Please list out changes in the directions of your project if the final project is different from your original proposal (based on your stage 1 proposal submission).

1. Discuss what you think your application achieved or failed to achieve regarding its usefulness.
    a. Our application achieved its goal of helping the user select a game based on the requirements of their choosing; for example, budget. It is an interactive and user-friendly database of games that can even filter based on multiple factors.
    b. In some ways, it can be further improved by encompassing more game factors and having more visualized interactive components.
2. Discuss if you change the schema or source of the data for your application
    a. We added more relations to the games table (platform, categories, genres) and we added foreign keys to the tables to reference other tables.
3. Discuss what you change to your ER diagram and/or your table implementations. What are some differences between the original design and the final design? Why? What do you think is a more suitable design?
    a. There are no changes in ER diagram or the table implementation
4. Discuss what functionalities you added or removed. Why?
    a. We added the trigger of reviews which will remark on top of the reviews if the current average rating of the game is over 7. Also, based on what kind of device the user has and the budget of the user, we will recommend good games (with high average ratings) for them using a stored procedure.
5. Explain how you think your advanced database programs complement your application.
    a. Our advanced database programs allow the user to better identify good quality games that are the best fit for them. The trigger creates a marker for good games based on the reviews from those that have played them. This allows a new user to identify a game that many people have liked without having to search through every review and rating on the game. The stored procedure allows the user to filter games based on their budget. In a lot of cases, it may seem that the best games are the most expensive ones. However, the user can input a budget to find good quality games with high ratings that also fit within the budget request.
6. Each team member should describe one technical challenge that the team encountered. This should be sufficiently detailed such that another future team could use this as helpful advice if they were to start a similar project or where to maintain your project.
    a. Ritika - one minor technical challenge that we encountered was adding stored procedures and triggers into gcp. In order to make sure that the semi-colons within the command do not interfere, you need to change the delimiter.
    b. Hang - debugging the stored procedure sometimes can be hard because the database contains so much data that sometimes although the results from the stored procedure looks reasonable, there are some edge cases undetected.
    c. Relena - web development was new to me, so I spent a significant amount of time figuring out both frontend and backend and how to link them together. Also our database got hacked :P, if that ever happened, if you are hosting your database on gcp, you can roll back to one of the backups!

    d. Xiaofei - One technical challenge that I encountered during our project was optimizing the performance of our database queries. As our database grew in size, we noticed that some of our queries were taking a long time to execute. Some of the techniques that helped me in this process were using indexes, optimizing joins, and minimizing the use of subqueries.
7. Are there other things that changed comparing the final application with the original proposal?
    a. Apart from the aforementioned changes, the rest are mostly consistent with the original proposal.
8. Describe future work that you think, other than the interface, that the application can improve on.
    a. The UserInfo currently stores the users' information such as password in plaintext, which is dangerous (we actually just suffered from a hack attack). In the future, we should use some hashing algorithms to store in the database. Also, some more features such as PG classification should be added typically for such kinds of applications (however, we don't have the information in the provided data, maybe we need to crawl from the web). In addition, the users may hate some games, so it is necessary to add a blacklist feature so that the game would not occur in the user's search.
9. Describe the final division of labor and how well you managed teamwork.
    a. Stage 0: completed by Relena
    b. Stage 1: completed by all members
    c. Stage 2: completed by Relena, Xiaofei, and Ritika
    d. Stage 3: completed by Relena
    e. Stage 4: completed by Relena
    f. Stage 5: trigger completed by Ritika, Stored Procedure completed by Hang, Checkup completed by Relena
    g. Stage 6: Video completed by Relena, Reflection report completed by Ritiika and Hang
    h. Overall, teamwork went pretty smoothly for us. We made sure to have clear communication to share ideas, provide feedback, and stay informed about progress and changes.