# INITIAL DESIGN REPORT

ThingForThing (T4T)

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CSCI3100 Software Engineering - Group 41

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|---|---|
| YAU Tsun Hin | 1155109318 |
| WONG Yik Lee | 1155108532 |
| TAM Siu Chi | 1155110781 |
| WAN Ka Fung | 1155116316 |
| MA Hoi Ching | 1155103921 |

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

# Content

# 1.    Introduction

## 1.1  Project Overview

In this project, we are proposing a trading platform, named ThingForThing (T4T). Unlike common trading platforms nowadays, T4T does not only support using money to trade, but it is also capable for items trading. Which means the users can use a product to exchange for another product. It aims to promote the public's environmental awareness by encouraging the circulation of second-handed items amongst the market. We also hope people can discover more trading chances all around Hong Kong by restructuring the classic online trading platform.

The below sections of this proposal will explain our idea's prototype, our expected market. Followed by a brief background description, which thoroughly discuss on the reasons why we pick this topic and the features of the design. We will then provide details on T4T system's specification and system architecture by using Data Flow Diagrams (DFD) and Unified Modeling Language (UML). The contents of this proposal are only for the client server of our web application.

## 1.2  Objective

In this affluent era, people's shopping styles are dominated by perceptual consumption. For example, around 60% of Hong Kong citizens have at least one piece of unworn clothing items (Junior Chamber International, 2019)[1]. Meanwhile, 88.8% of citizens are not recycling their clothes because of the lack of recycling services and facilities (Junior Chamber International, 2019)[2]. Our application will be just right to solve these problems.

Although we aim to reduce the numbers of unused products waste, it is too hard to get relevant data to indicate the business's success. Therefore, we will consider the number of trades through our platform to be our key performance indicator. We aim to have at least 1000 trades in the first month, followed by a rise of 300 trades per month in our first financial year.

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[1]  Junior Chamber International. (19 May 2019). *香港環保生活習慣*, P.1. Retrieved from http://www.jcihk.org/uploadfile/BTCW%20Press%20release_Final.pdf

[2]  Junior Chamber International. (19 May 2019). *香港環保生活習慣*, P.8. Retrieved from http://www.jcihk.org/uploadfile/BTCW%20Press%20release_Final.pdf

## 1.3  Expected Customers and Market

T4T is a public trading platform for everyone, with no specific segmentation. Everyone with Internet connections can access to our website to buy or sell things with money or items to be exchanged. In early stage, we will focus on Hong Kong market. We hope to cooperate with logistics companies to expand to a transnational business in the future.

## 1.4  System Features

The T4T system is composed with the following features. Details of the interactions between the features are further explained in Section 3 – Specification.

*Login System*: Linked to a user account database to authenticate login process.

*Shopping System*: For buyers to search and order for products to buy. Buyers will input what to buy, how many to buy, and purchasing method.

*Selling System*: For sellers to post items to be traded. Sellers will input what to sell, how many to sell, the newness of the product and even preferred trading method (money or thing).

*Exchange Request System*: Buyers send exchange requests to sellers here. Sellers will receive and choose to accept or not. Buyers will receive result here.

*Payment System*: If the buyers choose to purchase with money in shopping system, they are requested to pay by credit cards. If the buyers choose to trade with thing, they can choose to trade face-to-face, or enjoy our office's items collecting and taking service[3].

*Order Status Checking System*: If the customers choose to user our items collecting and taking service, they can check whether we have received the items here

*Price Estimation System*: A tool linked to a database with information of current market prices of different items. Used items' prices can also be shown by entering newness. This system will return the estimated prices calculated by a depreciation formula.

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[3] Our office will help collect the items from buyers and sellers. Once we have received items from both sides, we will notify them to come to office to take each other's item within a period. This is further explained in the fifth paragraph of Section 2 - Background.

