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## DATABASE URL

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<http://flip3.engr.oregonstate.edu:5668/>

## EXECUTIVE SUMMARY

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Most of the changes that have occurred since the inception of the project have been minor changes to design of UI/clarity of webpages. More significant changes include:

- Fleshing out the scope of the project more thoroughly. This includes adding more concrete values and details as to how the database would be used and what kind of volumes it would handle.
- Changing the naming conventions for all tables for consistency and renaming intersection tables for clarity. The original tables and attributes had a mix of camel case and snake case that could cause some headaches when trying to query the database. Intersection tables 'resume items' and 'personnel log' were also somewhat abstract and made understanding the M:M relationships overly complicated.
- Allowing the faction attribute across several tables to be nullable. This would have caused issues in the situation that a world, ship or person was added that was neutral in their political affiliations.
- Removing the attribute *leader* from the factions entity because it was a foreign key and when implemented, caused table creation to become circular.
- Adding an *acronym* attribute to the factions entity to help minimize errors in SELECT queries.
- Changing the datatype of the *worlds* entity's *population* attribute from INT to BIGINT; INT was too small to contain the appropriate values.
- Breaking up the *worlds* entity's *name* attribute into *name* and *location*.
- Setting the *people* entity's *last\_name* attribute to NOT NULL.
- Updating all tables with foreign key references to set null on delete. Had not originally planned for the situation in which an entry in a table that was a foreign key to another was deleted so this was a major issue we ran into when implementing the DB.

# PROJECT OUTLINE

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## TITLE

TYCHO STATION SURVEILLANCE DATABASE

## OVERVIEW & PROBLEM-TO-BE-SOLVED

Tycho Station is a space station dedicated to ship-building that houses over 15,000 spacefarers. It is also (covertly) home to the *Outer Planets Alliance* (OPA) branch run by Fred Johnson. The OPA itself is made up of roughly 100 million beltters, individuals who have lived most of their lives in space without the influence of gravity. In fact, of the entire belter population, at least 50 million are reported to be politically active members of the OPA!

Currently, the OPA's main goal is to obtain independence from the governments of Earth and Mars. In order to facilitate this, Tycho Station keeps meticulous records regarding the comings-and-goings of the galaxy. Their surveillance database records information about people working on registered ships, their skills, and their connection to other political factions. Users of the database need to be able to modify, add, and delete entries from the database to reflect various world events.

The OPA has made it a priority to record data about both its own citizens and those of the factions opposing belter independence: Earth and Mars. Earth, which is run by the *United Nations* (UN), is responsible for over 30 billion citizens, including 1 billion citizens living on the planet's moon. The UN claims to have over 100 million active troops and, at 250,000 warships, they have the largest fleet in the Sol system. Mars, which is run by the *Martian Congressional Republic* (MCR), claims roughly 9 billion citizens. Via mandatory military service and technological advancements, the MCR manages to hold its own against Earth; they boast a military arm of over 75 million troops and 100,000 warships.

Tycho Station's database could, potentially, contain information about >40 billion inhabitants and >300,000 ships; however, the OPA tends to prioritize collecting data about those considered politically significant. Of the politically significant players, roughly 100 leaders and 10 ships are deemed truly influential.

## DATABASE OUTLINE

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**people**: details those of interest to Tycho station

Attributes:

- person\_id: int, auto\_increment, unique, not NULL, PK
- first\_name: varchar, not unique, not NULL
- last\_name: varchar, not unique, not NULL
- homeworld: world\_id, not unique, not NULL, FK
- faction: faction\_id, not unique, can be NULL, FK
- living: boolean, not unique, not NULL

Relationship:

- people:worlds - M:1
  - One person has one homeworld, each homeworld can have many people
- people:factions - M:1
  - A faction has many people, but one person belongs to only one faction
- people:ships - M:M connected via the people\_ships intersection table
  - A person can work on many ships and a ship may have many employees

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**ships**: records details about ships owned by various factions

Attributes:

- ship\_id: int, auto\_increment, unique, not NULL, PK
- name: varchar, unique, not NULL
- class: varchar, not unique, not NULL
- type: varchar, not unique, not NULL
- faction: faction\_id, not unique, can be NULL, FK

Relationship:

- ships:factions - M:1
  - A ship has only one faction, but factions may have multiple ships
- ships:people - M:M implemented via the people\_ships intersection table
  - A person can work on many ships and a ship may have many employees

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**worlds**: details the worlds and inhabited colonies of the Sol system

Attributes:

- world\_id: int, auto\_increment, unique, not NULL, PK
- name: varchar, unique, not NULL
- location: varchar, unique, not NULL
- population: int, not unique, not NULL
- faction: faction\_id, not unique, can be NULL, FK
- designation: varchar, not unique, can be NULL

