

American International University- Bangladesh



Project: Arcade Game Center Database Model

Prepared for

Course Instructor: **Md. Ezazul Islam**

Course Name: Introduction to Database

Prepared by

Name: Maleque, Zayed Bin

Id: 14-26965-2

Sec: I

Semester: Spring 14-15

Table of Contents

Title	Page no.
Business and system summary	02
Overview of the business environment and project objectives	02
Brief technical summarization of developed database	02
Justification of developed Database	02
Entity Relationship Diagram	03
Normalization	04
Schema	05
SQL QUERY & RELATIONAL ALGEBRA	07
Over all summary of this experience with this project	09

PART-A

Business and system summary:

My client plays various arcade games where many gamers are present. One game can have different type's rules and regulation. There are multiple game sides or stalls across the several locations or net sides with numerous employees. The stalls and the game sides also service the games according to manufacturer's system. Each stall or side has one manager who supervises all the staff and overlooks the game rules and the money which the salaries of the staffs are drawn.

We are going to design a system that can accommodate the recording of all these transactions, using the Oracle database system. The employees are to be trained to learn SQL queries for the proper management of the database system. The system must be able to handle multiple deliveries from each customer and manufacturer. The managers also need to be able to easily supervise the staffs and the bank account of their respective stall or side. Management must also be able to track the identity of each individual game, its name, price, along with the ID of its customer.

Overview of the business environment and project objectives:

The game sides and the stalls have good environment with multiple transactions going constantly across several borders. Keeping track of all these records is fundamental to the profit margins of the games. The database we created aims to streamline a lot of the documentation process for convenient and efficient environment. I am using Oracle and SQL queries as they are powerful yet easy to use tools.

Brief technical summarization of developed database:

The database system has been developed to be used in proprietary Oracle 11g environment developed by Oracle Corporation. SQL query language has been used throughout. The operating system used throughout is Windows 7 Ultimate SP1, Linux.

Justification of developed Database:

The project met its objective in being able to connect a collection of interrelated data and setting up programs to access this data in a convenient and efficient environment. Because the tables are connected by foreign keys, there is no chance of data redundancy, inconsistency, isolation, integrity and update automatically. Multiple users can access the same data concurrently, so there are no drawbacks of user inaccessibility due to a manual filing system.

ER DIAGRAM:

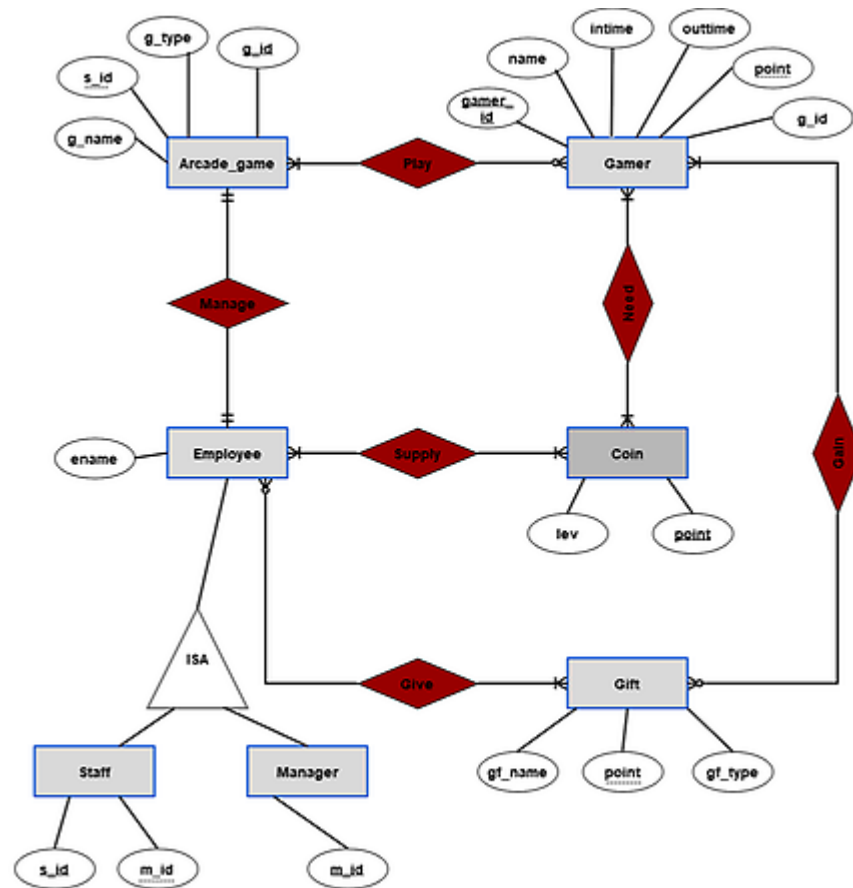


Fig: ER diagram for - Arcade Game Center

Normalization:

