Software Dev Technical Questionnaire and Task

October 2021

Overview

This questionnaire and task is intended to give ClearPoint a high level idea about a candidate's abstract technical abilities. This questionnaire and task should not take a long time to complete nor should it require a great deal of detail on each question. Where images are involved, you are welcome to supply scanned answers of tidy hand-drawn diagrams if that is easier than using drawing software. All of the submitted responses must be your own work.

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Questions

Data Model

A situation is described in the box below. For this situation, diagrammatically design a data model suitable for storage of the associated data. The structure should be normalized and suitable for storage in a relational database. Data types need not be described. Please consider the requirements of the "Database Query" question in your design.

Normally "Yanis' Bakery" operates from a popular store in central Auckland but owing to a pandemic, the business has instigated a delivery service. The bakery needs to get a database in place quickly to track the deliveries. A few drivers will be employed. Each driver will do one delivery run in the early morning (AM) and one around mid-afternoon (PM). Each delivery has a list of products together with quantities of each product. The products are tracked by a code such as "SOURDOUGH1". The drivers are identified by their email address. The owner is anxious to get the data well modelled so they can easily report on it.

Database Query

Based on your data model above, create a SQL query that will yield a table of the following data for the day 2021-09-21. The result should be sorted on the `DRIVER_EMAIL` first and then the `DELIVERY_TYPE`.

Result Column Name	Column Data
`DRIVER_EMAIL`	The email of the driver.
`DELIVERY_TYPE`	"AM" for the morning delivery run and "PM" for the afternoon run.
`QUANTITY_OF_ALL_PRODUCTS`	The quantity of all of the products delivered on the delivery run.

Task to Write a Small Program

Create a small program or function called `clocke`. Consider a standard analogue clock face. Given a 24 hour time, supplied as a short string, such as "1705", the small program should calculate the angle in degrees between the hour hand and the minute hand. The angle should be measured clockwise from the hour-hand around to the minute-hand. Beware that unless the minute is zero, the hour hand will not sit exactly on an hour.
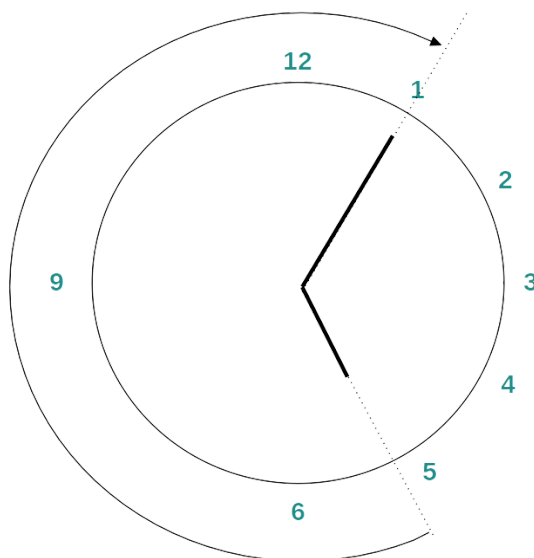
Example Input	Example Output
`1230`	165
`0245`	187.5
`1445`	187.5
`1754`	147
`1710`	265
`1200`	0

- The program would be executed with a single argument of the supplied time.
- <u>Basic</u> testing would be good to see.
- Other than to support build and test, please do not use third party libraries.
- The resulting source code should be supplied either in `.zip` or `.tgz`. Do not supply binaries.
- If you are using a build system please give brief instructions on how to build a runnable binary.

Deployment and Cloud

A system has been successfully deployed for a long time, but in recent weeks there have been some problems. An investigation has indicated that a new component (F) was introduced. The new component (F) runs a batch process each day that is putting pressure on the database (C) for an hour or two. This in turn is probably why REST API calls (E) from the Main Component to the Usage Storage Component are timing out around the same time. The Main Component (A) is not doing anything with the responses from the Usage Storage Component, but just checks to see if it gets a 200 HTTP response. <u>Briefly</u> outline any possible architectural remedies you can imagine being helpful in this situation.

A   B   C

| Main Component | REST (slow) → | Usage Storage Component | JDBC → | Database |

E

New Component

F