Relationship:

- worlds:people - 1:M
  - One person has one homeworld, each homeworld can have many people
- worlds:factions - M:1
  - One faction may control many homeworlds but one homeworld has only one controlling faction

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**skills**: details common skills and specialties utilized by spacefarers

Attributes:

- skill\_id: int, auto\_increment, unique, not NULL, PK
- skill: varchar, not unique, not NULL

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**factions**: catalogues the political groups present within the Sol system

Attributes:

- faction\_id: int, auto\_increment, unique, not NULL, PK
- name: varchar, not unique, not NULL

Relationships:

- factions:people - 1:M
  - People belong to only one faction, but a faction can have many people

## INTERSECTION TABLES

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**people\_ships**: connecting table linking people to ships

Attributes:

- person\_ship\_id: int, auto\_increment, unique, not NULL, PK
- passenger: person\_id, int, not unique, not NULL, FK
- ship: ship\_id, not unique, not NULL, FK to ship

Relationships:

- ships:people - M:M implemented using the people\_ships intersection table
  - A person can work on many ships and a ship may have many employees

**people\_skills**: connecting table linking people to skills

**\*\*\* NOTE: This table technically exists in our DB, but does not include any management options**

Attributes:

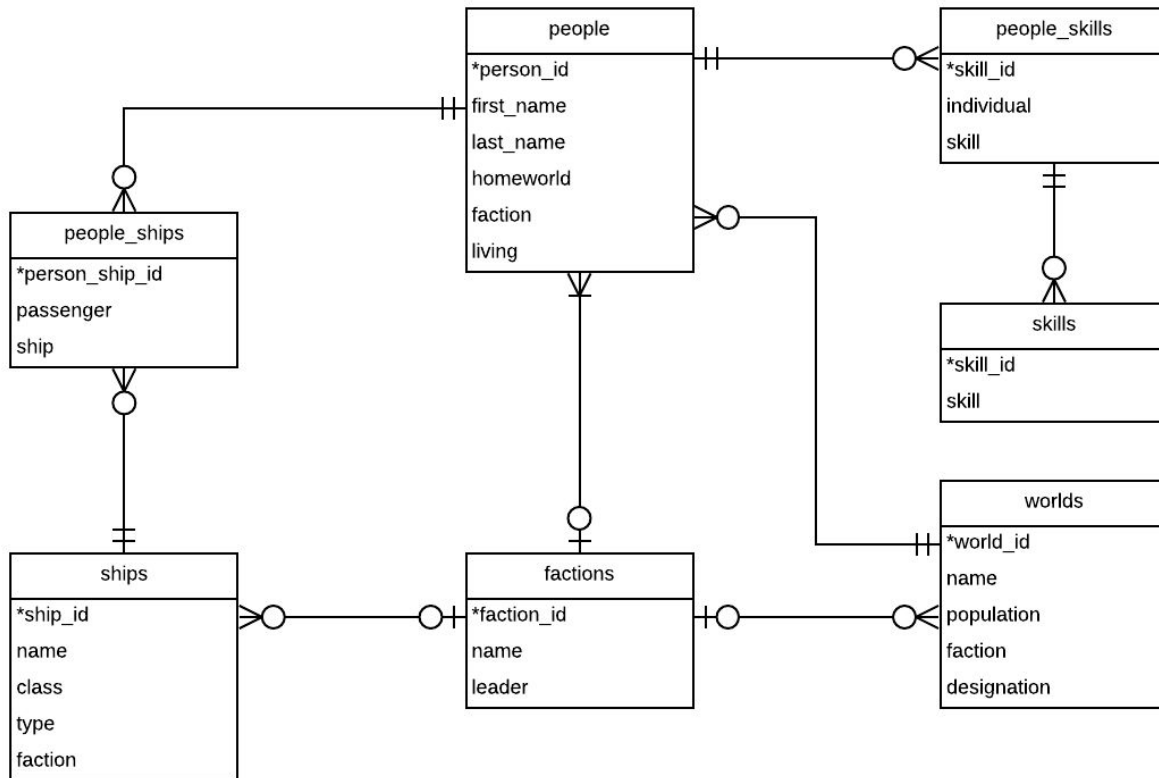
- person\_skill\_id: int, auto\_increment, unique, not NULL, PK
- individual: person\_id, not unique, not NULL, FK
- skill: skill\_id, not unique, not NULL, FK

Relationships:

- people:skills - M:M relationship is implemented using the people\_skills intersection table
  - A person may have multiple skills and a skill may belong to many people

