Basic Java 2 - Roomba Analysis

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1 SUMMARY

The goal of this homework is to write a report comparing two distinct strategies for your Roomba simulator. You will be writing many reports this semester, so this is a good opportunity to get used to the kind of results / reports we expect moving forward this semester.

1. Construct at least two distinct strategies for your makeMove() method.

2. Run an experiment comparing how well each strategy cleans various rooms.

3. Write a report summarizing and analyzing your findings.

4. **FILES TO DOWNLOAD:** None

5. **FILES TO SUBMIT:** RoombaAnalysis.pdf

1.1 PERFORMING AN EXPERIMENT

Your first task is to write **two unique** makeMove() methods that incorporate different strategies for cleaning the rooms. You should be able to argue that the two strategies are significantly different AND that it is not obvious to you which is better. You should be geniuinely cu-

rious which approach will succeed. It is okay if your second makeMove() method is a change / variation of your first, as long as they are substantially different in some way.

You should then plan to test your two Roombas on several rooms, given the following constraints:

- You will use four total room configurations. two of the rooms will be smaller in size and two will be larger in size (you may choose the exact sizes).

- For each set of two above, one will have a small number of obstacles generated, and one will have a large number of obstacles generated.

- You should run each Roomba in each of the four configurations at least 5 times each. That is $5 * 4 = 20$ total executions minimum.

- For each room configuration, you should average the percentage of the room cleaned for each Roomba strategy.

1.2 REPORT

Summarize your experiment and your findings in a report. Make sure to adhere to these general guidelines:

- Your submission MUST BE a pdf document. You will receive a zero if it is not.

- Your document MUST be presented as if submitted to a professional publication outlet. You can use the template posted in the course repository or follow Springer's guidelines for conference proceedings.

- You should write your report as if it is original novel research. *Yes, this is not really original research per se, but we'd like you to get in the habit of writing as if you are communicating new findings to others.*

- The grammar / spelling / professionalism of this document should be sound.

- When possible, do not use the first person. Instead of "I ran the code 60 times", use "The code was executed 60 times...".

In addition to the general guidelines above, please follow the following rough outline for your paper:

- **Abstract**: Summarize the entire document in a single paragraph/

- **Introduction**: Present the problem, and provide details regarding the two strategies you implemented.

- **Methods**: Describe your methodology for collecting data. How many rooms, how many executions, how you averaged things, etc.

- **Results**: Describe your results from your execution runs.

- **Conclusion**: Interpret your results. Which strategy was better? Why was it better? Were you surprised? Was one strategy better in some situations and not in others? Why do you think that is? Notice that I'm not looking for a particular answer here. Show me that you can interpret what happened when you ran your code.

Lastly, your paper MUST contain the following things:

- A table (methods section) summarizing the different experimental groups and how many execution runs were done in each group.

- A table (results section) summarizing each experimental group and the average percent cleaned for each (as well as any other data you decided to collect).

- Some kind of graph visualizing the results of the table from the previous bullet.