# 2.    Background

Today, in the era of advanced technologies, everything is linked to the Internet. The concept of Internet of Everything (IoE) brings everyone all around the world together, by the powerful Internet. Under this well globalized environment, buying things from places far away is no longer a hard thing. Just by a few clicks, we can successfully purchase for wanted things online.

In the current market, there are a lot of online shopping platforms, such as Amazon, Alibaba, Rakuten etc. In 2018, Amazon and Alibaba posted their revenues throughout the year, which were 232 billion US Dollars and 53 billion US Dollars respectively (Laboe D., 2019)[4]. Ma Yun, the founder of Alibaba, even announced that Alibaba had made trades worth a total of 143 billion of US Dollars during the "Double 11 Event" in 2015[5], which was just an event lasted for one day. After analyzing the current market, we concluded that running an online shopping platform wisely can be very profitable. Therefore, we hope to develop such an application.

However, we wonder whether it is compulsory to trade with money. Integrating with social responsibilities considerations, here comes our new idea: ThingForThing. We hope to eliminate the limitation of people using only money to shop online, and hence allow people to use product to trade with another product. By publishing such platform, we hope to make an epochally flexible online shopping platform for people to buy what they want.

Such function can benefit a lot to the society. First, this function makes great contribution to environmental protection. As the users can choose to use their old products to trade, the application will be able to promote the "Reuse" concept of the 4-R theory in environmental management area. Second, we can stimulate consumption. The global economy is going downslope recently due to the boom of CoV-19. People are panic to spend money because they feel uncertain for the future. To solve such kind of panic, also called money anxiety in Psychology, using "no money" to trade is the best way, which is exactly the most attractive feature of our

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[4] Laboe D. (8 April 2019). *Alibaba Vs. Amazon: Who Will Take Over the World First*. Zack Investment Research. Retrieved from https://www.zacks.com/stock/news/372664/alibaba-vs-amazon-who-will-take-over-the-world-first?cid=CS-YAHOO-FT-372664

[5] 阿里足跡團隊. (11 November 2015). *2015 阿里巴巴雙 11 全球購物狂歡節精彩回顧*. Retrieved from https://www.alibabanews.com/2015nianalibabashuang11quanqiugouwukuanghuanjiejingcaihuigu/

platform.

One more special thing of our application is that we offer "Item Collecting and Taking Service". Not everyone likes to exchange with strangers as it can be dangerous. Hence, we decide to help to get the products from both parties. The customers can then get the corresponding items from our office. It is like the "Documentary Collection (DC)" services offered by current commercial banks[6].

# 3.    Specification

In this section, we are going to explain the operations of the main features. For some features, we have included Data Flow Diagram (DFD) for better understanding.

Customers need to login every time by entering username and password before they use the platform. The username and password entered will be checked for correctness by the account database. The users can start using our application only if the input information is correct.

If the buyers have targeted product, they can input the information of the product for a search. They can also have some random looks of the posted products on our product list. After choosing items to buy with money or trade with item, buyers can choose the way to purchase if the sellers have no restriction on the purchasing choice.

**Buyers choose to buy with money:**
After choosing purchasing method, the order will be generated and sent to order list, and the buyers will be led to the payment system. The buyers will choose the way to get the product. There are two ways to get the product: Exchange with sellers face-to-face or use our "Item Collecting and Taking Service". If the buyers choose the latter choice, they are required to pay by credit cards to our office first. Once the credit card information is confirmed by banks' credit card information database, the payment is successful. Transaction result will be displayed. (Diagram 1)

**Buyers choose to trade with thing (Diagram 2):**
After the creation of order, information will be sent to sellers. Buyers need to wait for accept of exchange request from sellers (Diagram 3). If the seller accepts, the system will send a message to the customer and send the consumed product information to the transaction record database. Also, the product information will be deleted in the list of products. Finally, the exchange record will be displayed.