## ER DIAGRAM

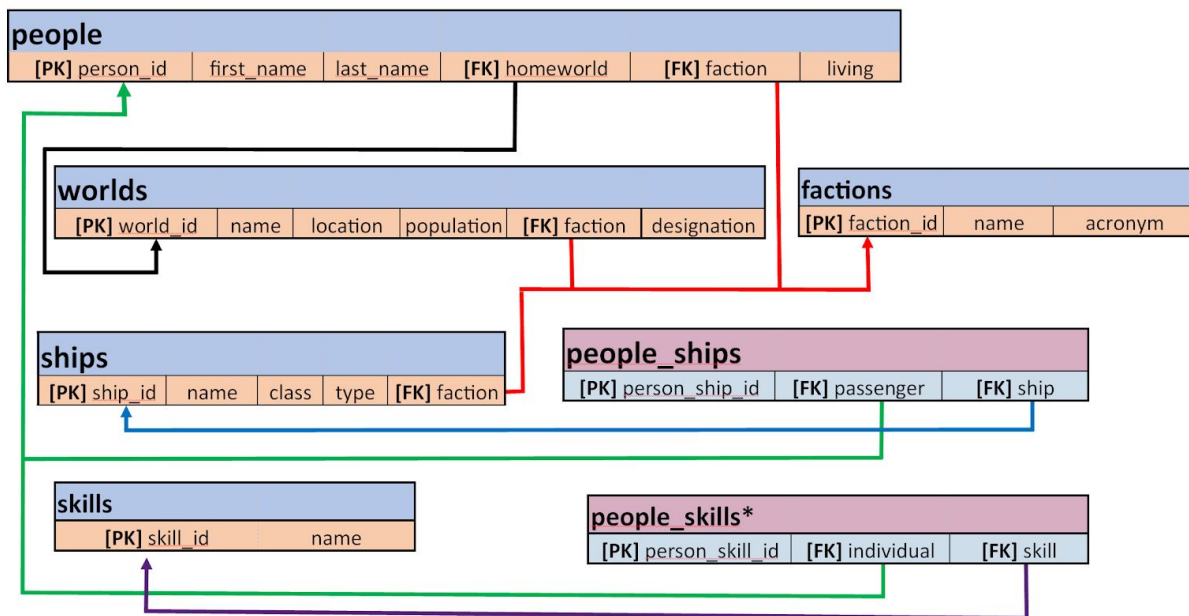
**\*\* NOTE: people\_skills technically exists in the DB, but does not include any management options**



## SCHEMA

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This first schema includes two M:M relationships where one has no implemented management options.



\* Please note, since only one M:M relationship must be implemented for this project, there are no management options implemented for this entity.



## UI SCREENSHOTS

READ/BROWSE/DISPLAY || CREATE/INSERT/ADD NEW || DELETE - PERSON

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### People-of-Interest

Name	Birth World	Faction	Status	
James T. Kirk	Belt	NULL	Alive	ADD
Neil Armstrong	Earth	United Nations	Alive	EDIT ✕
Chrisjen Avasarala	Earth	United Nations	Alive	EDIT ✕
Arjun Avasarala	Luna	United Nations	Alive	EDIT ✕
Amos Burton	Earth	NULL	Alive	EDIT ✕
Roberta "Bobbie" Draper	Mars	Mars Congressional Republic	Alive	EDIT ✕
Sadavir Errinwright	Earth	United Nations	Alive	EDIT ✕
Dmitri Havelocke	Earth	NULL	Alive	EDIT ✕
James Holden	Earth	NULL	Alive	EDIT ✕
Fred Johnson	Earth	Outer Planets Alliance	Alive	EDIT ✕
Alex Kamal	Mars	Mars Congressional Republic	Alive	EDIT ✕
Jess Kelly	Earth	United Nations	Alive	EDIT ✕
Pyotr Korshunov	Mars	Mars Congressional Republic	Dead	EDIT ✕
Julie Mao	Earth	Outer Planets Alliance	Dead	EDIT ✕
Jules-Pierre Mao	Earth	United Nations	Alive	EDIT ✕
Mei Meng	Luna	NULL	Alive	EDIT ✕
Praxideke Meng	Belt	NULL	Alive	EDIT ✕

EDIT/UPDATE - PERSON

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### Edit Profile

First Name	Last Name	Birth World	Political Affiliation	Status	
Neil	Armstrong	Earth	UN	Alive	SAVE

### Ships Boarded by Neil Armstrong

Name	Class	Type	Owning Faction
0 Ships			

Associate Ship with Neil Armstrong: Agatha King ADD SHIP

## SEARCH/FILTER PASSENGERS BY SHIP

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Search for Passenger Manifest by Ship: Thomas Prince

