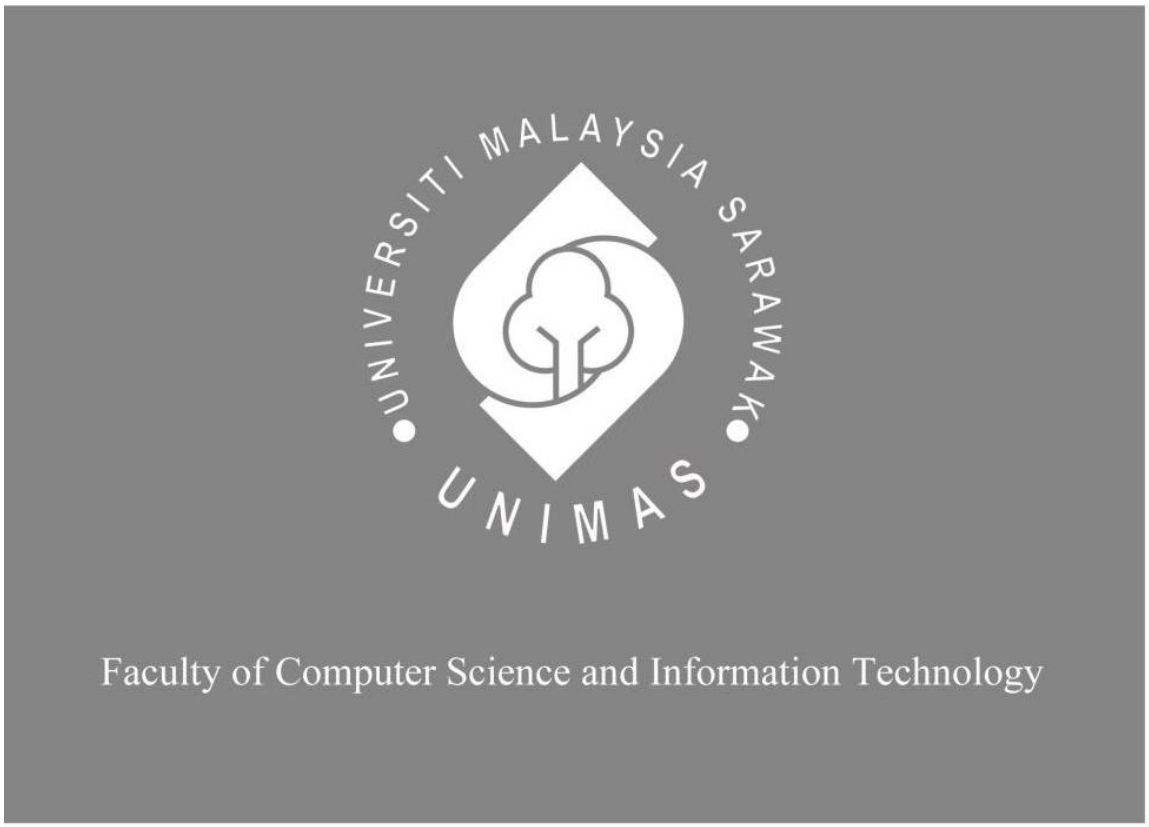

e-Recycle for PreLoved Items

Goh Kai Yen

Bachelor of Computer Science with Honours
(Network Computing)
2020

E-RECYCLE FOR PRELOVED ITEMS

GOH KAI YEN

This project is submitted in partial fulfillment of the requirements for the degree of
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GOH KAI YEN

