**CS2261 Human/Dog simulation Fall 2019**

**Project #3 [100 points]**

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In this assignment you will be writing a program that uses polymorphism, an abstract class and

inheritance.

You will have the following classes:

An abstract SpaceShip class with the following members:

The name of the ship (string)

Date the ship was built (int)

Attributes for its x and y coordinates (int), which represent the row/column it will be

displayed at in the world.

A constructor and appropriate accessors and mutators

toString that displays the ships name and the year it was built

An interface CanMove with the following:

Method moveShip that takes in two variables and changes the location of the ship (x,y

coordinates).

A CargoShip class that is a subclass of SpaceShip that implements CanMove. This should have

the following members:

Variable for amount of cargo(int)

A constructor and appropriate accessors and mutators

A toString that only displays the ships name, its location and the amount of current cargo

it has.

A PirateShip class that is a subclass of SpaceShip that implements CanMove. This should have

the following members:

Member variable for the amount of booty it has (int).

Constructor and appropriate accessors and mutators

A toString that displays only the ships name, its location and its booty.

A class with your main method.

In your main method, you will now maintain a list of these objects in an ArrayList.

Start by prompting the user for how many SpaceShips they would like to work with(1-9). Then

in a loop, start filling up your ArrayList with SpaceShips. For each SpaceShip, prompt for what

type of ship, then prompt for the data for the ship and then put it in the ArrayList.

Now your main body will go into a loop:

It should start each iteration by calling a method that takes in the ArrayList of SpaceShips and displays it to the screen. Your “world” should be a grid of 10 rows and 10 columns, with

spaceships represented by starting with the first letter of the type of object it is (C for cargoship or P for pirateship) and the location it is in the ArrayList of ships.

An example:

Our universe is the following:

|C1|\*\*|\*\*|\*\*|C0|\*\*|\*\*|\*\*|\*\*|\*\*|

|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|

|\*\*|\*\*|P2|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|\*\*|

and so forth for 7 more rows.

When that is done, call a method that sequentially calls all the toStrings of each of the ships in

ArrayList, one per line.

Once the board is displayed and all the ship data is displayed, you should prompt and ask them if

they want to change the status of a ship.

They should have two options once they have selected a ship to change:

1) Change the ship type: In that case, change that ship by creating a new ship and putting it in it’s

place.

2) Moving the ship, in which case you use the moveShip method from CanMove.

For submission, please have separate files for each class.

I want UML class diagrams for your classes, both showing the methods and their hierarchy, which can be all together in the same file.

Note: If your files are in a package (using the package keyword), please delete that line and

submit them without it