

Fleet Scheduling Question

Logistics

1. You may spend **up to 2 hours** on your solution. You may not need the full 2 hours. Do not take a long break in the middle of solving this problem.
2. If you have questions or think the requirements are unclear, make an assumption and proceed with it. In your submission, tell us what you thought was unclear and what assumption you made.

The assignment

Imagine that you are responsible for a fleet of electric mail trucks. You need to get all your trucks recharged overnight so they are ready for the next day. Please write code to come up with a schedule for charging your trucks.

You have:

1. Some number of trucks, each with a unique ID, battery capacity (in kilowatt hours), and current level of charge
2. Some number of chargers, each with a unique ID and charging rate (in kilowatts)
3. A specified amount of time (an integer number of hours)

Your goal is to get as many trucks as possible charged to full capacity in the specified amount of time.

You should make the following assumptions:

1. Each charger can charge one truck at a time
2. Once a truck starts charging, it must continue until it is fully charged
3. Once a truck is done charging, it takes zero seconds before the next truck can start charging on the same charger

Your task is to write code that prints a schedule indicating which trucks should be charged on each charger.

For example, if your code prints:

```
1: 1, 3
2: 4
```

That means that trucks 1 and 3 should be charged on charger 1 and truck 4 should be charged on charger 2. Truck 2 will not be charged by the end of the time period.

Your code should be able to run this task with different scheduling algorithms so you can evaluate which schedule is best. You only need to implement one algorithm, but it should be a simple matter to plug in a different algorithm.

Rules

1. You may use Java, Python, Go, or PHP.
2. You do not need to parse inputs from the command line--inputs can be specified in your main function. You may choose what inputs to specify in your main function.
3. You may look up how to do things in a particular language, but you may not look up how to solve this problem. You may also look up anything you want about electric vehicle charging, such as what kilowatts and kilowatt hours are.
4. You may only use standard libraries. If you want to use a unit testing framework, that is fine.

Submission

You can submit your implementation in a private GitHub repo or something like Box or Dropbox. (Our email server filters out a lot of attachments, so attaching it isn't a great option.) Just email us a link! If you use a private GitHub repo, you can invite nicky.robinson@chargepoint.com to it.

Please include:

1. All of your code
2. Any tests you wrote
3. Any documentation we'll need to understand or run your code

How you'll be evaluated

1. You are not expected to find an optimal solution, but your algorithm should be reasonable.
2. We are more interested in the way you've designed and architected your solution than whether it works perfectly.
3. We expect to be able to read, understand, and run your submission without asking you questions.

What's next

In the next round of interviews, we will ask you questions about your solution. You will need to be able to explain how it works, describe the pros and cons of your algorithm, and add new functionality.