STUDENT NAME: Dylan Govender

STUDENT NUMBER: 221040222

COMP306 – DATABASE SYSTEMS

PROJECT PHASE 1

NOTE: Changes are highlighted in yellow.

An e-commerce start-up, BAMazon, can sell various products, such as physical and digital products, in South Africa. Currently, BAMazon manages its customer base, staff and sales information via spreadsheets, documents, and text files. This system is not ideal because it makes data redundant, and the storage of valuable information is poorly secured. There is difficulty in searching, storing, and sorting information and data when required urgently. BAMazon employed me, Mr Dylan Govender, an upcoming computer scientist, to help them design a new database that centralises essential information and data. I will make an efficient system to sort and access information. After a meeting with the company's board of directors and business analysts, the following system design was a draft:

> A user will sign into their BAMazon account via an email address and a password. In addition to their email address and password, the user has the following attributes: contact number, whether the user is online, first name and last name. BAMazon has four types of users, which are subtypes of the user, namely, customer, seller, shipper, and administrator. At a given time, a user must be one of these subtypes.
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> A customer purchases a product via the BAMazon platform. A customer also has additional information, such as the date, signed in and signed out, and the customer's ID. A customer has a cart which stores the products the customer wants to purchase. The customer's cart will capture the following information: cart ID, the total number, and the total price of all the products in the cart. A customer must only be associated with one customer's cart. A customer's cart must only be associated with one customer, entailing a one-to-one relationship. The customer's cart may associate with many products or none. A product can associate with many carts or none, meaning a many-to-many relationship. A cart detail represents the details of the cart. The cart detail must include the following attributes: cart detail ID, date added, the quantity, and the price of each product (storing product price because if the seller changes or increases the price of a product, during purchasing, the customer will purchase the product at the original price they found it as). A cart detail can be associated with many carts or none, and a customer's cart can only be associated with one cart detail, meaning a one-to-many relationship. A cart detail will also add various product(s), and a product can be added to only one cart detail, entailing a one-to-many relationship.
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> A customer will also have a wish list. A wish list contains the products the customer is interested in but has not yet added to their cart. A wish list will have the following attributes: wish list ID, wish list title, and date made. A customer can make multiple wish lists to store various products. A wish list can only be associated with one customer, meaning a one-to-many relationship. A wish list can be associated with many products or

none, and a product can be added to many wish lists or none, entailing a many-to-many relationship. A wish list detail will represent the details of a wish list and will have the following attributes: wish list detail ID, date added, and whether the product is in the customer's cart. A wish list detail can be associated with many wish lists. A wish list will only be associated with one wish list detail, meaning a one-to-many relationship. A wish list detail will also add various products, and a product can only be added to one wish list detail, meaning a one-to-many relationship.

A customer can order a variety of products. A customer can place many orders. An order has the following attributes: order number, order date, order price, delivery method, the total number of items purchased, and whether the order is active (waiting for payment or cancelled). A customer can be associated with many orders, and an order can only be associated with one customer, meaning a one-to-many relationship. An order can include many products, and a product can be added to many orders entailing a many-to-many relationship. An order detail will represent the details of an order and the products included in the order. The order detail will have the following attributes: order detail ID, quantity, and price of a product. An order detail can associate with many orders, and an order can only be associated with one order detail, entailing a one-to-many relationship. An order detail will be associated with many products, and a product can be added to only one order detail, implying a one-to-many relationship.

An order can be associated with the customer's payment, which has the attributes; payment ID, payment type, payment date, whether the customer paid, shipping cost, and order's total cost. A customer's payment can be associated with only one order, and an order can only be associated with one of the customer's payments, implying a one-to-one relationship. The customer's payment can have the following methods or subtypes; Credit/Debit Card Payment and Cash on Delivery (COD). At a given time, the customer's payment must use either subtype. A Credit/Debit Card Payment has the following attributes: card number, card description, name on card, expiry month (MM), expiry year (YYYY), and CVV number (3-digit number on the back of the card). Cash on Delivery (COD) will have the following attributes: COD ID, signed by the recipient, and the recipient's name who will pay for the order. A customer has an address book that stores the customer's details: such as the street address, complex or building name, suburb, city or town, province, and postal code. An address book ensures a customer's order arrives at the correct location. A customer must only be associated with one address book. An address book will be related to only one customer, implying a one-to-one relationship.

