APPENDIX A

User requirements about the DBMS

- Each customer of the platform is identified by an id and has a unique username and a unique email address. Other information about the customer, including password, full name, address, and phone number, is also maintained.

- A customer may have one or more credit cards registered with the website. The credit card number and other related information of the credit card are kept.

- The platform may host many shops. Each shop has a name and a unique shop id. Each shop sells different projects. Every product has a name, color, size, price and description. It may also have one or several photos. A product belongs to a certain product type identified by a product type id. A product type has a description and all product types form a hierarchy - a product type may have one other product type as its parent. Some shops are restricted to sell a subset of types of products only.

- A customer can place an order. Each order is identified by an order id and the date of the order as well as a status ('processing', 'completed' or 'cancelled') is maintained.

- An order may contain one or more order items (products). For each order item (product), we keep the product unit price, the quantity of the product ordered as well as a status ('processing', 'shipped' or 'out of stock'), and some other related information. Each order item may have a sequence number, which is unique within each order. Note that the order price can be different from the product price.

- An invoice is issued for every order. Each invoice carries an invoice number, a date and a status ('issued' or 'paid').

- Payment can be made for an invoice. The payment id, date and the amount are captured. Partial payment to an invoice can be made.

- Shipment will be made for items in a fully paid order. Items in an order may be shipped separately. The shipment id, items, date, and tracking number are recorded for each shipment.

Note that Appendix A only gives the scope of the project, and understanding and defining user requirement is a necessary part of database design in practice. The provided information is not complete. Many aspects of the system's functions and details have been omitted. It is expected that the teams come up with their own solutions in case of inconsistencies or missing information. However, you have to keep track of these aspects and explain your assumptions if asked for the reasons. Extensions to the implementation of the basis system are encouraged. Focus on database design and implementation though, and no graphical/web user interface is required.

APPENDIX B

Queries

- Given a customer by an email address, returns the product ids that have been ordered and paid by this customer but not yet shipped.
- Find the 3 bestselling product type ids in terms of product quantity sold. The products of concerned must be ordered and paid. Whether they have been shipped is irrelevant.
- Return the descriptions of all the 2nd level product types. The product types with no parent will be regarded as 1st level product types and their direct child product types will be regarded as 2nd level.
- Find 2 product ids that are ordered together the most.
- Get 3 random customers and return their email addresses.

Design two queries that are not in the above list. They are evaluated based on the usefulness, complexity, and the interestingness.

Appendix C
Constraints

- When the full payment to an invoice is made, the invoice status is changed from 'issued' to 'paid'.
- When an order item is shipped, its status is changed from 'processing' to 'shipped'.
- When all the products in an order have been shipped, the order status is changed from 'processing' to 'completed'.
- There can be at most 3 payments to an invoice, i.e., if the customer chooses to perform partial payments, the 3rd payment must complete the full amount.
- If an ordered has been paid, either fully or partially, it can no longer be cancelled, i.e., its status cannot be changed to 'cancelled'.