Analyst Position Interview Task

Dear candidate,

The following task is meant to test your analytical thinking and ability to comprehend and master complex business processes; it is also meant to test your technical abilities in SQL.
Please read the following business case and the report that needs to be written based on the related data. The data itself, is in SQLite format (please see SQLite instructions attached), along with an ERD and table descriptions.

When working on the case please keep the following guidelines in mind:

- Keep a copy of all your queries, even if you don't include their conclusion in your report. We want to know how you think, and how you write queries.

- The dataset is small enough to be copied into an Excel sheet or into an R/Pandas dataframe. We ask you not to do so, since the data you will handle during the job is too large to be handled properly in such tools. If you need to use Excel/R/Matplotlib for data visualization, please do all preliminary processing and aggregation with SQL (we will look at the queries).

- You are free to use the internet, but not your friends. Please be honest.

Welcome to the wonderful world of commercial magical pony farming!

Life of a Magical Pony

In the far away land of Ponia, the magical ponies roam happy and free, and are eventually sold to toy companies for hefty profit. A Pony lives its entire life on a single farm, and is identifiable by a unique numerical ID that is branded on its hind leg. Ponies also have first and last names, and ponies with the same last name are considered family members. A magical pony's life expectancy is about 25 years. In the first years of their lives, their market value grows; it peaks around the age of 5, and then rapidly declines. There is little economic sense in keeping ponies at the farm after the age of 10. The pony market is extremely volatile, so no exact prices are provided, only rough guidelines for determining the worth of a magical pony.

Magical Powers

A magical pony develops its first magical power on its first birthday. Each birthday, a pony **has a chance** of acquiring an additional power, up to a maximum of four powers. The following powers are available:

- The Power of Friendship: the pony's enemies and frenemies have no effect, positive or negative, on its popularity (see below)
- The Power of Love: the pony's friends contributes twice as much to its popularity (see below). This applies to true friends only, not to frenemies.
- The Power of Gratitude: treatments (see below) for this pony are provided without cost
- The Power of Kindness: No quantifiable effect

The more magical powers a pony has, the more it is worth. A pony that has acquired all four magical powers is considered a *Powerful Pony*, and is worth considerably more than other ponies. A pony that has acquired just one power and is past its fifth birthday is considered a *Puny Pony*, and is worth very little.

Popularity

Magical ponies are highly social creatures. Each pony has feelings towards other ponies. The feelings are unilateral, meaning Pony A can be a friend of Pony B without Pony B being a friend of Pony A. A relationship is defined by **type** and a number indicating **intensity**. A feeling may be one of the following:

- Friend: the intensity of the relationship contributes to the recipient's popularity
- Enemy: the intensity of the relationship detracts to the recipient's popularity
- Frenemy: if a pony has more friends than enemies, a frenemy is treated like a friend. Otherwise, a frenemy is treated as an enemy.

A pony's popularity rating is calculated by adding in the intensity of friendships and subtracting the intensity of enmities. In addition, a pony receives **1** popularity point for each family member currently living in the farm. A pony with a negative popularity rating is a *Pariah Pony*, and is worth nothing; it also degrades the values of all other ponies on the farm. A pony with popularity rating of **at least 150** is a *Popular Pony*, and is worth considerably more than regular ponies. For other ponies, popularity is strongly correlated with value.

Treatments

When ponies **get depressed** or **lose their sparkle**, they are taken to a physical or psychological treatment. These cost a lot of money (to ponies without The Power of Gratitude), and make up the main cost of magical pony farming.

The Task

Your company has recently purchased *Sunshine Valley*, a struggling mid-level magical pony farm. As the company's analyst, you are tasked with going over the farm's data and issuing a report. Specifically, you are expected to do the following:

- **Take stock.** The business needs to know how much the farm is worth. Be as accurate as possible, but stick to the relevant details. Accurate financial details in the magical pony business are in constant flux, so the actual costs and revenues from each aspect or pony farming are not available to you; actual worth will be determined later by the business people, based on the data you present.
- **Find anomalies.** The data in the business case describes ideal conditions at a pony farm. *Sunshine Valley* is not an ideal farm. The data contains several anomalies: find one or two of them and include them in your report. The anomalies are relatively straightforward; there is no need for advanced statistical modelling to locate them.
- **Provide actionable insights.** Based on your findings, suggest actions the business might take to improve the situation at Sunshine Valley.
- **Provide directions for future analysis**. We don't expect you to delve too deeply into the data during this test. We would, however, like to know what else you would have checked given more time.