Final Project Analysis

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TABLE OF CONTENTS

Executive Summary

This final report begins with an introduction of the design of the game in order to use the database. We will then talk about our solution with front and back end discussion, followed by key challenges, the design of the database, including everything from stored procedures to triggers, the design analysis of our end product, and finally an appendix that contains our relational schema and ER diagram.

Introduction

As a group we decided to build a text based game. Our initial design of the game was to basically be a “Galatic Oregon Trail”. We have everything from planets to star systems included in the database. Throughout this document will further describe the details that encircle our project design and database analysis. In the end we will include a relational schema and entity relationship diagram.

Problem Description

We wanted to make a text based game that could be played the way that Oregon Trail was played. The player would start the game as a trader targeting the Galactic Triads good distribution. The player would set out to destroy or remove all illegal goods from the galaxy thus cutting off profit for the triads and winning the game.

Below is a list of features that are present in the game

Feature #	Feature Name	Feature Explanation
1	NPCS	There are non-playable characters in game
2	Inventory	A player and NPCs can have expansive inventories
3	Random Items	Items will randomly generate for the player
4	Planets	There is a multitude of planets
5	Star Systems	There is a multitude of star systems
6	Events	Events will randomly happen to player; such as police checking your cargo hold

Solution Description

FRONT END:

For the user interface of our game, we chose to use Java outputting to a terminal. We created an engine class that we could use to print to the screen the same way every single time, and an event class to keep consistnacy between events as well. This made use of an interface that was fufilled by a backend Java class that made all the JDBC calls for the project, providing the program will all its interaction to the MySQL database. The user was presented with the same input entry type every single time, which was a line at the bottom of the screen to type into, with the line being entered and the next screen being rendered upon the pressing of the enter key.

BACK END:

For the database interface, we used the class called BlackDatabase to handle all of the connections between the front end GUI and the actual database. This class utilized the mysql connector for JDBC in order to call procedures and functions from the database without actually knowing what the commands are, only what they do. It uses prepared calls in which the parameters needed for the functions are set when needed and then the call is executed. Then the ResultSet of the function can be gotten to be parsed by the front end in order to display the desired data.

KEY CHALLENGES

- **Challenge**: Using MySQL
  Solution: Throughout the weeks we spent on this project we came into many issues using MySQL, however, it was just a matter of keeping a close eye on the documentation and being able to read and implement instructions on command.
- **Challenge:** Getting program to run outside of eclipse
  Solution: In the end we were not able to successfully accomplish this task. We still run it inside of eclipse.

DATABASE DESIGN

For reference of the database design, please refer to Appendix A for a relational schema and ER diagram

Security Measures – Stored Procedures & User Permissions

Due to the fact that we create a new database for each user the restrictions for the user to user database access is fairly null. However we do protect against SQL injection attacks by formatting the entry of the player name and ship name, as well as, all entries into the command table.

Integrity Constraints

Various referential integrity constraints are included in the database to prevent from SQL attacks. We maintain integrity through our stored procedures.

Here is a list of constraints that exist:

- Player Name must be within database to load
- Values must match in trade
- Quantities must be accurate in trades
- Planets must exist
- Star Systems must exist

STORED PROCEDURES

Stored Procedure Name	Procedure Purpose
log_from_planet	gets the log from the planet
Log_from_star_system	Gets the log from the star system
Log_from_galaxy	Gets log of everything
Persons_inventory	Returns the items that the person is holding
Planets_given_system	Returns the list of planets from a system name
All_systems_in_galaxy	Returns the list of systems in world
Travel_to_planet	Changes player location to new planet
Player_planet	Gets the player planet
Create_new_player	Starts a new game with new player
Get_vendors	Gets vendors from given planet
Get_goods_vendor	Gets the goods from a given vendor
Make_trade	Safely makes trade from player to vendor
System_given_planet	Returns the system to which a planet belongs
Get_player_money	Returns the amount of money a player has
Get_used_weight	Returns the total weight of the user
Get_player_ship	Gets players ship name
Get_total_weight	Returns players max weight
Get_all_goods	Returns a list of all goods in database
Player_exists	Checks to see if a player exists
Drop_player	Deletes player from database
Give_good_to_player	Inserts item into players inventory
Get_legality_good	Checks the legality of a given good
Get_police_planet	Gets the police level of a planet
Get_danger_planet	Gets the danger level of a planet
Get_police_star_system	Gets the police level of a system
Get_danger_star_system	Gets the danger level of a system
All_goods_illegal	Checks if all illegal goods are gone or owned

VIEWS, INDEXES, TRIGGERS

Due to the attributes of our database we had no need for views, indexes, or triggers.