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[6]  The Hong Kong and Shanghai Banking Corporation Limited. *Documentary Collection.* Retrieved from https://www.business.hsbc.com.hk/en-gb/import-and-export/imports/documentary-collections

**Selling products on our platform (Diagram 4):**

If customers want to sell product, they need to input the information of the product and set the preferred or limited trading method. Then, the product information will be sent to the list of products. Result will be displayed once the item is successfully uploaded to the database.
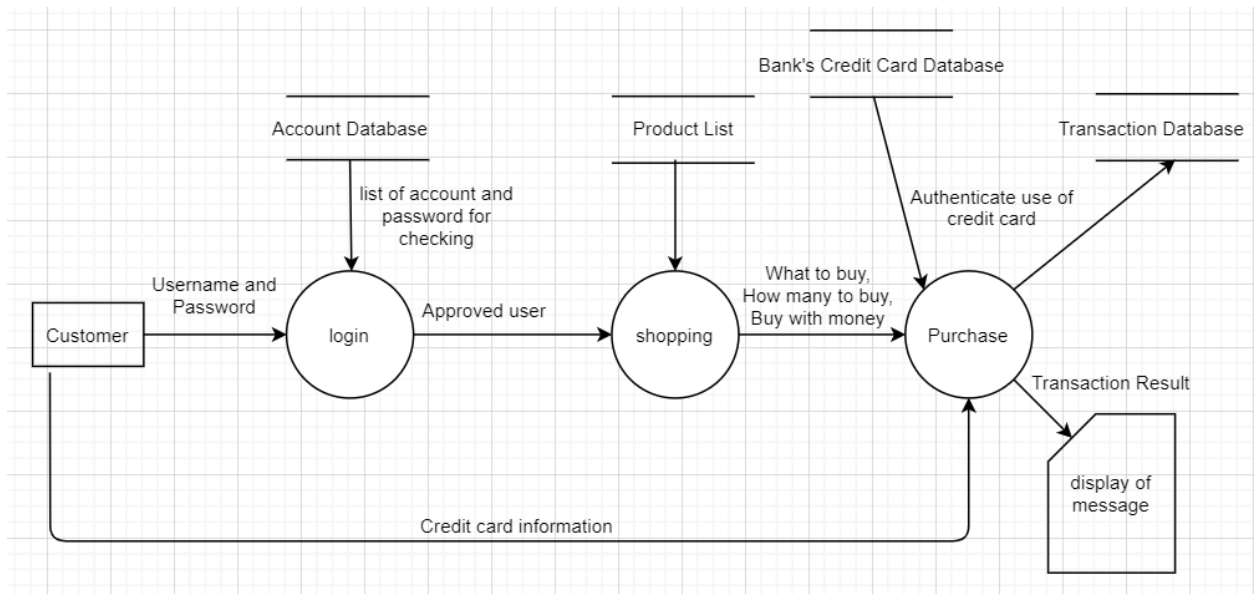