GAMER_ID -> NAME, G_NAME, G_TYPE, G_ID, OUTTIME, INTIME, POINT, S_ID, ENAME, M_ID

POINT -> LEVEL, GF_NAME, GF_TYPE

<u>GAMER_ID</u>	NAME	G_NAME	G_TYPE	<u>G_ID</u>	OUTTIME	INTIME	<u>POINT</u>	<u>S_ID</u>	ENAME	<u>M_ID</u>
-----------------	------	--------	--------	-------------	---------	--------	--------------	-------------	-------	-------------

<u>POINT</u>	LEVEL	GF_NAME	GF_TYPE
--------------	-------	---------	---------

1NF:

GAMER_ID -> NAME, G_ID, OUTTIME, INTIME, POINT, S_ID, ENAME, M_ID

G_ID -> G_NAME, G_TYPE

POINT -> LEVEL, GF_NAME, GF_TYPE

2NF:

<u>GAMER_ID</u>	NAME	<u>G_ID</u>	OUTTIME	INTIME	<u>POINT</u>	<u>S_ID</u>	ENAME	<u>M_ID</u>

GAMER_ID -> NAME, G_ID, OUTTIME, INTIME, POINT, S_ID, M_ID

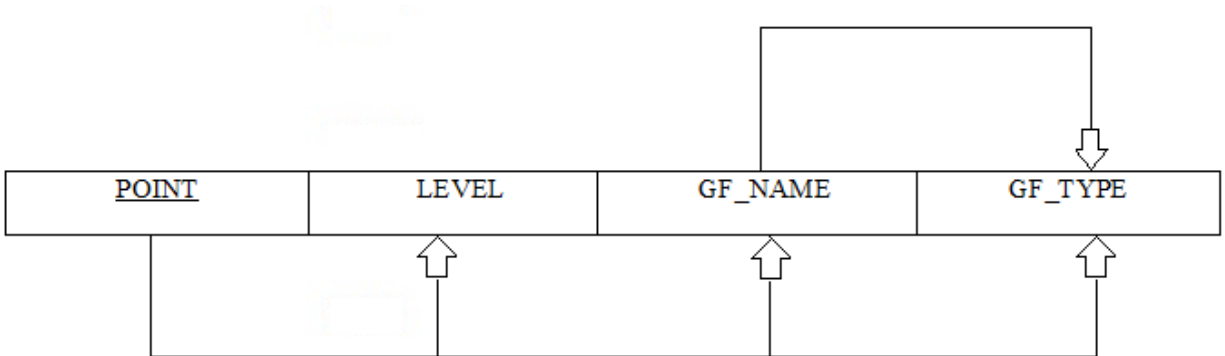
M_ID -> ENAME

S_ID -> ENAME

G_ID -> G_NAME, G_TYPE

POINT -> LEVEL, GF_NAME, GF_TYPE

3NF:



GAMER_ID -> NAME, G_ID, OUTTIME, INTIME, POINT, S_ID

M_ID -> ENAME, S_ID

S_ID -> ENAME

G_ID -> G_NAME, G_TYPE

POINT -> LEVEL

POINT -> GF_NAME, GF_TYPE

SCHEMA: (After Normalization)

GAMER:

Gamer_id	Name	G_id	Point	Intime	Outtime
----------	------	------	-------	--------	---------

ARCADE_GAME:

G_id	G_type	G_name	S_id
------	--------	--------	------

STAFF:

S_id	Ename	M_id
------	-------	------

MANAGER:

M_id	Ename
------	-------

GIFT:

Point	Gf_name	Gf_type
-------	---------	---------

COIN:

Point	LEVEL
-------	-------

SQL QUERY & RELATIONAL ALGEBRA:

1. For the purpose of a case Police want the name and entry time of the gamer whose id is 1012.

Ans: select name, intime from gamer where gamer_id=1012;

$$\Pi_{name, intime} (\sigma_{gamer_id = 1012} (gamer))$$

2. HR department want to know the manager name of gamer 'ZAYED' .

Ans: select m.ename from manager m, staff s, arcade_game a, gamer g where g.name='ZAYED' and g.g_id=a.g_id and a.s_id=s.s_id and s.m_id=m.m_id;

$$\Pi_{m.ename} (\sigma_{g.name='ZAYED' \text{ and } g.g_id=a.g_id \text{ and } a.s_id=s.s_id \text{ and } s.m_id=m.m_id} (\rho_m(manager) \times \rho_s(staff) \times \rho_a(arcade_game) \times \rho_g(gamer)))$$

3. A gamer want to know the type of POOL game.

Ans: select g_type from Arcade_game where g_name='POOL';

$$\Pi_{g_type} (\sigma_{g_name='POOL'} (arcade_game))$$

4. HR department want to know the name of gamer that entered in 2AM.

Ans: select name from gamer where intime='2AM';

$$\Pi_{name} (\sigma_{intime='2AM'} (gamer))$$

5. An officer interested to know who services the BOXING game.

Ans: select s.ename from staff s, arcade_game a where s.s_id=a.s_id and a.g_name='BOXING';

$$\Pi_{s.ename} (\rho_a(arcade_game) \bowtie \rho_s(staff))$$

6. 'RAKIB' wants to know at which LEVEL he is ?

Ans: select c.LEVEL from coin c,gamer g where g.point>=c.point and g.name='RAKIB';

$$\Pi_{c.LEVEL} (\sigma_{g.point \geq c.point \text{ and } g.name='RAKIB'}(\rho_c(\text{coin}) \times \rho_g(\text{gamer})))$$

7. 'ANIK' asked for his available gift?

Ans: select g.gf_name from gift g, gamer gm where gm.point>=g.point and gm.name='ANIK';

$$\Pi_{g.gf_name} (\sigma_{gm.point \geq g.point \text{ and } gm.name='ANIK'}(\rho_g(\text{gift}) \times \rho_{gm}(\text{gamer})))$$

8. HR department want to know the players name of 'CAR_RACING'?

Ans: select g.name from gamer g, arcade_game a where g.g_id=a.g_id and a.g_name='CAR_RACING';

$$\Pi_{g.name} (\sigma_{g.g_id=a.g_id \text{ and } a.g_name='CAR_RACING'}(\rho_a(\text{arcade_game}) \times \rho_g(\text{gamer})))$$

9. HR department wants to know how many gamer at the Arcade?

Ans: select count(name) from gamer;

$$g_{count(name)}(gamer)$$

10.To make arcade larger HR department want to add a new action game called 'DRAGON_ATTACK_2' as a id-1008 at arcade which will be services by 1167 id holder staff.

Ans: INSERT INTO arcade_game VALUES (1008, 'DRAGON_ATTACK_2', 'ACTION', 1167);

PART- B:

Over all summary of this experience with this project:

Learning experience:

Through the project I could learned logical schema that can be used to the application of my theoretical knowledge on the subject of data base. I gained experience in translating a database model to a logical schema that can be used to create and categorize instances of any data user wants to insert.

Issues faced:

As this was the first project implementation, I had problems in deciding which fields are to be used as foreign key. During normalization, I had confusion about which non-identifying attributes were dependent upon each other in creating the normal form. Synchronizing each project member's work was also difficult and much coordination.

Achievement:

Through this project, I tried my best to create a database that fulfilled the criteria of the course project. I have successfully created multiple tables connected with each other with minimal data duplication. After inserting data into a column of one field, multiple tables automatically updated their own values of the same field. I have provided screenshots of description of tables after data and query insertions.

Lessons learned:

This database project helped me to learn the nuances of an entity-relationship model, especially the cardinality of relationships. I learned the functions of cardinality to a greater depth by trying to figure out which fields will have single or multiple instances in relation to which other field and then will converting the abstract relationship model to a schema, I learned the practical application of normalization-which tables insert, addition of new unique keys while joining table, removing multi valued dependencies etc.

Conclusion:

I would like to thank my honorable faculty for the help in all my enquiries during the project development.

To further develop the model, I can include multi-valued attributes for certain fields. More tables can be added to include stall or game side inventory control, regional division and their relationships to stall or game side and customer etc. More tables would need to be created and additional foreign keys added to existing tables during the normalization process. The entity relationship diagram will need to be updated.