**Passenger Manifest for the Rocinante**

Name	Designation	Political Affiliation	Status	
Chrisjen Avasarala	Earther	United Nations	Alive	REMOVE
Amos Burton	Earther	NULL	Alive	REMOVE
Roberta "Bobbie" Draper	Martian	Mars Congressional Republic	Alive	REMOVE
James Holden	Earther	NULL	Alive	REMOVE
Fred Johnson	Earther	Outer Planets Alliance	Alive	REMOVE
Alex Kamal	Martian	Mars Congressional Republic	Alive	REMOVE
Praxideke Meng	Belter	NULL	Alive	REMOVE

Add Passenger to the Rocinante: Neil Armstrong

ADD PASSENGER

## SEARCH/FILTER SHIPS BOARDED BY INDIVIDUAL

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Search for Ships Boarded by Individual: Amos Burton

**Ships Boarded by Amos Burton**

Name	Class	Type	Faction	
Behemoth	Generational	Colony	OPA	REMOVE
Canterbury	Ice Hauler	Freighter	OPA	REMOVE
Donnager	Donnager	Battleship	MCR	REMOVE
Rocinante	Corvette	Frigate	NULL	REMOVE

Add Ship to Amos Burton: Agatha King

ADD SHIP

## READ/BROWSE/DISPLAY || CREATE/INSERT/ADD NEW || DELETE - SHIPS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### Ships

Name	Class	Type	Owning Faction	
USS Enterprise	Constitution	Explorer	NULL	ADD
Agatha King	Truman	Dreadnought	United Nations	EDIT X
Behemoth	Generational	Colony	Outer Planets Alliance	EDIT X
Canterbury	Ice Hauler	Freighter	Outer Planets Alliance	EDIT X
Donnager	Donnager	Battleship	Mars Congressional Republic	EDIT X
Rocinante	Corvette	Frigate	NULL	EDIT X
Scirocco	Scirocco	Assault Cruiser	Mars Congressional Republic	EDIT X
Scopuli	Transport	Freighter	Outer Planets Alliance	EDIT X
Thomas Prince	Xerxes	Battleship	United Nations	EDIT X

## EDIT/UPDATE - SHIP & PASSENGERS TO SHIPS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### Edit Ship

Name	Class	Type	Owning Faction	
Agatha King	Truman	Dreadnought	United Nations	SAVE

### Passenger Manifest for the Agatha King

Name	Designation	Political Affiliation	Status	
Praxideke Meng	Belter	NULL	Alive	REMOVE

Add Passenger to Agatha King:

## READ/BROWSE/DISPLAY || CREATE/INSERT/ADD NEW || DELETE - WORLDS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Worlds

Name	Location	Population	Governing Body	Resident Designation	
Ganymede	Sol Va	0	NULL	Belter	ADD
Venus	Sol II	0	United Nations		EDIT ✕
Earth	Sol III	30000000000	United Nations	Earther	EDIT ✕
Luna	Sol IIIa	10000000000	United Nations	Earther	EDIT ✕
Mars	Sol IV	10000000000	Mars Congressional Republic	Martian	EDIT ✕
Belt	(Sol IV, Sol V)	100000000	Outer Planets Alliance	Belter	EDIT ✕
Jupiter	Sol V	45000000	United Nations	Belter	EDIT ✕
TEST	Yes Land	-6	NULL	Belter	EDIT ✕

## EDIT/UPDATE - WORLDS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Edit World

Name	Location	Population	Governing Body	Resident Designation	
Venus	Sol II	0	United Nations		SAVE




## READ/BROWSE/DISPLAY || CREATE/INSERT/ADD NEW || DELETE - FACTIONS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### Factions and Political Organizations

Faction Name	Acronym	
Starfleet	SF	ADD
Mars Congressional Republic	MCR	EDIT X
Outer Planets Alliance	OPA	EDIT X
United Nations	UN	EDIT X



## EDIT/UPDATE - FACTION

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

### Edit Faction

Name	Acronym	
Mars Congressional	MCR	SAVE

## READ/BROWSE/DISPLAY || CREATE/INSERT/ADD NEW || DELETE - SKILLS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Skills & Qualifications	
Description	
Acrobatics	ADD
Ballistics	EDIT X
Engineering	EDIT X
Espionage	EDIT X
Leadership	EDIT X
Medical	EDIT X
Navigation	EDIT X
Politics	EDIT X
Programming	EDIT X
Science	EDIT X
Security	EDIT X
Strategy	EDIT X
Weapons	EDIT X

## EDIT/UPDATE - SKILLS

Tycho Station Surveillance System

HOME PEOPLE SHIPS WORLDS FACTIONS SKILLS

Edit Skills	
Name	
Ballistics	SAVE