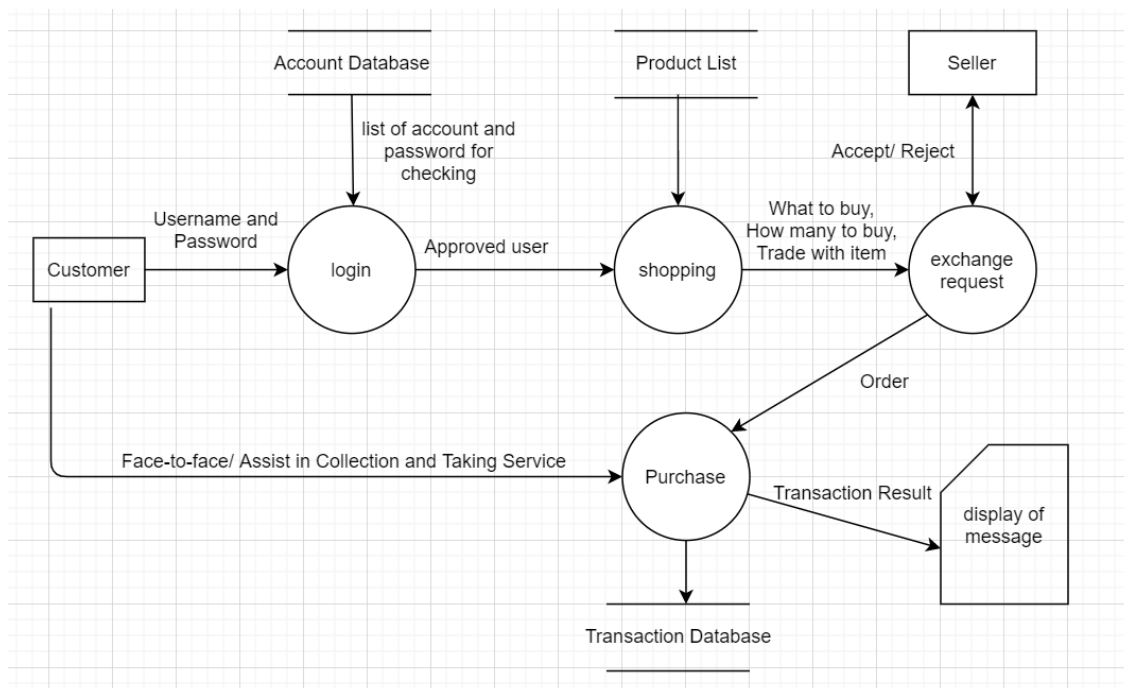Diagram 1: DFD when buyers choose to pay with money and pay with credit cards
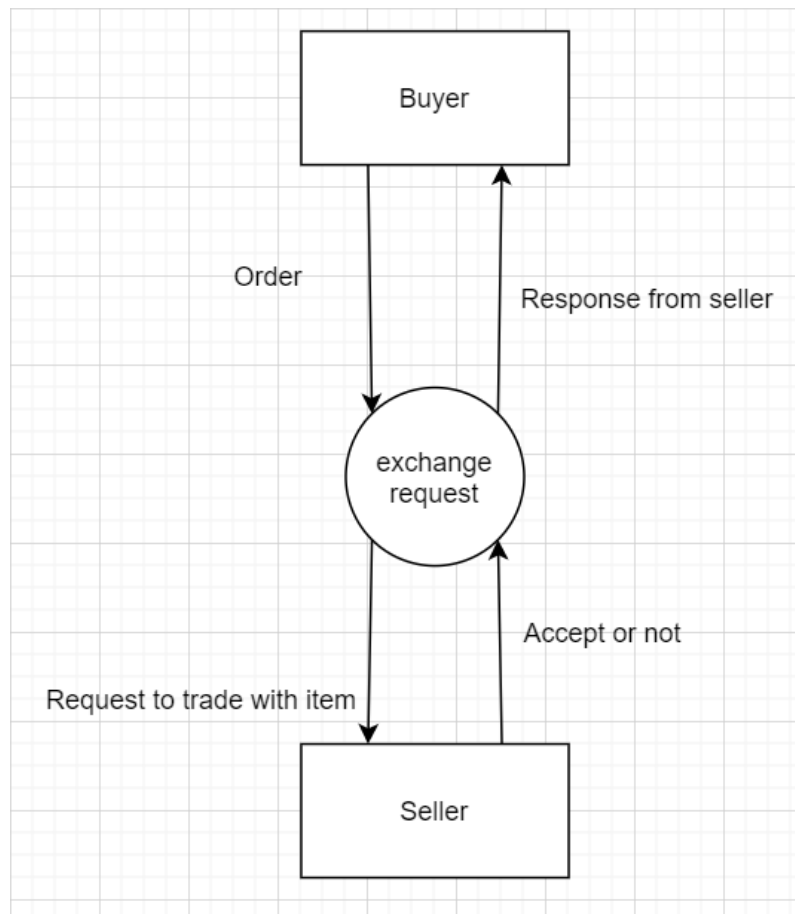


