Customer"."Customer_ID" =
"High_Score"."Customer_ID"
where "High_Score"."Game_ID" = 405
```

The screenshot shows the pgAdmin 4 interface. On the left is the object browser tree, which includes nodes for 'game\_zone' (Collations, Domains, FTS Configurations, FTS Dictionaries, FTS Parsers, FTS Templates, Foreign Tables, Functions, Materialized Views, Procedures, Sequences), 'Tables (8)' (Credit\_Card, Customer, Game, Game\_History, Gifts, with further sub-nodes for Columns (5) including Product\_ID, Product\_name, Game\_ID, Required\_points, Available\_Stock, Constraints, Indexes, RLS Policies, Rules, Triggers, High\_Score, Management, Staff, Trigger Functions, Types), and 'final\_project/postgres@PostgreSQL 13 \*' (Dashboard, Properties, Statistics, Dependencies, Dependents). The 'Query Editor' tab is active, displaying the SQL query from above. The 'Data Output' tab shows a single row of results:

First_Name	Middle_Name	Last_Name
Shreyon	sokin	Chakraborty

A green status bar at the bottom right indicates: 'Successfully run. Total query runtime: 99 msec. 1 rows affected.'

No. of Tuples = 1

22. Find all the names of customers who have achieved the highest score in a game which is managed by staff\_id = 610.

SQL query :

```
select "First_Name", "Middle_Name", "Last_Name"
from "Game_Zone"."Customer"
join "Game_Zone"."High_Score" on "Customer"."Customer_ID" =
"High_Score"."Customer_ID"
join "Game_Zone"."Management" on "High_Score"."Game_ID" =
"Management"."Game_ID"
where "Management"."Staff_ID" = 610
```

pgAdmin 4

File ▾ Object ▾ Tools ▾ Help ▾

Browser

- Game\_Zone
  - Collations
  - Domains
  - FTS Configurations
  - FTS Dictionaries
  - FTS Parsers
  - Foreign Tables
  - Functions
  - Materialized Views
  - Procedures
  - Sequences
- Tables (8)
  - Credit\_Card
  - Customer
  - Game
  - Game\_History
  - Gifts
    - Columns (5)
      - Product\_ID
      - Product\_name
      - Game\_ID
      - Required\_points
      - Available\_Stock
    - Constraints
    - Indexes
    - RLS Policies
    - Rules
    - Triggers
  - High\_Score
  - Management
  - Staff
  - Trigger Functions
  - Types

final\_project/postgres@PostgreSQL 13\*

Query Editor Query History

```

1 select "First_Name", "Middle_Name", "Last_Name"
2 from "Game_Zone"."Customer"
3 join "Game_Zone"."High_Score" on "Customer"."Customer_ID" = "High_Score"."Customer_ID"
4 join "Game_Zone"."Management" on "High_Score"."Game_ID" = "Management"."Game_ID"
5 where "Management"."Staff_ID" = 610

```

Notifications Explain Messages Data Output

First_Name	Middle_Name	Last_Name
Radhey	tauseek	Jena
Vimal	ramesh	Naik

Type here to search

1621 16-11-2021

No. of Tuples = 2

23. Get the customer names in the order sorted by the max points scored in any game.

SQL query :

```

create view points as select "Customer_ID", max("Points_earned") as max_points
from "Game_Zone"."Game_History"
group by "Customer_ID";
select * from points
order by max_points desc;

```

pgAdmin 4

File ▾ Object ▾ Tools ▾ Help ▾

Browser

- Tables (8)
  - Credit\_Card
    - Columns (6)
      - Card\_No
      - Customer\_I
      - Balance
      - Buying\_date
      - Expiry\_date
      - Total\_Point
    - Constraints
    - Indexes
    - RLS Policies
    - Rules
    - Triggers
  - Customer
  - Game
  - Game\_History
  - Gifts
  - High\_Score

201901188\_db/postgres@PostgreSQL 13\*

Query Editor Query History

```

4 create view points as select "Customer_ID", max("Points_earned") as max_points
5 from "Game_Zone"."Game_History"
6 group by "Customer_ID";
7
8 select * from points
9 order by max_points desc;

```

Data Output Explain Messages Notifications

Customer_ID	max_points
1	159
2	150
3	154
4	143
5	119
6	107
7	120
8	141
9	145

No of Tuples = 60

24. Find the highest score of the customer whose credit card number is 201901014.

SQL query :

```
select "Highest_score"
from "Game_Zone"."High_Score"
join "Game_Zone"."Credit_Card" on "Credit_Card"."Customer_ID" =
"High_Score"."Customer_ID"
where "Card_No" = '201901014'
```

The screenshot shows the pgAdmin 4 interface. On the left is the 'Browser' pane, which displays the database structure under 'Servers (1)'. It includes 'PostgreSQL 13', 'Databases (4)', 'final\_project', 'Casts', 'Catalogs', 'Event Triggers', 'Extensions', 'Foreign Data Wrappers', 'Languages', 'Publications', 'Schemas (2)', and 'Game\_Zone' (which is expanded to show 'Collations', 'Domains', 'FTS Configurations', 'FTS Dictionaries', 'FTS Parsers', 'FTS Templates', 'Foreign Tables', 'Functions', 'Materialized Views', 'Procedures', 'Sequences', 'Tables (8)', 'Credit\_Card', 'Customer', 'Game', 'Game\_History', 'Gifts', 'Columns (5)', 'Product\_ID', and 'Product\_name'). The 'final\_project' database is selected. The main area is the 'Query Editor' with the following SQL code:

```
1 select "Highest_score"
2 from "Game_Zone"."High_Score"
3 join "Game_Zone"."Credit_Card" on "Credit_Card"."Customer_ID" = "High_Score"."Customer_ID"
4 where "Card_No" = '201901014'
5
6
```

Below the code, the 'Data Output' tab is selected, showing a single row of results:

Highest_score	integer
1	384

A green notification bar at the bottom right indicates: 'Successfully run. Total query runtime: 89 msec. 1 rows affected.'

No. of tuples = 1

25. Find the name of the game played by the customer whose card\_no is 201901006 at time 2020-01-08 6:05:06.

SQL query :

```
select "Game_Name" from "Game_Zone"."Game"
where "Game_ID" = (select "Game_ID" from "Game_Zone"."Game_History"
where "Customer_ID" = (select "Customer_ID" from "Game_Zone"."Credit_Card"
where "Card_No"=201901006) and "Start_time"='2020-01-08 6:05:06');
```

```

13
14 select "Game_Name" from "Game_Zone"."Game"
15 where "Game_ID" = (select "Game_ID" from "Game_Zone"."Game_History"
16 where "Customer_ID" = (select "Customer_ID" from "Game_Zone"."Credit_Card"
17 where "Card_No"='201901006' and "Start_time"='2020-01-08 6:05:06');
18

```

Data Output Explain Messages Notifications

Game_Name
Trampoline

No. of Tuples = 1

26. Find the customer balance and earned point who score highest in game with game\_id 404.  
SQL query :

