1 - Robot Traversal

Assignment 1: Due January 27th, 6:00 pm

• Write a java program that helps model a remote controlled robot:

• The robot moves in an 8 by 8 meter grid

• Each grid cell has a ‘cost’ to traverse, which ranges from 1 (low) to 9 (high)

• The robot is charged whenever it enters a new cell

• Use a loop to accept keyboard command input

• Use a switch statement to provide for input options (commands) :

1) Allow input of a target cell X,Y location

2) Determine path options, and calculate the cost incurred along the way (print options for the user)

3) Drive to the new location by selecting a path option

4) Print a history of the last three trips taken, and the cost of each

5) Quit – Allow the user to exit from the program

• Please comment your code, and think about making your code simple and easy to write

• Submit your source code to Blackboard. Please fill in your name and NUID number.

1-机器人遍历

作业1：于1月27日下午6:00到期

•编写一个有助于对远程控制机器人进行建模的Java程序：

•机器人以8 x 8米的网格移动

•每个网格单元都有一个“遍历”的成本，范围从1（低）到9（高）

•进入新单元格时，会对机器人充电

•使用循环接受键盘命令输入

•使用switch语句提供输入选项（命令）：

1）允许输入目标单元格X，Y的位置

2）确定路径选项，并计算沿途产生的费用（用户的打印选项）

3）通过选择路径选项驱车到新位置

4）打印最近三趟的历史记录，以及每趟的费用

5）退出–允许用户退出程序

•请注释您的代码，并考虑使您的代码简单易写

•将源代码提交到Blackboard。 请填写您的姓名和NUID号。

Assignment

2a - Robot Classes

• Assignment : Robot Classes – Due February 3 rd , 6:00 pm (prior to class)

• Write a Robot and RobotTest class ( Robot.java and RobotTest.java )

• To the Robot class

• Add Strings for the robot name and manufacturer

• Add values for the position (X, Y), heading (in degrees), and speed

• Add values for weight (i.e. total mass Kg), engine power draw (mA), battery capacity (mA-Hour)

• Add a constructor that sets the name and other major values

• Add getter and setter methods for major variables

• Add a “ moveTo ” method that moves your robot and prints the cell boundary transitions

• In the RobotTest program, use the ‘new’ operation with your Robot constructor to generate five instances of a Robot.

• Add a method to print an attractive display of the Robot information

• Have your test code print details about all of the Robot instances

• Submit your source code to Blackboard as .java files. Include a copy of your program’s output captured in a text file.

•作业：机器人课– 2月3日，下午6:00（课前）

•编写一个Robot和RobotTest类（Robot.java和RobotTest.java）

•前往机器人课

•添加用于机器人名称和制造商的字符串

•添加位置（X，Y），航向（以度为单位）和速度的值

•添加重量（即，总质量Kg），发动机功率（mA），电池容量（mA-小时）的值

•添加用于设置名称和其他主要值的构造函数

•为主要变量添加getter和setter方法

•添加一个“ moveTo”方法来移动您的机器人并打印单元边界过渡

•在RobotTest程序中，对Robot构造函数使用“ new”操作来生成五个Robot实例。

•添加一种方法来打印吸引人的机器人信息显示

•让您的测试代码打印有关所有Robot实例的详细信息

•将源代码作为.java文件提交到Blackboard。在文本文件中包含捕获的程序输出副本。

Assignment

2AB Robot Classes (part 2)

• Assignment: Robot Classes – Due February 10 th , 6:00 pm (prior to class)

• Write a Robot and RobotTest class ( Robot.java and RobotTest.java )

• To the Robot class

• Add Strings for the robot name and manufacturer

• Add values for the position (X, Y), heading (in degrees), and speed

• Add values for weight (i.e. total mass Kg), engine power draw (mA), battery capacity (mA-Hour)

• Add a constructor that sets the name and other major values

• Add getter and setter methods for major variables

• Add a “ moveTo ” method that moves your robot and prints the cell boundary transitions

• In the RobotTest program

• Use the ‘new’ operation with your Robot constructor to generate five instances of a Robot .

• Add a method to print an attractive display of the Robot information

• Have your test code print details about all of the Robot instances

• Move all test code (i.e. from ‘main’) and place it into a run() method. Call run() from main .

• Write a RobotTask (RT) class

• Add an ID, Task name, Objective, start date/time, and assigned Robot/ID.

• Write a RobotScheduler class

• Add a private ArrayList for holding RTs , and add public convenience methods that support adding, getting and removing of RT instances.

• Create a public method that loops through all RTs and prints an attractive listing

• Add a private HashMap that stores RTs by Robot ID, and a public method to allow retrieval by the same ID .

• Ensure that both lists remain in sync !

• Submit your source code to Blackboard as .java files. Include a copy of your program’s output captured in a text file.

