

Journey of Space Exploration

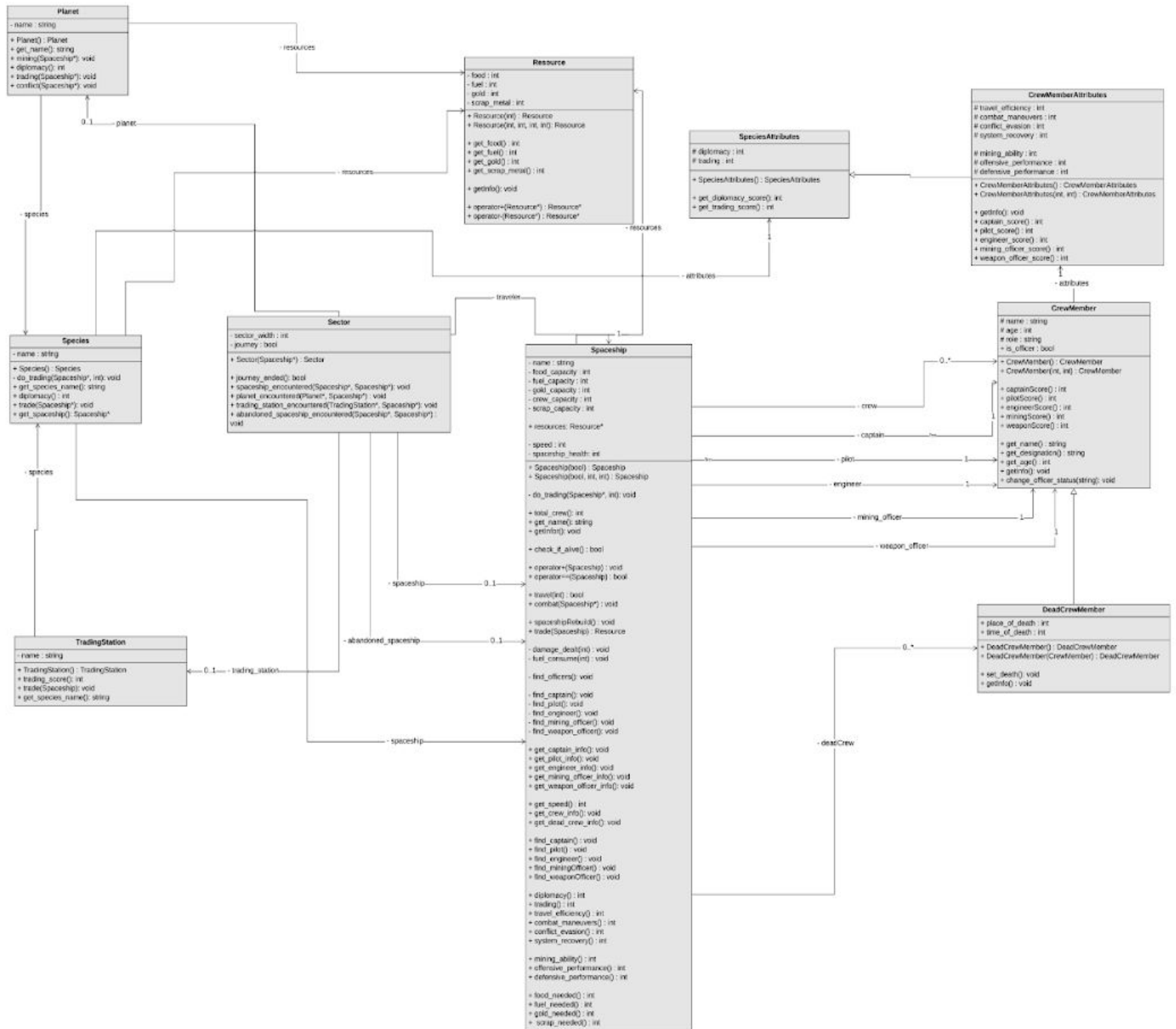
**CSCI251/851 Advanced Programming
Assignment 2**

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UML Diagram



Classes

Sector

This is where the actual logic of the program lies. Here a random number between 1 and 100 is generated. If the number is between 1 and 36, a spaceship is encountered. If the number is between 36 and 60, a planet is encountered. If the number is between 61 and 75, a Trading Station is encountered. If the number is between 76 and 90, an empty sector is encountered. If the number is between 91 and 100, an abandoned spaceship is encountered.

Species

Every species have a distinct name and attributes. The attributes of a species are diplomacy and trading. The attributes of the crew members of a spaceship which belongs to that particular species will be dependent on the attributes of the species itself.

Every species will have resources like food, fuel, gold and scrap metal.

SpaceShip

Every spaceship object created will have distinct features. The fuel capacity of a spaceship ranges from 7000 to 8500. The food capacity of a spaceship ranges from 5000 to 6500. The gold capacity of a spaceship ranges from 3000 to 4000. The crew capacity of a spaceship ranges from 25 to 75. The scrap metal capacity of a spaceship ranges from 1500 to 2500.