```

select "Balance","Total_Points"
from "Game_Zone"."Credit_Card"
where "Customer_ID" = (select "Customer_ID"
                        from "Game_Zone"."High_Score"
                        where "Game_ID"= 404);

```

```

1 select "Balance","Total_Points"
2 from "Game_Zone"."Credit_Card"
3 where "Customer_ID" = (select "Customer_ID"
4                         from "Game_Zone"."High_Score"
5                         where "Game_ID"= 404);
6

```

Notifications Explain Messages Data Output

Balance	Total_Points
650.00	136

No. of Tuples = 1

27. Find customers' names and id who played the game Bowling .

SQL query :

```
create view cus as select "Customer_ID"
from "Game_Zone"."Game_History"
where "Game_ID"=(select "Game_ID"
                  from "Game_Zone"."Game"
                  where "Game_Name"='Bowling');

select "Customer"."Customer_ID","First_Name","Middle_Name","Last_Name"
from "Game_Zone"."Customer" join cus on
"Customer"."Customer_ID"=cus."Customer_ID";
```

The screenshot shows the pgAdmin 4 interface. In the left sidebar, under the 'Tables' section, the 'Credit\_Card' table is selected, showing its six columns: Card\_No, Customer\_ID, Balance, Buying\_date, Expiry\_date, and Total\_Points. The main window displays the SQL query and its execution results. The results are presented in a table:

	Customer_ID	First_Name	Middle_Name	Last_Name
1	103	Naresh	shambhu	Makavan
2	123	Pranali	anil kumar	Brahma
3	143	Nadim	mukul	Gaud

No. of Tuples = 3

28. Find the customers' names and total points they earned in descending order who played the game Table tennis.

SQL query :

```
create view descus as select "Customer_ID"
from "Game_Zone"."Game_History"
where "Game_ID"=(select "Game_ID"
                  from "Game_Zone"."Game"
                  where "Game_Name"='Table tennis');

select "Credit_Card"."Customer_ID","Total_Points"
from "Game_Zone"."Credit_Card" join descus on
"Credit_Card"."Customer_ID"=descus."Customer_ID"
order by "Total_Points" desc
```

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane displays a tree view of database objects under 'final\_project/postgres@PostgreSQL 13'. The 'Tables' node is expanded, showing 'Credit\_Card' with its columns: Customer\_ID, Total\_Points, Card\_No, Customer\_ID, Balance, Buying\_date, Expiry\_date, and Total\_Points. The 'Data Output' tab for 'Credit\_Card' shows a table with three rows:

Customer_ID	Total_Points
107	235
127	132
147	117

The 'Query Editor' tab contains the following SQL code:

```

1 create view descus as select "Customer_ID"
2 from "Game_Zone"."Game_History"
3 where "Game_ID"=(select "Game_ID"
4                 from "Game_Zone"."Game"
5                   where "Game_Name"='Table tennis')
6
7 select "Credit_Card"."Customer_ID","Total_Points"
8 from "Game_Zone"."Credit_Card" join descus on "Credit_Card"."Customer_ID"=descus."Customer_ID"
9 order by "Total_Points" desc
10

```

No. of Tuples = 3

29. Find the customer id and their names who are eligible for bike racing.

SQL query:

```

select "Customer_ID", "First_Name", "Middle_Name", "Last_Name"
from "Game_Zone"."Customer"
where "Customer"."Height" >= (select "Min_Height" from "Game_Zone"."Game" where
"Game"."Game_Name"='Bike racing')
      and "Customer"."Weight" >= (select "Min_Weight" from
"Game_Zone"."Game" where "Game"."Game_Name"='Bike racing')

```

```

1 select "Customer_ID","First_Name","Middle_Name","Last_Name"
2 from "Game_Zone"."Customer"
3 where "Customer"."Height" >= (select "Min_Height" from "Game_Zone"."Game" where "Game"."Game_Name"='Bike racing')
4 and "Customer"."Weight" >= (select "Min_Weight" from "Game_Zone"."Game" where "Game"."Game_Name"='Bike racing')

```

Customer_ID	First_Name	Middle_Name	Last_Name
102	Purvam	gagan	Chaudhary
103	Naresh	shambhu	Makavan
104	Radhey	tauseek	Jena
105	Shreyon	sokin	Chakraborty
106	Vinay	khairti	Hussain
107	Vineet	kunal	Pathan
110	Shivaagna	sanjay	Vasav
113	Pal	alok	More
119	Vicky	puneet	Sih
121	Miloni	ravi kumar	Oraon
123	Pranali	anil kumar	Brahma
124	Monali	ramesh	Gamit
127	Akhtar	gollu	Kumbhar
129	Bhoomik	bhuri	Seda
132	Kundan	bhagyaan	Jagtap
139	Arifa	surender	SK
140	Yagnesh	vikram	Rahaman
145	Venish	salman	Gazi
147	Vraj	veerban	Meshram

No. of Tuples = 22

30. List the game's name in descending order of required points to win a gift for a particular game.  
SQL query:

```

select "Game_Name", "Required_points"
from "Game_Zone"."Game" join "Game_Zone"."Gifts" on
"Game"."Game_ID"="Gifts"."Game_ID"
order by "Gifts"."Required_points" desc

```

```

    select "Game_Name", "Required_points"
    from "Game_Zone"."Game" join "Game_Zone"."Gifts" on "Game"."Game_ID"="Gifts"."Game_ID"
    order by "Gifts"."Required_points" desc
  
```

Game_Name	Required_points
Bowling	196
Bike racing	185
Trampoline	184
Star wars battle front 2	181
Counter strike	176
Lost legacy	169
GT sport	159
Snooker	158
CS go	157
Hzd frozen wild lands dlc	147
Knack2	146
Car racing	139
Star wars battle front	138
Fifa18	127
UC4	121
Basket ball	120
Nioh	115
Air hockey	112
Glow Hockey	111
Table tennis	105

No. of Tuples = 20

31. Find the customer's id and name who has earned greater than 80 points on date 2020-01-09.

SQL query:

```

Select "Customer_ID", "First_Name", "Middle_Name", "Last_Name"
from "Game_Zone"."Customer"
where "Customer"."Customer_ID"
      in  (select "Customer_ID"
            from "Game_Zone"."Game_History"
            where     "Game_History"."Points_earned">>=80
            and "Game_History"."Start_time"
            between '2020-01-09' and '2020-01-10')
  
```

```

1 select "Customer_ID", "First_Name", "Middle_Name", "Last_Name"
2 from "Game_Zone"."Customer"
3 where "Customer"."Customer_ID" in (select "Customer_ID"
4                                     from "Game_Zone"."Game_History"
5                                     where "Game_History"."Points_earned">>=80
6                                     and "Game_History"."Start_time" between '2020-01-09' and '2020-01-10')

```

Notifications Explain Messages Data Output

Customer_ID	First_Name	Middle_Name	Last_Name
111	Tejaswini	mohd	Debnath
119	Vicky	puneet	Sih
120	Karishma	kishan	Mohammed

No. of Tuples = 3

32. Find the game name and customer's name who has at least 400 total points and has a high score in any game.  
SQL query:

```

create view high as select * from "Game_Zone"."Credit_Card" natural join
"Game_Zone"."High_Score";

select "Game_Name", "First_Name", "Middle_Name", "Last_Name"
from "high" join "Game_Zone"."Customer" on
"Customer"."Customer_ID"="high"."Customer_ID"
      join "Game_Zone"."Game" on "Game"."Game_ID"="high"."Game_ID"
where "high"."Total_Points">>=400

```

```

1 create view high as select * from "Game_Zone"."Credit_Card" natural join "Game_Zone"."High_Score";
2
3
4
5 select "Game_Name", "First_Name", "Middle_Name", "Last_Name"
6 from "high" join "Game_Zone"."Customer" on "Customer"."Customer_ID"="high"."Customer_ID"
7 join "Game_Zone"."Game" on "Game"."Game_ID"="high"."Game_ID"
8 where "high"."Total_Points">>=400
9

```

Game_Name	First_Name	Middle_Name	Last_Name
Bowling	Naresh	shambhu	Makavan
Bike racing	Shreyon	sokin	Chakraborty

No. of Tuples = 20

33. Get the names of the customers who have played games more than once.

SQL query :

```

select "First_Name", "Middle_Name", "Last_Name" from "Game_Zone"."Customer"
where "Customer_ID" = some(select "Customer_ID" from "Game_Zone"."Game_History"
group by "Customer_ID" having count(*)>1);

```

```

62
63 select "First_Name", "Middle_Name", "Last_Name" from "Game_Zone"."Customer"
64 where "Customer_ID" = some(select "Customer_ID" from "Game_Zone"."Game_History" group by "Customer_ID" having count(*)>1)
65
66
67

```

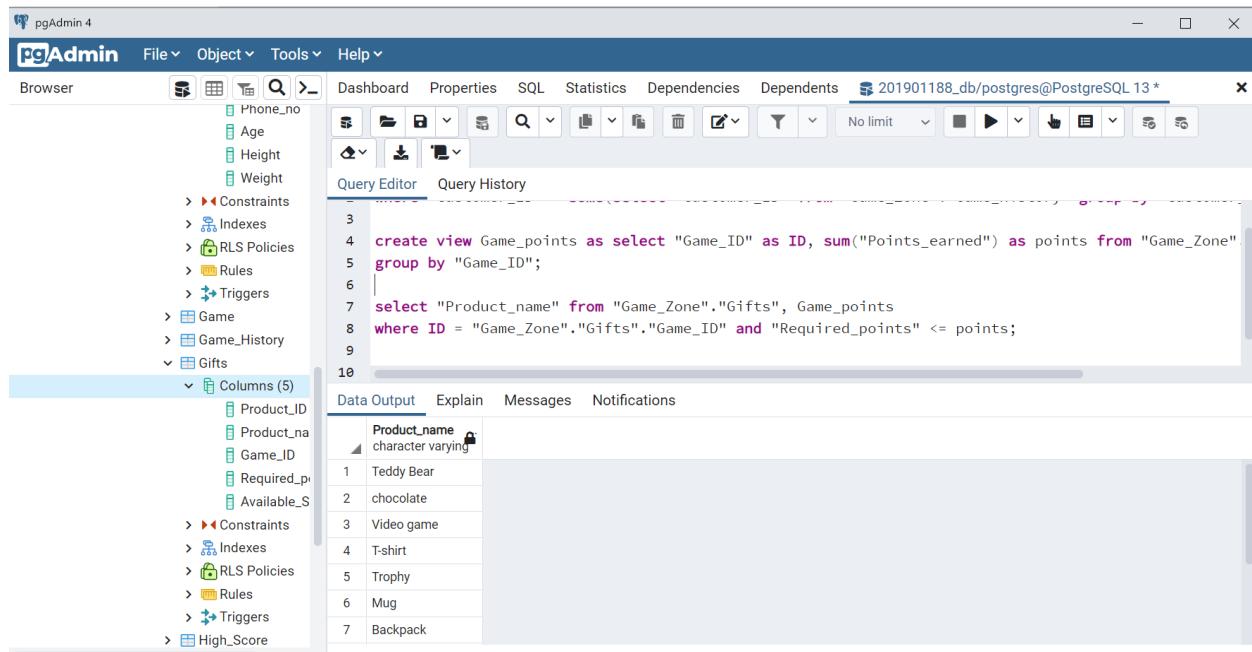
First_Name	Middle_Name	Last_Name
ashary	bipin	kothari
jay	dilip	bhimjiyani
isha	mahesh	kikani

No of Tuples = 3

34. List the names of all the gifts which can be bought by at least one of the customers.

SQL query :

```
create view Game_points as select "Game_ID" as ID, sum("Points_earned") as points from "Game_Zone"."Game_History" group by "Game_ID";  
select "Product_name" from "Game_Zone"."Gifts", Game_points where ID = "Game_Zone"."Gifts"."Game_ID" and "Required_points" <= points;
```



The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects, including a table named 'Gifts' with five columns: Product\_ID, Product\_name, Game\_ID, Required\_points, and Available\_S. The main window contains the SQL query and its execution results. The results show a list of product names:

Product_name
Teddy Bear
chocolate
Video game
T-shirt
Trophy
Mug
Backpack

35. What is the name and age of the customer who was playing a game which is managed by staff\_id = 605 at time '2020-02-20 04:05:06'?

SQL query :

```
select "First_Name", "Middle_Name", "Last_Name", "Age"  
from "Game_Zone"."Customer"  
join "Game_Zone"."Game_History" on "Customer"."Customer_ID" =  
"Game_History"."Customer_ID"  
join "Game_Zone"."Management" on "Game_History"."Game_ID" =  
"Management"."Game_ID"  
where "Staff_ID" = 605 and "Start_time" = '2020-02-20 04:05:06';
```

```

1 select "First_Name", "Middle_Name", "Last_Name", "Age"
2 from "Game_Zone"."Customer"
3 join "Game_Zone"."Game_History" on "Customer"."Customer_ID" = "Game_History"."Customer_ID"
4 join "Game_Zone"."Management" on "Game_History"."Game_ID" = "Management"."Game_ID"
5 where "Staff_ID" = 605 and "Start_time" = '2020-02-20 04:05:06';

```

	First_Name	Middle_Name	Last_Name	Age
1	Imran	matadeen	Mahajan	34

No of Tuples =1

36. Find out the average salary of the staff members who manage the game with game\_id = 407  
SQL query :

```

select avg("Salary")
from "Game_Zone"."Staff"
join "Game_Zone"."Management" on "Staff"."Staff_ID" = "Management"."Staff_ID"
where "Game_ID" = 407

```

