Reflection Report

1. Please list out changes in directions of your project if the final project is different from your original proposal (based on your stage 1 proposal submission).
    - We added a login function for each user, which can increase the security of data.
    - We removed the ability to add reviews to each purchase.Because we don't think it's practical.
    - We changed the UI layout of our main page to remove the ability to retrieve items by category. Because we found that the database we were using was not clear on the categories of goods.
    - We added a function that allows users to check their bought history.
    - In the initial proposal, we wanted to run the server locally. Finally, we run our server on 'https://champaigndeals.shop', a real website.

2. Discuss what you think your application achieved or failed to achieve regarding its usefulness.
    - We achieve most usefulness and functionalities we planned in our proposal.
    - We successfully established a dealing platform to fulfill the demand from both sellers and buyers.
    - We also achieve basic CRUD operations, two advanced queries, transactions, and triggers for our database and develop, .
    - But we do not achieve the operation of adding comments under each item. We believe this operation is not very important for our platform currently.

3. Discuss if you changed the schema or source of the data for your application
    - We reduced the number of transactions in our Transaction table because we transact all the 2000 items from our past schema, which means all the items are sold. This is not reasonable because we need to let users find some available items on the homepage.
    - We change all the "Date" variable type into "Datetime" on Item and Transaction tables because we need to record the real time of each item's publishing to always show the latest published items on the top row of homepage

- We add “Price” and “Date” columns in the Transaction table in order to record each transacted item’s price and transaction time.

4. 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?
    - We first divided the user into 2 tables: buyers and sellers. Then, we realized that dividing the user into 2 tables is redundant. So,we finally only use one table to represent all ‘Users’ in the ER diagram.
    - In order to adapt the above change, we also added the other relationship between Users (Table) and Item(Table) which is Publish. We also change the Transaction (Relationship) from one to many to many to many to correct the previous error.

5. Discuss what functionalities you added or removed. Why?
    - We added the google login functionality so that the project would be one more step closer to a real product, plus since every google account is unique we could directly use it as a primary key in the table.
    - We removed the functionality of adding comments under each item because we found this functionality is not useful for our current dealing platform

6. Explain how you think your advanced database programs complement your application.
    - Our advanced query will give the best seller list: union two query each has group by or subquery to constrain different requirements. The output list will help users to find sellers with good past history which provides good experience for a trading platform.
    - Our advanced program that includes transaction and trigger packs several standards to give auto discount before inserting the purchase into the transaction table plus updating the status of purchased item to “sold out” for concurrence resolvement. Our discount mechanism is as following:
        - (Implemented inside transaction) If the total value of all products bought by the user is greater than $1000, 10% off will be given on all the items in categories that the user has bought before.

        - (Implemented inside transaction) If the previous rule is not triggered, and the user has bought less than two items released in 2 recent years, 20% off will be given on any item the user bought.
        - (Implemented by trigger) Upon the previous two rules, every third item the user buys will receive a further 50% off on discounted price.
    - The advanced program using the transaction feature ensures the integrity of data, which improves the stability of the system. Also, the discount mechanism will also attract more customers to the platform and encourage them to make more purchases.

7. 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.
    - Yuteng Zhuang: GCP shell is hard to use and very slow. Using MySQL WorkBench to write sql code is much easier and straightforward.
    - Haiyue Zhang: In order to add foreign keys in tables, we need to add the primary key's column from the original table to the table having foreign keys in order to help the database to make matches.
    - Chang Li : Set a strong password for GCP so that it will not auto terminate your database for a weak security setting
    - Raymond Wu: API provided by MySQL JavaScript client library was difficult to use at first. We did a lot of testing to figure out the behavior of some functions and wrapped several functions to write queries and transactions efficiently.

8. Are there other things that changed comparing the final application with the original proposal?
    - Purchased a domain name and deployed the entire project to that url, which can be accessed by anyone on Google as if it were a real commercial platform
    - Improving front end interactive design to help users easily use our website.

9. Describe future work that you think, other than the interface, that the application can improve on

- Since our data set is from amazon which is pretty large, we haven't implemented the option to set a valid category when a login user wants to sell a new product. This could be fixed by setting a class that constrains the “category” could be chosen when inserting to the table so that users could only select from a given set of categories like the real amazon platform. After that, our algorithm that includes category as a factor will also work for the newly added items. By the way, after this course we will definitely delete all the data from amazon data set and convert it to a real “Champion Deal” website where data is really submitted by people who live here.
- In our advance query section which is displayed in our “discover” page, we have a list of “best sellers”. We could further improve this functionality by offering a detailed page for each “bestseller” that lists that person’s selling page.
- Upload pictures for each item to make our website more fancy.

10. Describe the final division of labor and how well you managed teamwork.
    - In the database part, we together designed the data structures and schemas. Then, Haiyue Zhang configured and deployed the database, Yuteng Zhuang obtained and cleaned datasets, Chang Li developed advanced queries, and Raymond Wu developed indexing on large tables.
    - In the frontend and middleware part, we together designed the user interface. Then, Raymond Wu selected frontend technologies and built the project structure. After that, Chang Li and Raymond Wu developed application pages and middleware functions that access the database, while Haiyue Zhang and Yuteng Zhuang were in charge of integration testing on finished pages, revising database configuration if needed.
    - In addition to meeting in class, we also meet 1-2 times a week outside of class to discuss the project and divide work. Overall, our team functioned in an efficient way and everyone’s unique skill is utilized.