•作业：机器人课– 2月10日下午6:00（课前）

•编写一个Robot和RobotTest类（Robot.java和RobotTest.java）

•前往机器人课

•添加用于机器人名称和制造商的字符串

•添加位置（X，Y），航向（以度为单位）和速度的值

•添加重量（即，总质量Kg），发动机功率（mA），电池容量（mA-小时）的值

•添加用于设置名称和其他主要值的构造函数

•为主要变量添加getter和setter方法

•添加一个“ moveTo”方法来移动您的机器人并打印单元边界过渡

•在RobotTest程序中

•对Robot构造函数使用“ new”操作来生成五个Robot实例。

•添加一种方法来打印吸引人的机器人信息显示

•让您的测试代码打印有关所有Robot实例的详细信息

•移动所有测试代码（即从“ main”中移出）并将其放入run（）方法中。从main调用run（）。

•编写一个RobotTask（RT）类

•添加ID，任务名称，目标，开始日期/时间以及分配的机械手/ ID。

•编写RobotScheduler类

•添加用于保存RT的私有ArrayList，并添加支持添加，获取和删除RT实例的公共便捷方法。

•创建一个遍历所有RT的公共方法，并打印出有吸引力的清单

•添加一个私有的HashMap来存储通过机器人ID的RT，并添加一个公共方法以允许通过相同的ID进行检索。

•确保两个列表保持同步！

•将源代码作为.java文件提交到Blackboard。在文本文件中包含捕获的程序输出副本。

Assignment

Robot IO

• Assignment 3 – Robot IO: Due February 17 th , 6:00 pm – 20 pts.

• Create a Transport Robot class. Use inheritance to e xtend from your Assignment 2b Robot class

• For the Transport Robot class:

• Add member variables to this class tha t track the height, width and length of the main cargo hold.

• Add a new public method that calculates the cargo area

• Add an attractive print routine to the TransportRobot class that leverages the Robot print routine from 2b, but add on information abou t the cargo area (hint: use ‘super’ to access parent class methods with the same method name)

• Create a RobotIO class: This class will permit Robot information to be stored (and possibly retrieved) from disk

• Create a private ‘save’ method for writing/storing a single Robot to an open file (pass the Robot and open file as parameters)

• Add public methods to load() and save() all Robot instances to disk. For both methods, pass in a Robot list and a filename as parameters. Implement the save() feature.

• For all IO operations, use a try-catch() block to capture and print appropriate error messages

• BONUS (+5 pts ) Implement the load() method functionality and read the contents written by your save() method back into a new Robot classes. Can you recreate the original Robot instances? What about a Transport Robot class?

• Upload your .java files to Blackboard . You should archive/compress (.zip or .tar) up the entire src directory. Include a copy of your program’s output captured in a text file.

•作业3 –机器人IO：2月17日下午6:00 – 20分。

•创建运输机器人类。使用继承从Assignment 2b Robot类进行继承

•对于运输机器人类：

•将成员变量添加到此类中，以跟踪主货舱的高度，宽度和长度。

•添加一个新的公共方法来计算货物面积

•在TransportRobot类中添加一个吸引人的打印例程，以利用2b中的Robot打印例程，但是在货物区域添加信息（提示：使用“ super”访问具有相同方法名称的父类方法）

•创建一个RobotIO类：该类将允许从磁盘存储（并可能检索）机器人信息。

•创建用于将单个机器人写入/存储到打开文件的私有“保存”方法（将机器人和打开文件作为参数传递）

•将公共方法添加到load（）并将所有Robot实例保存到磁盘。对于这两种方法，请传入机械手列表和文件名作为参数。实现save（）功能。

•对于所有IO操作，请使用try-catch（）块捕获并打印适当的错误消息

•奖励（+5分）实现load（）方法的功能，并将save（）方法写入的内容读回到新的Robot类中。您可以重新创建原始的Robot实例吗？那运输机器人课呢？

•将.java文件上传到Blackboard。您应该将整个src目录归档/压缩（.zip或.tar）。在文本文件中包含捕获的程序输出副本。

Assignment

Robot Sorting/Logging/Simulation

• Assignment: Due Mar. 16 th , 6:00 pm – 25 pts.

• Create a package called ‘edu.neu.csye6200 .robot’ and move all related assignment #2 & #3 code into it

• Convert your RobotScheduler class to use the Singleton pattern

• Add a method to sort your RobotTask (RT) by ID

( See Quicksort c h . 6 pp. 210-213).

• Ensure that you have at least 10 RT instances defined in a roster

• Print the results before and after sorting.

• Create a Robot Simulation class

• Create a simulation loop and call an ‘update()’ method for each Robot defined in the scheduler .

• The update() method on each robot should cause the robot to move or take action.

• Add logging to your RobotScheduler and RobotIO classes

• Log information messages for class creation (constructor call), and for load/save methods

• Log a severe message if an error is captured in your try-catch block(s)

• Add a FileHandler to send your log messages to disk

分配

机械手分类/记录/模拟

•作业：3月16日下午6:00 – 25分。

•创建一个名为“ edu.neu.csye6200 .robot”的程序包，并将所有相关的作业＃2和＃3代码移入其中

•转换RobotScheduler类以使用Singleton模式

•添加一种通过ID对您的RobotTask（RT）进行排序的方法

（请参阅Quicksort c h。6 pp。210-213）。

•确保在名册中至少定义了10个RT实例

•在排序前后打印结果。

•创建机器人仿真课程

•创建一个模拟循环，并为调度程序中定义的每个机器人调用“ update（）”方法。

•每个机器人上的update（）方法应使机器人移动或采取措施。

•将日志添加到RobotScheduler和RobotIO类

•记录信息消息以进行类创建（构造函数调用）以及加载/保存方法

•如果在try-catch块中捕获到错误，则记录一条严重消息

•添加一个FileHandler将您的日志消息发送到磁盘