```

1 select avg("Salary")
2 from "Game_Zone"."Staff"
3 join "Game_Zone"."Management" on "Staff"."Staff_ID" = "Management"."Staff_ID"
4 where "Game_ID" = 407
5
6

```

	avg
1	7500.000000000000000000

No of Tuples =1

37. Find the phone numbers of all the staff members who manage the game in which the customer with customer\_id = 110 has the highest score.

SQL query :

```

select "Phone_No"
from "Game_Zone"."Staff"
join "Game_Zone"."Management" on "Staff"."Staff_ID" = "Management"."Staff_ID"
join "Game_Zone"."High_Score" on "Management"."Game_ID" =
"High_Score"."Game_ID"
where "High_Score"."Customer_ID" = 110 and "High_Score"."Highest_score" = 161

```

The screenshot shows the pgAdmin 4 interface. At the top, there's a toolbar with icons for file operations, object management, tools, and help. Below the toolbar is a menu bar with 'File', 'Object', 'Tools', and 'Help'. The main window has a 'Browser' tab on the left, which is expanded to show 'Columns (4)' under a table named 'Management'. The columns listed are 'Game\_ID', 'Highest\_score', 'Date', and 'Customer\_ID'. There are also sections for 'Constraints', 'Indexes', 'RLS Policies', 'Rules', and 'Triggers'. Another section for 'Management' is collapsed. To the right of the browser is a 'Query Editor' pane containing the SQL query from above. Below the query editor is a 'Data Output' pane showing a table with two rows. The table has one column labeled 'Phone\_No' with the type 'character varying'. The data rows are 9727368521 and 9408720771.

Phone_No
character varying
9727368521
9408720771

No of Tuples = 2

38. Find Customers name and id who receive gift in game which has game id 401.

SQL query :

```

create view gif as select "Customer_ID"
    from game_zone."Game_History"
        where "Game_ID"=401 and "Points_earned">>=(select
"Required_points"
    from game_zone."Gifts"
        where "Game_ID"=401 );

select
"Customer"."Customer_ID","First_Name","Middle_Name","Last_Name"
from game_zone."Customer" join gif on
"Customer"."Customer_ID"=gif."Customer_ID"

```

```

create view gif as select "Customer_ID"
    from game_zone."Game_History"
    where "Game_ID"=401 and "Points_earned">>=(select "Required_points"
        from game_zone."Gifts"
        where "Game_ID"=401 );

select "Customer"."Customer_ID","First_Name","Middle_Name","Last_Name"
    from game_zone."Customer" join gif on "Customer"."Customer_ID"=gif."Customer_ID"

```

The screenshot shows the PgAdmin 4 interface. The left pane displays the database schema with tables like Points\_learned, Ratings\_given, Game\_History, and Gifts. The right pane contains a Query Editor window with the above SQL code. Below the code, the Data Output tab shows a single tuple:

	Customer_ID	First_Name	Middle_Name	Last_Name
1	157	isha	mahe	kani

No of Tuples =1

39. List the games in decreasing order of their available stock which has rating greater than 3 .  
SQL query :

```

create view desgif as select "Game_ID"
    from game_zone."Game"
    where "Rating">>3

select "Gifts"."Game_ID","Available_Stock"
from game_zone."Gifts" join desgif on "Gifts"."Game_ID"=desgif."Game_ID"
order by "Available_Stock" desc

```

```

1 create view desgif as select "Game_ID"
2                         from game_zone."Game"
3                         where "Rating">>3
4
5 select "Gifts"."Game_ID", "Available_Stock"
6 from game_zone."Gifts" join desgif on "Gifts"."Game_ID"=desgif."Game_ID"
7 order by "Available_Stock" desc
8

```

Game_ID	Available_Stock
1	403
2	411
3	402
4	405
5	420
6	416
7	410
8	415
9	412
10	407

No of Tuples = 10

40. List the customer who is given rating greater than 3 and their age is greater than 20.  
SQL query :

```

create view cus_rat as select distinct "Customer_ID"
                                from game_zone."Game_History"
                                where "Ratings_given">>3

select "Customer"."Customer_ID", "First_Name", "Middle_Name", "Last_Name", "Age"
from game_zone."Customer" join Cus_rat on
"Customer"."Customer_ID"=cus_rat."Customer_ID" and "Age">>20

```

```

1 create view cus_rat as select distinct "Customer_ID"
2                         from game_zone."Game_History"
3                         where "Ratings_given">>3
4
5 select "Customer"."Customer_ID", "First_Name", "Middle_Name", "Last_Name", "Age"
6 from game_zone."Customer" join Cus_rat on "Customer"."Customer_ID"=cus_rat."Customer_ID" and "Age">3
7

```

Customer_ID	First_Name	Middle_Name	Last_Name	Age
105	Shreyon	sokin	Chakraborty	24
108	Garima	devender	Gayakwad	47
111	Tejaswini	mohd	Debnath	21
117	Zarin	rajkumar	Bag	50
126	Sonam	shivji	Lata	40
132	Kundan	bhagvaan	Jagtap	45
138	Yashraj	pinak	Pravin	51
144	Imran	matadeen	Mahajan	34
149	Vithal	laxminarain	Kalavadiya	24
152	nisarg	nitin	nampurkar	22
155	ashary	bipin	kothari	21
157	isha	mahesh	kikani	23
158	hari	sanjeev	patel	27

No of Tuples = 13

## Trigger Function:

### 1. Trigger for updating rating of games

Trigger function SQL code:

```

CREATE FUNCTION game_zone."Game_History_trigfunc"()
RETURNS trigger
LANGUAGE 'plpgsql'
NOT LEAKPROOF
AS $BODY$
declare
tmp bigint;

begin
tmp=new."Game_ID";
update "Game_Zone"."Game"
set "Rating"=(select avg("Ratings_given") as avg_ratings
              from "Game_Zone"."Game_History"
              where "Game_ID"=tmp)
where "Game"."Game_ID"=tmp;
raise notice 'Triggered';

```

```

return NULL;
end
$BODY$;

ALTER FUNCTION game_zone."Game_History_trigfunc"()
OWNER TO postgres;