If a customer is unsatisfied with an order: the product of an order is in the wrong size, damaged, or not functioning as described, the customer can submit a return. A return is when the customer wants to return a product to the seller whilst attaining a full refund. A return will not occur for a digital product. A return will not be approved if the product warranty is expired. A return will have the following attributes: tracking number, return date, return reason, return status (current status of the return, such as pending, approved, or rejected), and refund amount. A return is associated with a single customer, and a customer can have multiple returns, implying a one-to-many relationship. A return will have a return detail which stores the information of a return. A return detail will have the following attributes: return detail ID, quantity, and price of each product returned. The return detail will be associated with many returns, and a return can only be associated with one return detail, meaning a one-to-many relationship. The return detail will be associated with many products, and a product can only be associated with one return detail, entailing a

one-to-many relationship. A return will not be associated to any delivery as the customer must arrange for the delivery of their returns' independently of BAMazon.

A seller sells products via the BAMazon platform. A typical seller has the following attributes: seller ID, name, and rating. A seller will also have an address book that will store exactly the same information as the customers' address book. The address book will allow the shipper to pick up the shipment from the correct location. A seller's address book can only be associated to only one seller, and a seller can only be associated with only one address book, meaning a one-to-one relationship.

A seller will sell many products. A product will include the following details: product serial code, title, price, picture(s), description, quantity, type, whether the product has a warranty, and the duration of said warranty. The product will have the following subtypes: the product will be either physical or digital. At any given time, a product must be either physical or digital. A physical product will have the following attributes: size, weight, warranty, and colour, whilst a digital product is a file with the following properties: type and size. A product will only be associated with one seller, and a seller will be associated with many products, implying a one-to-many relationship. A product can have a review which contains the attributes; review ID, reviewer's name, rating, review comment, number of likes, and the date made. A product can have many reviews, and a customer review can only be associated with one product, meaning a one-to-many relationship between the item and the item review. A review is also associated with the customer, where the customer can leave multiple reviews. A customer review can only be associated with a single customer, implying a one-to-many relationship.

A shipper is responsible for delivering the product from the seller to the customer, maintaining the care and quality of the product. A shipper will only transport various physical product(s) from the seller or distributor to a warehouse or the customer's residence. A shipper may have the following attributes: shipper ID, type, and name. Delivery of a customer's product will ensure that the customer picks up their package of products at the correct location. A typical delivery will have the following attributes: delivery ID, date, method (whether to deliver to the customer's house or a warehouse's pick-up point), and status (the current status of a delivery, whether the order is picked up from the seller/distributor, whether the package is in transit, or delivered). Delivery will have the following methods or subtypes: delivery to a customer's house or to a warehouse's pick-up point. At a given time, the delivery can at least be one method.

Delivery to a customer's home or house address will have the following attributes: recipient name and whether the customer signed (if the customer picked up their order). Delivery to a warehouse's pick-up point will have the following attributes: warehouse name, capacity, availability, whether the warehouse is active, whether the shipper dropped off the package at the warehouse, and whether the customer fetched their order from the warehouse. A warehouse will have an address book like the customers' address book which will contain the same information. A warehouse can only be associated to one warehouse address and a warehouse address can be associated to only one warehouse. A warehouse will also have a manager that will take care of the warehouse in case of any emergency or unexpected event and keep contact with the shippers and customers. A manager will be manually entered into the system by an administrator with the following manager's information captured: first name, last name, contact number, and email address. A manager will only be associated with one warehouse, and a warehouse will be associated with only one manager. Delivery will be associated with only one shipper, and a shipper can associate with many deliveries,

entailing a one-to-many relationship. A delivery will have a delivery detail that will store the details of a delivery. A delivery detail will have the following information: delivery detail ID, delivery status, actual delivery date, estimated delivery date, street address, suburb, city or town, province, and postal code. A delivery detail will be associated with many orders and an order can only be associated with one delivery detail. A delivery detail will also be associated with many deliveries and a delivery can only be associated with one delivery detail.

The administrator is the user who manages the system. The administrator will check if a shipper delivered their shipment to a warehouse and whether the customer received their order. The administrator will also ensure a product is valid and not dangerous to the customer. The administrator will also validate and check a customer's product review to ensure it is void of profanity and other unrelated information. The administrator will also check whether a return from the customer has a valid reason and should be refunded. The administrator will have a pivotal role in operating BAMazon's system. The administrator will include the following attributes: whether the administrator is online and the type of job the administrator may do. An administrator will record the changes they made by using their logbook. A logbook will have the following details: logbook ID, the user in effect (the user ID), the time and date of the change, the type of change, and the reason for the administrator's change. A logbook will be related to only one administrator, and an administrator will only be associated with one book, meaning a one-to-one relationship.

This system design is subject to change. If there is a way to improve the system or introduce new entities to unify or intermediate other entities, those changes will initiate appropriately. Other changes may consist of adding various structured or unstructured data, such as pictures and video samples.