Diagram 2: DFD when buyers choose to trade with item
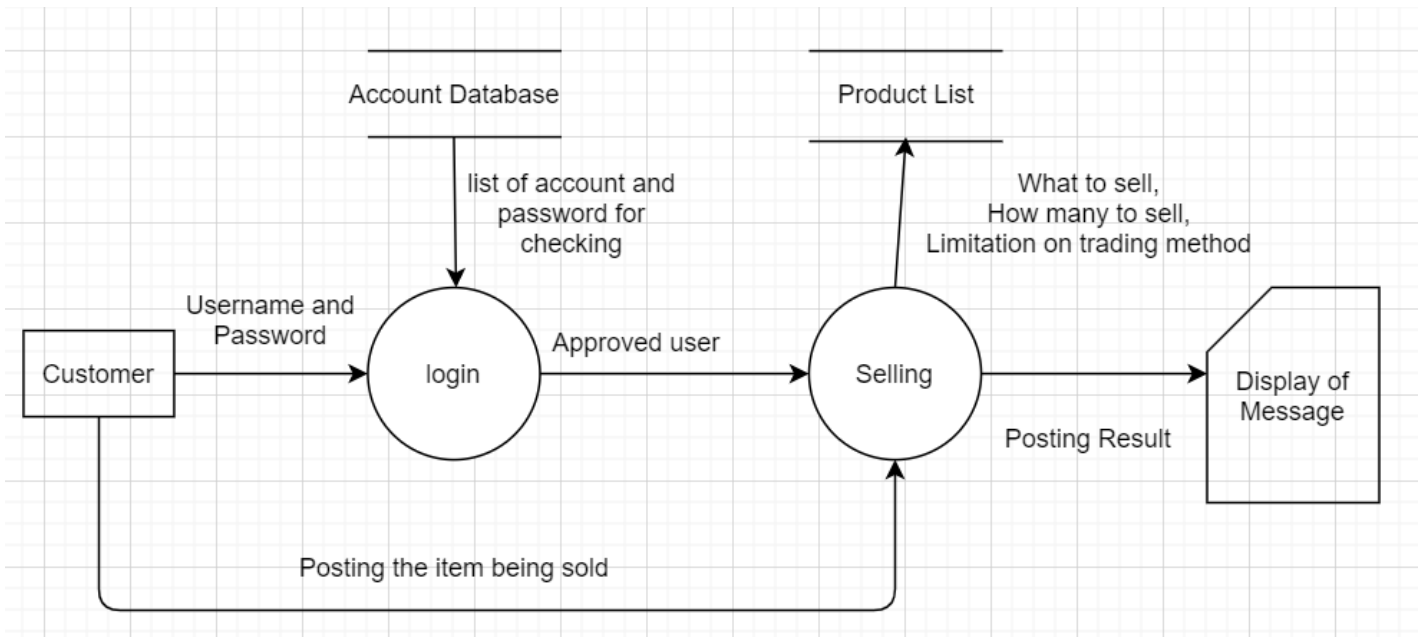
Diagram 3: DFD of Exchange Request System