The speed of a spaceship will determine how fast a spaceship travels in a sector. The speed is between 60 and 100. The spaceship health is the condition of the spaceship which is between 70 and 100.

The total crew members are between the crew member limit and the crew member limit minus 20. In case if it an abandoned spaceship, the crew members are between 5 and 25.

Crew Member

The crew members has an attribute age which is between 20 and 100.

By default a crew members has a role “Crew Member” which can be changed if that particular crew member has a captain score, engineer score, pilot score, mining officer score or weapon officer score better than the other crew members of that spaceship.

Crew Member Attributes

The crew member attributes are travel efficiency, combat maneuvers, conflict evasion, system recovery, mining ability, defensive performance and offensive performance. These attributes are randomly assigned values between 1 and 100.

Crew Member Attributes have a diplomacy score of minimum 1 and a maximum of the diplomacy score of the species they belong to. Same is the case with trading score.

Crew Member Attributes is a child class of Species Attributes, hence it has the attributes of trading score and diplomacy score.

Dead Crew Member

The Dead Crew Member is a child class of Crew Member. An object of this class is created whenever any crew member(including officers) die while the journey. The day on which the crew member died and the sector is stored in the object.

Planet

A planet consists of 2 things, resources and species. Whenever a traveler comes in contact with a planet, the travelers will have to interact with the species they find here. If the species allow them to do mining, the traveler can then do it. If either of them are not happy, then it will result to a trade among them. If both are at conflict then the species will launch a spaceship for battle.

Resource

There are 4 types of resources : Food, Fuel, Gold and Metal Scrap. Food is necessary for the survival of the crew members. Fuel is used for traveling among sectors. Gold is required for trade of other resources. Scrap Metal is used to rebuild the spaceship.

The range of resources allocated to a spaceship, a species and a planet differs.

Spaceship :

Food : 3100 - 4900
Fuel : 6200 - 7000
Gold : 3500 - 5500
Scrap Metal : 400 - 600

Species:

Food : 5000 - 55000
Fuel : 5000 - 55000
Gold : 5000 - 55000
Scrap Metal : 5000 - 55000

Planet:

Food : 15000 - 215000
Fuel : 15000 - 215000
Gold : 15000 - 215000
Scrap Metal : 15000 - 215000

Species Attributes

A species has two types of attributes in common : Diplomacy and Trading.

The range for diplomacy and trading is between 1 and 100.

Trading Station

Trading stations are where the travelers come in contact with another species who want to trade resources. The purpose of this class is simply to bring them together for exchange of resources.

Events

Random number generation is used in all cases

Trading

Trading can be done only in 3 scenarios - Spaceship encounter, Planet encounter and Trading Station encounter. The rate of exchange depends on the level of the trading skills of each trader.

Case 1 - Spaceship Encounter

A trading can only occur among two spaceships if the diplomacy levels of their captains matches.

If both the captains have a good trading score, then the multiplier will be 1. Meaning for every resource an equal amount of gold will be given. In case if the traveler trading score is bad, then the multiplier will be 1.5, meaning the traveler will end up paying one and a half times the actual amount. If the other captain has a bad trading score then the multiplier will be 0.5, which means the traveler will have to pay only half the price for the resources.

In case the travelers have access of resources and the other spaceship requires some, then the spaceship can also buy from the travelers.

Case 2 - Planet Encounter

A trading can occur at a planet only if either of the species or the travelers have a good diplomacy score.

The same rules of trade apply here as well, based on the trading skills on species and the captain. This is only one way trade, meaning the species wont buy anything from the travelers.

Case 3 - Trading Station Encounter

Whenever a trading station is encountered, the travelers will meet with a species who want to trade. So the chance of trade here is 100%.

Again, the same rules of trade apply in this case and the trade is done directly with the species.

Combat

A combat can be done in 2 scenarios - Spaceship encounter and Planet Encounter.

Case 1 - Spaceship Encounter

The traveler will go in combat with the spaceship encountered if the diplomacy scores of both the captains do not match.

The combat is done in rounds, so every spaceship gets a chance to decide whether to run away from the scenario or to fight. A spaceship can try to run away if their crew has been depleted to a number below 10 or if they have taken more than 30% damage in the battle.

If a spaceship chooses to fight, the spaceship can launch a missile and the damage it causes will depend upon the skills of the weapon officer and the engineer. The other spaceship can try to dodge the attack and the chance is based upon the skills of the pilot and the engineer. If the other spaceship fails to evade the attack, the damage it deals will be equal to the damage of the missile minus its defensive own defensive performance.

The battle will go on until one of them evades or dies.

Case 2 - Planet Encounter

A planet will be in conflict with the travelers if neither of the traveler or the species succeed in negotiation. The species will then launch their spaceship for battle with the travelers.

The battle scenario is pretty much the same in this case as well.

Mining

Mining is possible only in one scenario, when the travelers encounter a planet.

If the diplomacy score of the travelers and the species that they encountered on the planet match, then they species will allow the travelers to mine on the planet.

The End