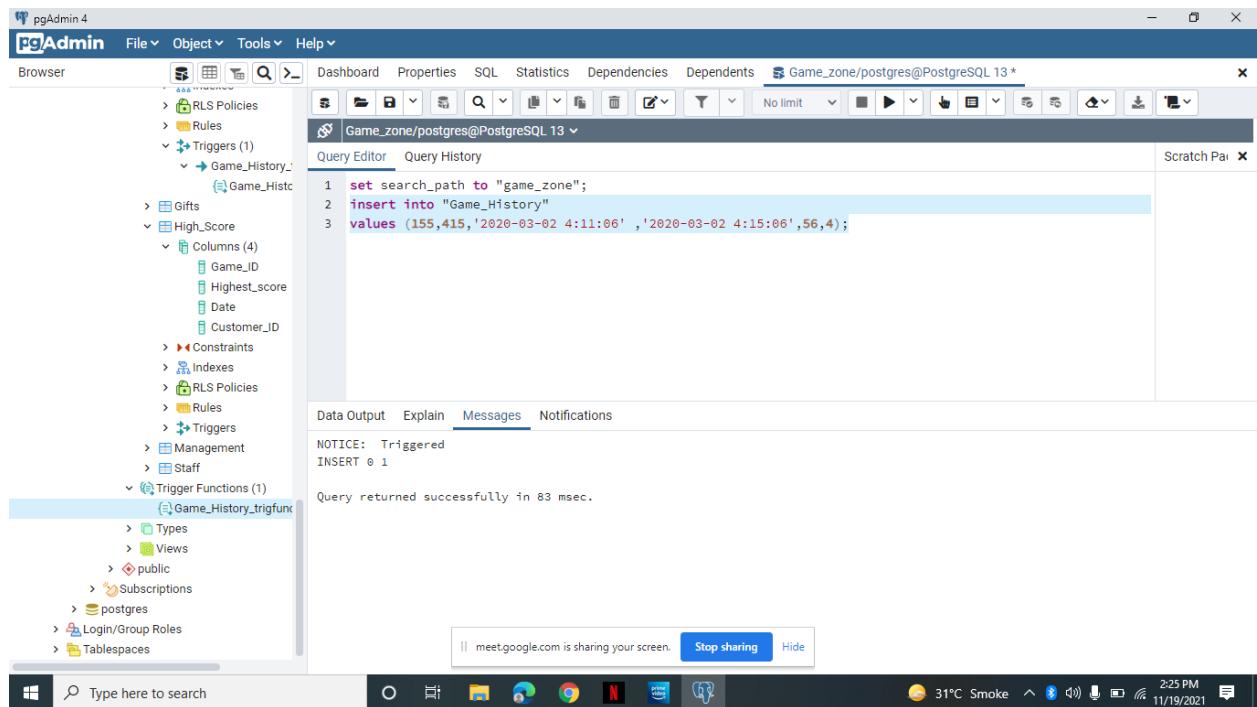
```

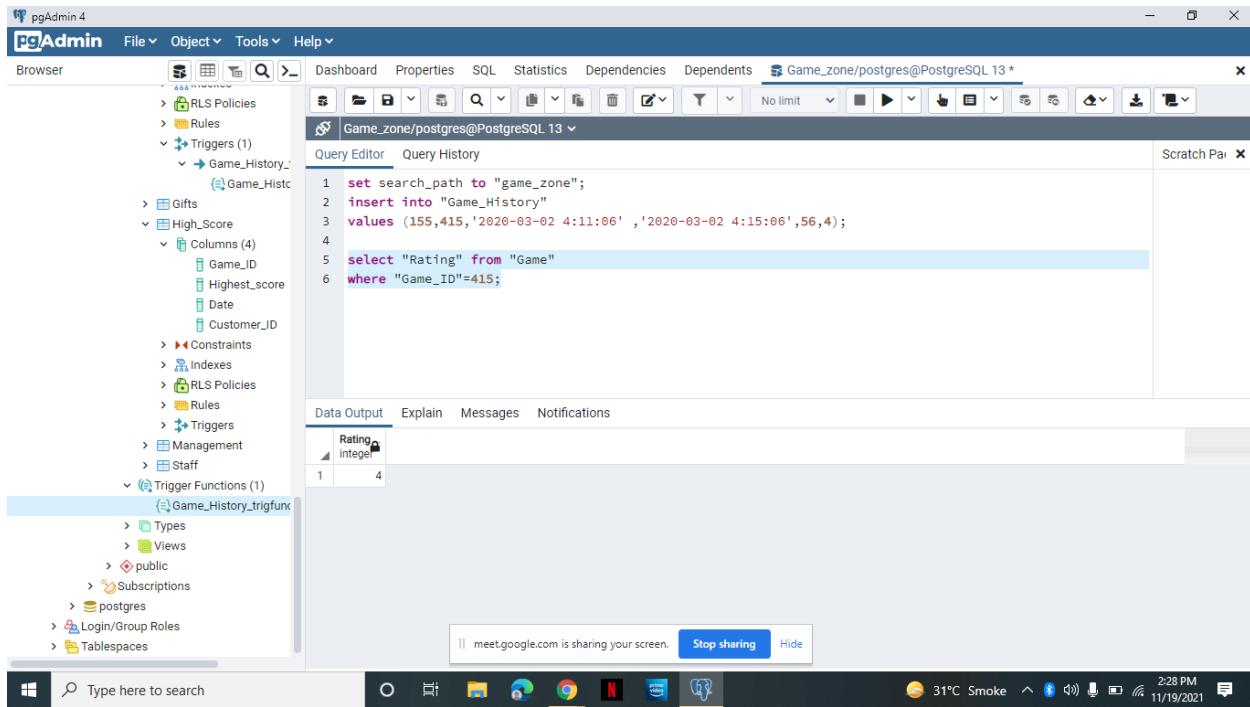
Creating trigger in table:

```

CREATE TRIGGER "Game_History_trigger"
AFTER INSERT
ON game_zone."Game_History"
FOR EACH ROW
EXECUTE FUNCTION game_zone."Game_History_trigfunc"();

```





Before inserting in game\_history, the rating of the game with id '415' was 1. After inserting, the rating of that game changed to 4, which is displayed in the above screen shot.

## 2. Trigger for updating balance and total points in credit card

Trigger function SQL code:

```

CREATE OR REPLACE FUNCTION "Game_Zone"."Balance_Points_update"()
RETURNS trigger
LANGUAGE 'plpgsql'
VOLATILE
COST 100
AS $BODY$
declare
tmp bigint;
x money;
begin
tmp=new."Game_ID";

select "Price" into x from "Game_Zone"."Game"
where "Game_ID"=tmp;

update "Game_Zone"."Credit_Card"
set "Balance"="Balance"-x,
"Total_Points"="Total_Points"+new."Points_earned"

```

```

where "Customer_ID"=new."Customer_ID";

raise notice 'Triggered';
return NULL;
end
$BODY$;

```

### Creating trigger in table:

```

CREATE TRIGGER "Balance_Points_update_trigger"
AFTER INSERT
ON "Game_Zone"."Game_History"
FOR EACH ROW
EXECUTE FUNCTION "Game_Zone"."Balance_Points_update"();

```

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane is open, displaying a tree view of database objects. Under the 'Tables' section, 'Credit\_Card', 'Customer', 'Game', and 'Game\_History' are listed. The 'Game\_History' table has 6 columns: Customer\_ID, Game\_ID, Start\_time, End\_time, Points\_earned, and Ratings\_given. The 'Query Editor' tab is active, showing the following SQL code and its execution results:

```

1  SELECT * FROM "Game_Zone"."Credit_Card"
2  ORDER BY "Card_No" ASC

```

Card_No	Customer_ID	Balance	Buying_date	Expiry_date	Total_Points	
48	20190148	148	600.00	2011-02-01	2012-02-01	339
49	20190149	149	250.00	2012-11-11	2013-11-11	314
50	20190150	150	300.00	2017-02-23	2018-02-23	281
51	20190151	151	350.00	2020-12-01	2021-12-01	193
52	20190152	152	650.00	2021-01-19	2022-01-19	390
53	20190153	153	400.00	2019-10-01	2020-10-01	130
54	20190154	154	500.00	2020-01-01	2021-01-01	166
55	20190155	155	600.00	2021-02-01	2022-02-01	288
56	20190156	156	700.00	2018-03-10	2019-03-10	30
57	20190157	157	600.00	2019-12-12	2020-12-12	23
58	20190158	158	400.00	2011-02-01	2012-02-01	294
59	20190159	159	250.00	2012-11-11	2013-11-11	368
60	20190160	160	300.00	2017-02-23	2018-02-23	484

pgAdmin 4

File ▾ Object ▾ Tools ▾ Help ▾

Browser

Dependencies    Game\_zone/postgres@PostgreSQL 13    game\_zone.Credit\_Card    game\_zone.Credit\_Card/Game\_zone/postgres@PostgreSQL 13

Query Editor    Query History    Scratch Pad

Query Editor

```
1 SELECT * FROM game_zone."Credit_Card"
2 ORDER BY "Card_No" ASC
```

Data Output    Explain    Messages    Notifications

	Card_No	Customer_ID	Balance	Buying_date	Expiry_date	Total_Points
50	201901050	150	\$300.00	2017-02-23	2018-02-23	281
51	201901051	151	\$350.00	2020-12-01	2021-12-01	193
52	201901052	152	\$650.00	2021-01-19	2022-01-19	390
53	201901053	153	\$400.00	2019-10-01	2020-10-01	130
54	201901054	154	\$500.00	2020-01-01	2021-01-01	166
55	201901055	155	\$600.00	2021-02-01	2022-02-01	288
56	201901056	156	\$500.00	2018-03-10	2019-03-10	86
57	201901057	157	\$600.00	2019-12-12	2020-12-12	23
58	201901058	158	\$400.00	2011-02-01	2012-02-01	294
59	201901059	159	\$250.00	2012-11-11	2013-11-11	368
60	201901060	160	\$300.00	2017-02-23	2018-02-23	484

Before inserting in game\_history, a customer with id 156 has a balance of 700 and total\_points 36.

After inserting one tuple in game\_history, that customer's balance reduced to 200 and total\_points increased to 86 according to the inserted tuple.

### 3.Trigger for updating high score of game

Trigger function SQL code:

```
CREATE OR REPLACE FUNCTION "Game_Zone"."Highscore_update"()
RETURNS trigger
LANGUAGE 'plpgsql'
VOLATILE
COST 100
AS $BODY$
declare
tmp bigint;
x integer;
y integer;
begin
tmp=new."Game_ID";
x=new."Points_earned";

select "Highest_score" into y from "Game_Zone"."High_Score"
where "Game_ID"=tmp;
```

```

if(x>y) then
    update "Game_Zone"."High_Score"
    set "Highest_score"=x,
        "Customer_ID"=new."Customer_ID",
        "Date"=date(new."Start_time")
    where "Game_ID"=tmp;
end if;

raise notice 'Triggered';
return NULL;
end
$BODY$;

```

Creating trigger in table:

```

CREATE TRIGGER "Highscore_update_trigger"
AFTER INSERT
ON "Game_Zone"."Game_History"
FOR EACH ROW
EXECUTE FUNCTION "Game_Zone"."Highscore_update"();

```

The screenshot shows the pgAdmin 4 interface with the 'Browser' tab selected. The left sidebar shows the database schema with 'High\_Score' highlighted. The main area displays the 'Data Output' of the 'High\_Score' table, which contains 12 rows of data. A message at the bottom right indicates the query was successfully run.

Game_ID	Highest_score	Date	Customer_ID
1	401	2020-01-08	101
2	402	2020-01-08	102
3	403	2020-01-08	103
4	404	2020-01-08	104
5	405	2020-01-08	105
6	406	2020-01-08	106
7	407	2020-01-08	107
8	408	2020-01-08	108
9	409	2020-01-08	109
10	410	2020-01-09	110
11	411	2020-01-09	111
12	412	2020-01-09	112

✓ Successfully run. Total query runtime: 195 msec. 20 rows affected.

	Game_ID	Highest_score	Date	Customer_ID
1	401	500	2020-07-03	157
2	402	416	2020-01-08	102
3	403	479	2020-01-08	103
4	404	485	2020-01-08	104
5	405	122	2020-01-08	105
6	406	421	2020-01-08	106
7	407	266	2020-01-08	107
8	408	346	2020-01-08	108
9	409	482	2020-01-08	109
10	410	161	2020-01-09	110
11	411	363	2020-01-09	111
12	412	223	2020-01-09	112

Before inserting in game\_history, the high score of the game with id 401 is 383, scored by customer id 157 on 2020-01-08.

After inserting in game\_history, the high score of the game with id 401 changed to 500, customer id changed to 157 and date changed to 2020-07-03.

## 4. Trigger for insertion in credit card table

Trigger function SQL code:

```

CREATE FUNCTION "Game_Zone".credit_card_update()
RETURNS trigger
LANGUAGE 'plpgsql'
NOT LEAKPROOF
AS $BODY$

declare
m bigint;

begin
select max("Card_No") into m from "game_zone"."Credit_Card";
insert into "game_zone"."Credit_Card"
values(m+1,new."Customer_ID",'$ 500',date(now()),date(now())+ interval '1
year',0);
raise notice 'Triggered';
return NULL;

```

```
end
```

```
$BODY$;
```

```
ALTER FUNCTION "Game_Zone".credit_card_update()
OWNER TO postgres;
```

Creating trigger in table:

```
CREATE TRIGGER credit_card_update_trigger
AFTER INSERT
ON "Game_Zone"."Customer"
FOR EACH ROW
EXECUTE FUNCTION "Game_Zone".credit_card_update();
```

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane displays a tree view of database objects under 'game\_zone'. A node for 'Credit\_Card' is selected, revealing its columns: Card\_No, Customer\_ID, Balance, Buying\_date, Expiry\_date, and Total\_Points. The 'Query Editor' pane at the top contains a simple SELECT query:

```
1 SELECT * FROM game_zone."Credit_Card"
2 ORDER BY "Card_No" ASC
```

The 'Data Output' pane below shows the results of this query, listing 12 rows of data:

	Card_No	Customer_ID	Balance	Buying_date	Expiry_date	Total_Points
51	201901051	151	\$350.00	2020-12-01	2021-12-01	193
52	201901052	152	\$650.00	2021-01-19	2022-01-19	390
53	201901053	153	\$400.00	2019-10-01	2020-10-01	130
54	201901054	154	\$500.00	2020-01-01	2021-01-01	166
55	201901055	155	\$600.00	2021-02-01	2022-02-01	288
56	201901056	156	\$500.00	2018-03-10	2019-03-10	86
57	201901057	157	\$550.00	2019-12-12	2020-12-12	523
58	201901058	158	\$400.00	2011-02-01	2012-02-01	294
59	201901059	159	\$250.00	2012-11-11	2013-11-11	368
60	201901060	160	\$300.00	2017-02-23	2018-02-23	484
61	201901061	161	\$500.00	2021-11-19	2022-11-19	0

If a new customer is added into the customer table, the customer is given a new credit card. These details are added to the credit card table.

## Function:

### 1. To find average salary of staff

