Lead Developer Technical Test (Database)

**Introduction**

This is a test to evaluate your approach for building a simple application using PostgreSQL.

You do not need to worry about the user interface, however all the data processing and business logic should be implemented within the database code.

The application will be a survey tool for health researchers and patients. There will be two types user: respondents who answer questions, and administrators who define the questions and when they should appear to respondents, and who view reports on the respondent’s answers.

**Use Cases**

*Respondent*

1. Register with name, gender, post code, date of birth. These are all mandatory.
2. View the next question that should be answered:
   1. The system should first select questions (at random) that are marked as ‘priority’ and have not already been answered by the respondent at least once in the current week (beginning on Monday).
   2. Once all ‘priority’ questions have been answered at least once in the current week, a ‘non-priority’ question may be randomly chosen that has not already been answered by the respondent at least once in the same week.
   3. Once all available questions have been answered at least once in the current week, either a ‘priority’ or ‘non-priority’ question may be randomly chosen next, as long as it has the least number of answers from the user in that week.
3. Submit an answer only to the next question, as selected above.

*Administrator*

1. Define questions the same format as the GAD-7 Questionnaire. See <https://www.smartcjs.org.uk/wp-content/uploads/2015/07/GAD-7.pdf>
2. Define which questions are ‘priority’. These questions will be presented to respondents before any others on each day
3. View demographic reports:
   1. For each gender and for each postcode, total responses for (0, 1, 2, 3), for each question
   2. For each age range decile (0-9, 10-19 etc) total responses for each answer type (0, 1, 2, 3), for each question (1-7)
4. View statistical reports:
   1. For each week, average number of people responding with each type of answer (0,1,2,3)
   2. A list of people whose average number of answers with type = 0 (or ‘not at all’), is below 1 standard deviation from the population average.

**Deliverable**

We need to be able to understand your design and implementation decisions, and to run your database interactively to test each of the use cases.

We recommend creating SQL script files to create each database object and committing these to a git repository, numbering them so that when they are applied to a blank database in the correct order, your schema is fully reproduced.

In addition, you will need to write documentation explaining your data models (tables, fields, types, primary keys, constraints) and user-facing operations using appropriate software engineering diagrams (entity relation, flow charts etc).

You will also need to include written descriptions and examples of how each use case specified above can be achieved.

You can submit your work either using a public git repository, or by sending it as a tar archive.