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ITEC 3245

02 November 2024

Module 12 Assignment

1.

A diagram of a ship

Description automatically generated

Within the diagram, the “Ship” class is viewed as the primary base class. “Cruise Ship,” “Oil Tanker,” “Container Ship,” and “Automobile Transport Ship” are viewed as specialized subclass of the primary class “Ship.” Aggregation is seen specifically pertaining to the “Oil Tanker” class as it has multiple aggregation relationships with “Hull,” “Engine,” and “Oil Storage Tank.” Since, “Ship” is the primary base class, the subclasses associated with “Ship” will inherit attributes from the primary base class. This is where inheritance is seen within the diagram. Finally, polymorphism is shown within the operation of each subclass. Each subclass has the same operation in “Calculate Refuel Date,” but the operation is performed differently under the “Cruise Ship” class to accommodate passenger safety.

2.

A diagram of a company

Description automatically generated

Converting the E-R diagram to the complete object-oriented class diagram consists of combining the E-R diagram and the object-oriented generalization diagram. The structure of the E-R diagram will remain relatively the same, but ship will now include the subclasses which were defined in the object-oriented generalization diagram, and these are marked by the inheritance arrow which show that these subclasses will inherit and share attributes which are defined under the primary base class. The aggregation relationships are also present which are linked specifically to the “Oil Tanker” subclass. Multiplicity is used to define the associative entities within the diagram. This will allow an accurate depiction of the relationship between classes and allows for database creation to be more accurately constructed based upon the necessary entity-relationship model of each class-to-class relation. The associative entities are as follows:

Port and Visit: A port may have many visits, but each visit occurs at a single port.

Visit and Cruise: A visit is affiliated with a single cruise, but a cruise may have multiple visits.

Cruise and Voyage: A cruise may have multiple voyages, but a voyage is assigned to one cruise.

Voyage and Passenger: A voyage is associated with one passenger, but a passenger may book multiple voyages.

Cruise and Ship: A cruise may only deploy a single ship, but a ship can embark on multiple cruises.

Ship and Sailor: A ship may have multiple sailors aboard, but no sailor to many sailors could work on multiple ships.

Sailor and Sailor: Multiple sailors are supervised by a single superior sailor, but a single superior sailor can supervise at least one subordinate sailors.