```
CREATE FUNCTION "Game_Zone".Avg_StaffSalary }()
RETURNS integer
LANGUAGE 'plpgsql'

AS $BODY$
declare
```

```

x integer;
begin
select avg("Salary") into x from "Game_Zone"."Staff";
return x;

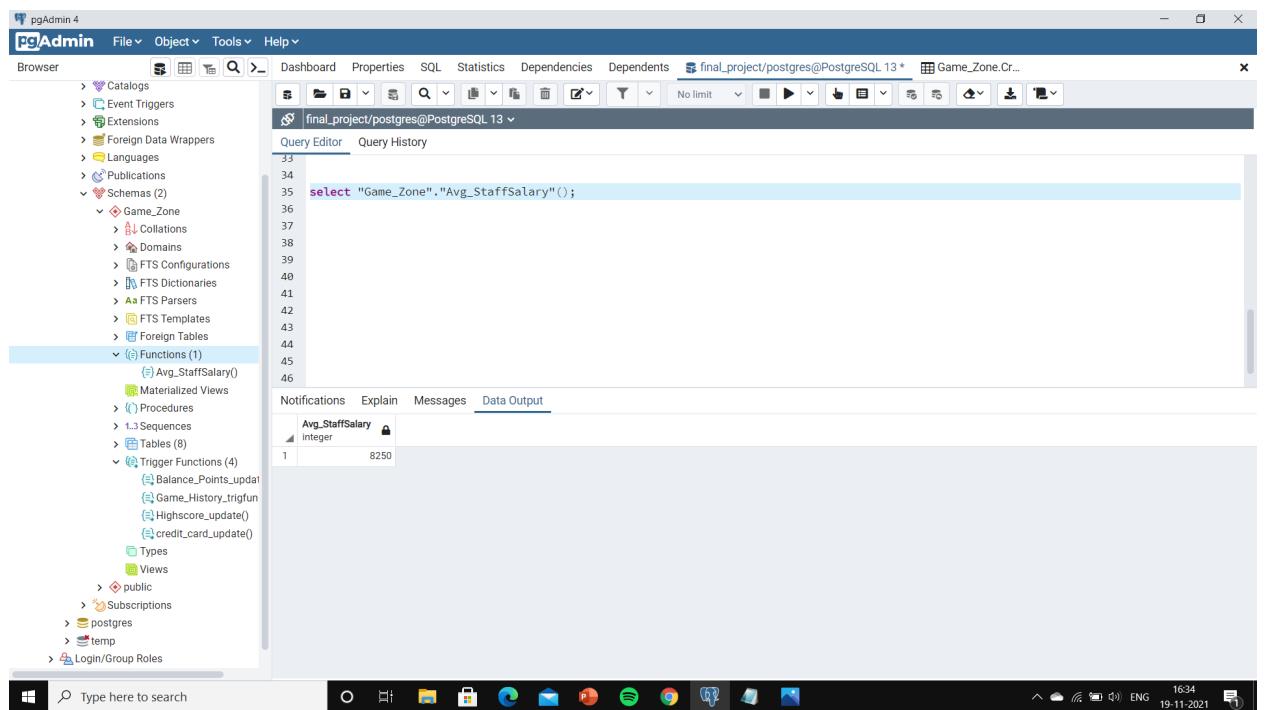
end
$BODY$;

ALTER FUNCTION "Game_Zone"."Avg_StaffSalary"()
OWNER TO postgres;

```

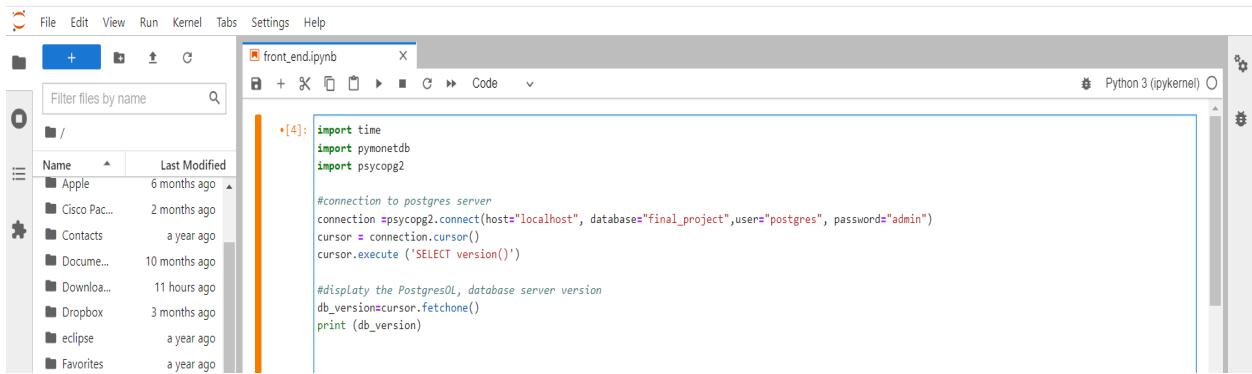
**Call function:**

```
select "Game_Zone"."Avg_StaffSalary"();
```



## Section7: Project Code with output screenshots.

## **Code for connecting to postgres database:**



The screenshot shows the Jupyter Notebook interface. On the left, there's a file browser with a list of files in the current directory. In the center, a code cell titled 'front\_end.ipynb' contains Python code for connecting to a PostgreSQL database. On the right, a status bar indicates 'Python 3 (ipykernel)'.

```
[4]: import time
import pymonetdb
import psycopg2

#connection to postgres server
connection =psycopg2.connect(host="localhost", database="final_project",user="postgres", password="admin")
cursor = connection.cursor()
cursor.execute ('SELECT version()')

#display the PostgresOL, database server version
db_version=cursor.fetchone()
print (db_version)
```

## **CODE :**

```
import time
import pymonetdb
import psycopg2

#connection to postgres server
connection =psycopg2.connect(host="localhost",
database="final_project",user="postgres", password="admin")
cursor = connection.cursor()
cursor.execute ('SELECT version()')

#display the PostgresOL, database server version
db_version=cursor.fetchone()
print (db_version)
```

```

#insertion in table of database
t=input("enter the name of the table you want to insert in:")
i=int(input("enter the id of new game:"))
name=input("enter the name of game:")
pr=float(input("enter the price of game:"))
player=int(input("enter the players required:"))
he=int(input("enter the minimun height:"))
we=int(input("enter the minimun weight:"))
ra=int(input("enter the rating of game:"))

ch="Insert Into game_zone.%s values (%d, '%s', %f, %d, %d, %d, %d);" %(t,
i,name,pr,player,he,we,ra)
print(ch)
print('Data entered successfully')
cursor.execute(ch)
connection.commit()

```

```

#query - 1
ch="select staff_id,salary from game_zone.staff"
cursor.execute (ch)
rows=cursor.fetchall()
print('staff_id      salary')
for r in rows:
    print('%d          %d ' %(r[0],r[1]))

```

```

#query -2
ch="select product_name from game_zone.gifts where available_stock > 10"
cursor.execute (ch)
rows=cursor.fetchall()
print ('\nGift_name\n-----\n')
for r in rows:
    print ('%s ' %(r[0]))

```

## Insertion in table:

The screenshot shows a Jupyter Notebook interface with two panes. The left pane displays a file tree with various files like 'Cisco Pac...', 'Contacts', 'Dropbox', etc. The right pane shows a code cell and its output. The code cell contains Python code for inserting data into a PostgreSQL table named 'game\_zone.game'. The output shows the command being run and the resulting data being inserted.