DESIGN ANALYSIS

STRENGTHS

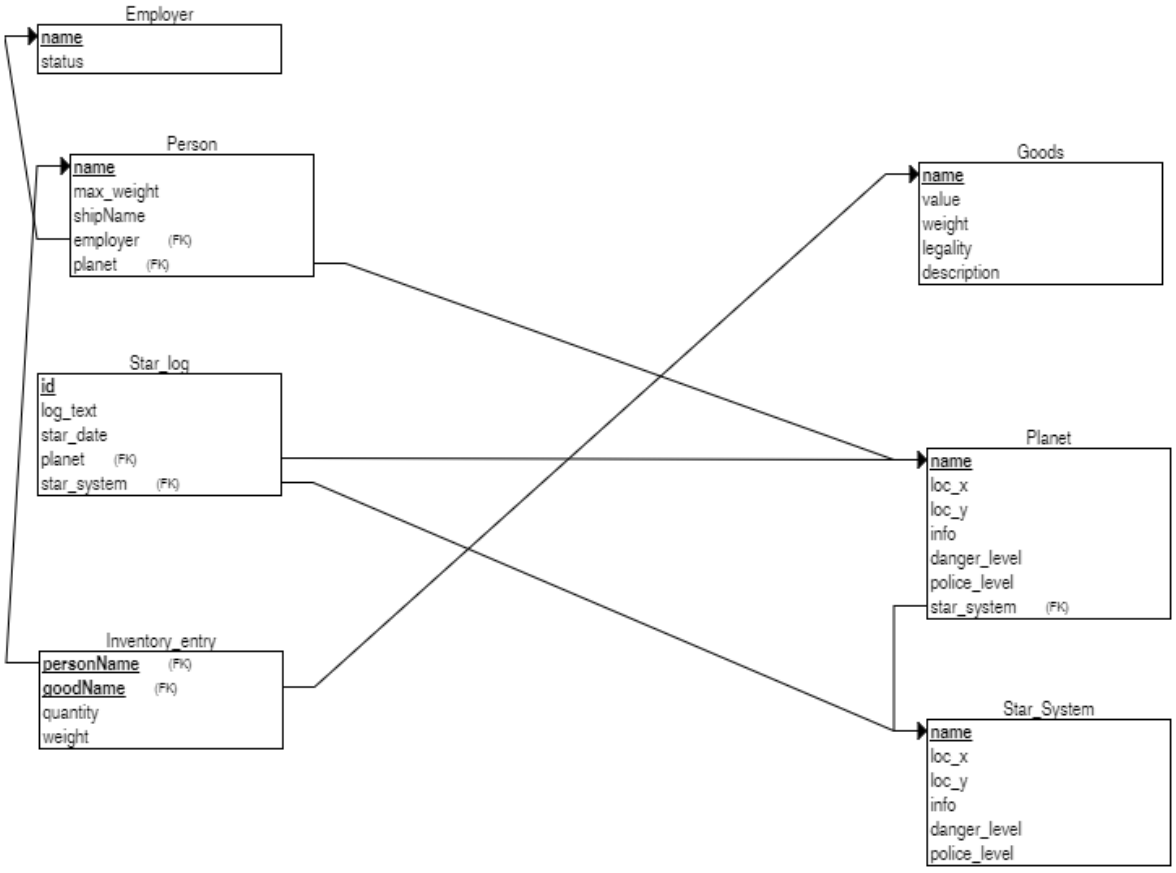
- Drawing things to the terminal went well, we managed to create a system to always get the terminal filled properly
- Making use of an interface allowed us to improve our workflow as a team
- Using stored procedures allowed us to check our data as we were putting it into the database to prevent duplicates

WEAKNESSES

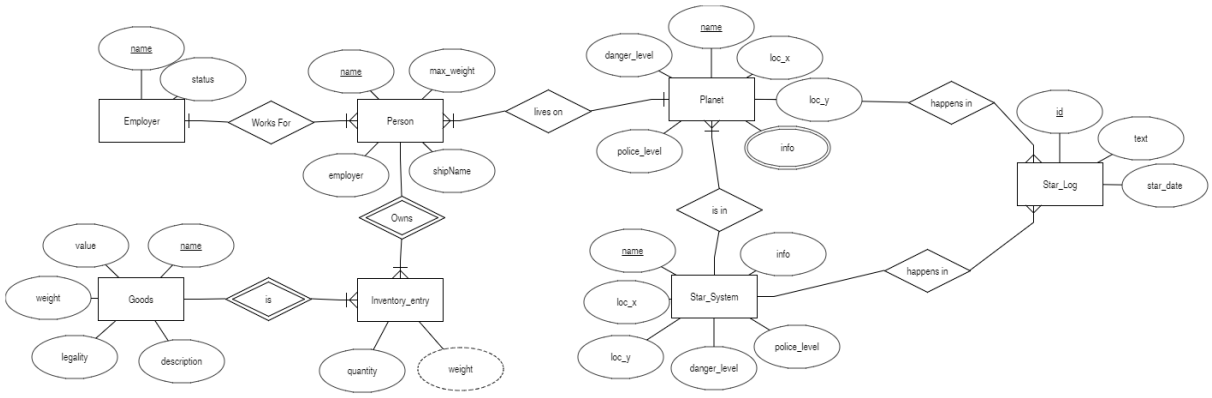
- Rolling an external jar into a project so that it can be run outside of eclipse proved extremely difficult, as such, we were never able to get the final version of our project to run in a normal terminal, as was the original plan
- Although we had a streamlined system for rendering each window, we did not have a streamlined system for menus, which quickly became messy and unwieldy, slowing down development speed and leading to many errors and problems

APPENDIX A

RELATIONAL SCHEMA



ER DIAGRAM



GRID GUIDE: MANDATORY: <
MANY: |

ASSUMPTIONS:

IF ENTITY HAS A TRIANGLE AND A LINE IT IS MANY MANDATORY RELATION

JUST A LINE IS AT LEAST ONE

CLASS DIAGRAM