Diagram 4: DFD of Selling System

# 4. System Architecture

## 4.1 Architecture Diagram

The Unified Modeling Language (UML) Activity Diagram below illustrates the architecture of T4T system. (Diagram 5)
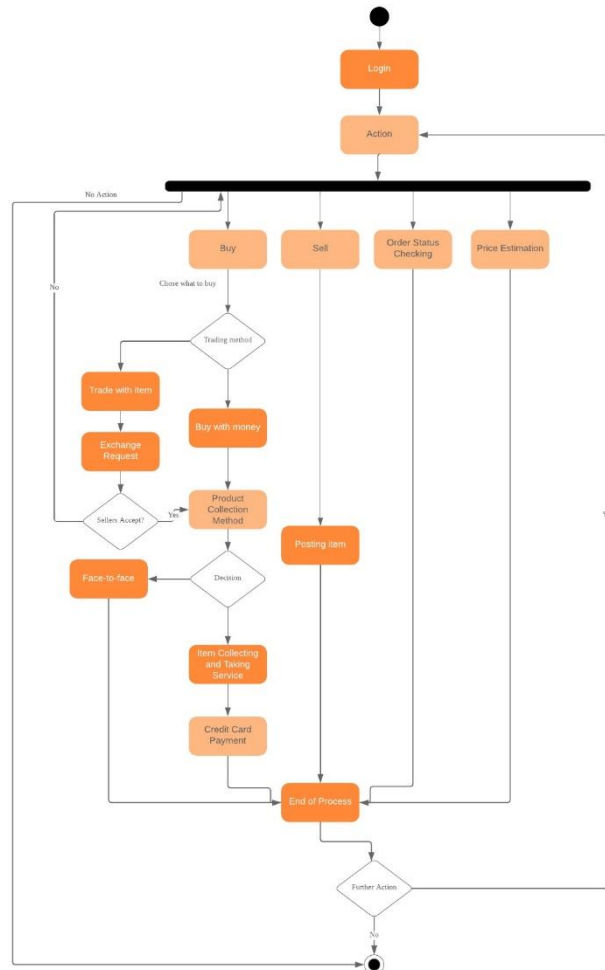


Diagram 5: UML Activity Diagram of T4T's architecture

## 4.2 System Components

The system features can be mainly categorized into three system components:

*Everyone Component*: Login System, Order Status Checking System, Exchange Request System, Price Estimation System

*Buyer-Side Component*: Buying System, Purchase System

*Seller-Side Component*: Selling System

## 4.3  Description of Major System Components by UML

The UML Diagram below shows the linkage of our system components (Diagram 6).
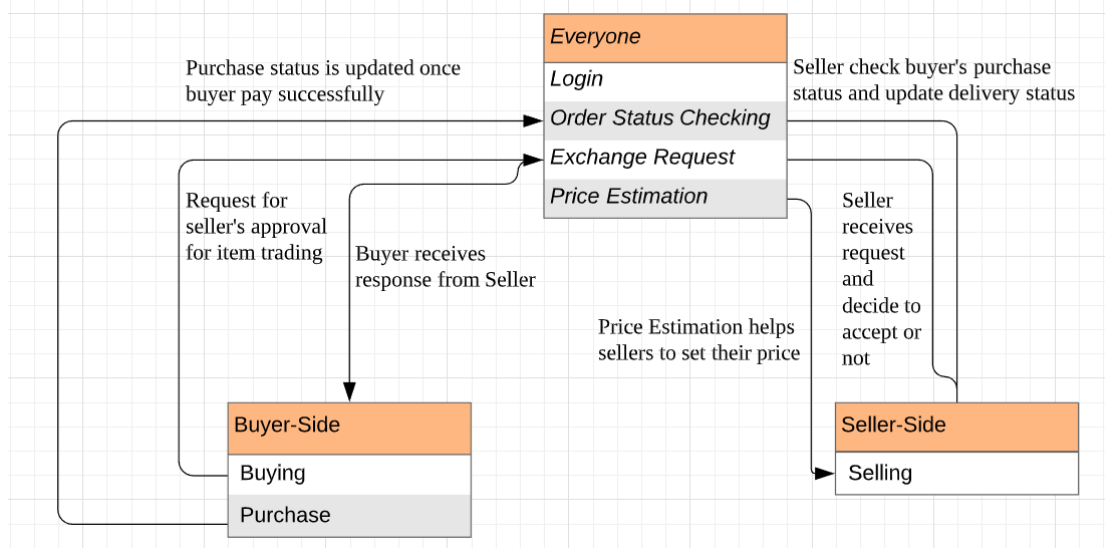


Diagram 6: UML Diagram of Major System Components

# 5.    Reference

The Hong Kong and Shanghai Banking Corporation Limited. *Documentary Collection.*
Retrieved from https://www.business.hsbc.com.hk/en-gb/import-and-
export/imports/documentary-collections

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Zack Investment Research. Retrieved from
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first?cid=CS-YAHOO-FT-372664

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uigu/