```

t=input("enter the name of the table you want to insert in:")
i=int(input("enter the id of new game:"))
name=input("enter the name of game:")
pr=float(input("enter the price of game:"))
player=int(input("enter the players required:"))
he=int(input("enter the minimum height:"))
we=int(input("enter the minimum weight:"))
ra=int(input("enter the rating of game:"))

cha="Insert Into game_zone.%s values (%d,'%s',%f,%d,%d,%d);" %(t, i,name,pr,player,he,we,ra)

print(ch)
print('Data entered successfully')
cursor.execute(ch)
connection.commit()

('PostgreSQL 13.4, compiled by Visual C++ build 1914, 64-bit',
enter the name of the table you want to insert in: game
enter the id of new game: 421
enter the name of game: subway surfer
enter the price of game: 200
enter the players required: 1
enter the minimum height: 140
enter the minimum weight: 30
enter the rating of game: 2
Insert Into game_zone.game values (421,'subway surfer',200.000000,1,140,30,2);
Data entered successfully
)

```

Before insertion there are only 20 games, with id of the last game 420. This is shown in the screenshot below.

The screenshot shows the pgAdmin 4 interface. The left sidebar shows the database structure with 'Tables (8)' expanded, showing 'Credit\_Card', 'Game', 'Game\_History', 'Gifts', 'High\_Score', 'Management', 'Staff', and 'Trigger Functions'. The main area shows a query editor with the following SQL query and a data output table.

```

1 SELECT * FROM "Game_Zone"."Game"
2 ORDER BY "Game_ID" ASC

```

**Data Output**

Game_ID	Game_Name	Price	Players_Required	Min_Height	Min_Weight	Rating
2	402 Counter strike	50.00	9	128	21	5
3	403 Bowling	150.00	1	106	36	4
4	404 Car racing	50.00	3	121	31	1
5	405 Bike racing	50.00	4	140	26	4
6	406 Trampoline	100.00	5	139	18	2
7	407 Table tennis	100.00	10	111	11	5
8	408 Air hockey	100.00	8	115	33	3
9	409 Snooker	150.00	2	118	25	1
10	410 Lost legacy	150.00	7	134	34	4
11	411 Nioh	150.00	6	127	27	4
12	412 GT sport	200.00	9	100	40	5
13	413 Knack2	100.00	1	103	14	1
14	414 Hzd frozen wild lands dlc	200.00	3	124	19	2
15	415 Fifa18	200.00	4	133	16	4
16	416 Star wars battle front	150.00	5	113	28	5
17	417 Basket ball	100.00	10	117	39	3
18	418 UC4	150.00	8	138	32	1
19	419 Star wars battle front 2	200.00	2	112	38	2
20	420 CS go	150.00	7	119	17	4

After insertion of a new game is added with id 421, which can be seen from the following screenshot.

**PgAdmin 4**

**Browser**

- Foreign Data Wrappers
- Languages
- Publications
- Schemas (2)
  - game\_zone
- Collations
- Domains
- FTS Configurations
- FTS Dictionaries
- FTS Parsers
- FTS Templates
- Foreign Tables
- Functions
- Materialized Views
- Procedures
- Sequences
- Tables (8)
  - credit\_card
  - customer
  - game
  - game\_history
  - gifts
  - high\_score
  - management
  - staff
- Trigger Functions
- Types
- Views
- public
- Subscriptions
- postgres
- temp
- xyz
- Login/Group Roles

**Query Editor** Query History

```
1 SELECT * FROM game_zone.game
2 ORDER BY "Game_ID" ASC
```

Game_ID	Game_Name	Price	Players_Required	Min_Height	Min_Weight	Rating
3	Bowling	150.00	1	106	36	4
4	Car racing	50.00	3	121	31	1
5	Bike racing	50.00	4	140	26	4
6	Trampoline	100.00	5	139	18	2
7	Table tennis	100.00	10	111	11	5
8	Air hockey	100.00	8	115	33	3
9	Snooker	150.00	2	118	25	1
10	Lost legacy	150.00	7	134	34	4
11	Nioh	150.00	6	127	27	4
12	GT sport	200.00	9	100	40	5
13	Knack2	100.00	1	103	14	1
14	Hzd frozen wild lands dlc	200.00	3	124	19	2
15	Fifa18	200.00	4	133	16	4
16	Star wars battle front	150.00	5	113	28	5
17	Basket ball	100.00	10	117	39	3
18	UC4	150.00	8	138	32	1
19	Star wars battle front 2	200.00	2	112	38	2
20	CS go	150.00	7	119	17	4
21	subway surfer	200.000000	1	140	30	2

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## Query 1: Find staff id and it's salary.

**Jupyter Notebook**

**front\_end.ipynb**

```
#query - 1
ch="select staff_id,salary from game_zone.staff"
cursor.execute (ch)
rows=cursor.fetchall()
print("staff_id    salary \n-----")
for r in rows:
    print(' %d    %d '%(r[0],r[1]))
```

('PostgreSQL 13.4, compiled by Visual C++ build 1914, 64-bit')

staff_id	salary
601	10000
602	10000
603	7000
604	10000
605	8000
606	7000
607	7000
608	8000
609	7000
610	10000
611	8000
612	8000
613	7000
614	8000
615	10000
616	9000
617	10000
618	7000
619	7000
620	7000

Query 2: Find the gifts name whose available stock is greater than 10.

The screenshot shows a Jupyter Notebook interface. On the left, there is a file browser titled 'front\_end.ipynb' showing various files and their last modified times. The main area contains a code cell with Python code and its output. The code is as follows:

```
#query -2
chs="select product_name from game_zone.gifts where available_stock > 10"
cursor.execute (chs)
rows=cursor.fetchall()
print('Gift_name\n-----')
for r in rows:
    print("%s" % (r[0]))
```

The output of the code is:

```
('PostgreSQL 13.4, compiled by Visual C++ build 1914, 64-bit',)
Gift_name
-----
Bottle
Bag
chocolate
Card
T-shirt
Pen
Mug
Tiffin
PencilBox
Table
Mouse
Cricket Bat
Tennis Ball
```