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GOH KAI YEN 14th July 2020

Faculty of Computer Science and Information Technology

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Abstract

Solid waste is one of the major environment problems in Malaysia. People have the will to throw rubbish properly, but only minority of them will recycle the recyclable garbage. They may not realize that not all garbage to be thrown away are truly garbage, those garbage were thrown away might be due to they are no longer needed by the owner, but yet, still have good usable values. Thus, a proposed system is designed for the purpose of providing an online platform for users to search and sell those reusable unneeded items. The significance of this project is able to help users to handle their unneeded but still reusable stuff in a more appropriate way. For sellers, they can sell their old stuff to earn back some money or give away for free, also they are being able to learn how to promote their items effectively via the designed platform, at the same time, help those people who in need. For buyers, they can buy their needed items in a lower price or even getting free. Not only that, the result of this project will improve the cleanliness of the environment. In order to build a good web-based system, Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD) is needed to determine the flow of the system and the contents of the system database. Wireframe is designed as a blueprint of the proposed system so that designer will have an overall view of the system design. Also, waterfall model is used as a methodology in completing this project. Lastly, the aim of this project is to design a web-based online platform for users to let go their still-usable stuffs and to put up request and look for desired used item. Another objective of this project is to develop a system which can automatically inform interested users about the availability status of the posted items.

Abstrak

Sisa pepejal adalah salah satu masalah alam sekitar utama di Malaysia. Kebanyakan orang mempunyai kesedaran untuk membuang sampah dengan cara yang betul, tetapi hanya minoriti akan mengitar semula sampah. Mereka mungkin tidak menyedari bahawa tidak semua sampah yang dibuang adalah benar-benar sampah, sampah-sampah yang dibuang mungkin disebabkan pemiliknya tidak lagi memerlukan mereka. Sampah tersebut masih mempunyai potensi untuk digunakan lagi. Oleh yang demikian, sebuah sistem akan dicadangkan dengan tujuan menyediakan platform kepada pengguna untuk mencari serta menjual barang-barang yang berpotensi digunakan semula. Kepentingan projek ini adalah membantu pengguna mengendalikan barang-barang yang tidak diperlukan, tetapi masih boleh digunakan, dengan cara yang lebih sesuai. Bagi penjual, mereka dapat menjual barang lama mereka untuk mendapatkan wang tambahan atau memberikan barang lama secara percuma. Bukan itu sahaja, dengan platform ini, penjual dapat belajar cara mempromosikan barang-barang mereka dengan berkesan, pada masa yang sama, dapat membantu orang yang memerlukan bantuan. Bagi pembeli pula, mereka dapat membeli barang keperluan mereka dengan harga yang lebih rendah atau mendapatkan barang tersebut secara percuma. Di samping itu, hasil projek ini akan meningkatkan kebersihan alam sekitar. Demi membina sistem berasaskan baik, Rajah Aliran Data serta Rajah Hubungan Entiti diperlukan untuk menentukan aliran sistem dan kandungan pangkalan data sistem. "Wireframe" juga akan direka sebagai pelan sistem yang dicadangkan supaya pereta bentuk web komputer akan mempunyai pandangan keseluruhan reka bentuk sistem. Seterusnya, model air terjun akan digunakan sebagai metodologi untuk menyelesaikan projek ini. Akhir sekali, matlamat projek ini adalah merekabentuk platform mesra pengguna untuk pengguna melepaskan barang-barang yang boleh digunakan dan mencari barang yang disukai. Objuktif lain projek ini adalah untuk membina sistem yang secara automatik yang dapat memaklumkan pengguna yang berminat tentang status ketersediaan item yang diposkan.

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Chapter 1: Introduction

1.1 Introduction/Background

In past decades, tremendous of garbage produced every day is fulfilling landfills quickly, resulting serious pollution and increased global warming. This become the most concerning issue in our society nowadays. Recycling is considered a small solution for a big problem like global warming, but it can also have a huge impact in our daily life. It is a simple and cheap solution with a massive impact in the reduction of pollution. In a country like Malaysia, adopting a law that establishes permanent recycling practices not only can increase the awareness and importance of recycling, but also preventing the world from falling into wastes and pollutions. However, this law is still paper talk only in Malaysia. Our government has indeed made a lot of effort into encouraging people to practice recycling, such as providing recycling bins in every household area, but people still ignore the importance of recycling by just simply throwing all garbage into the common bins. Lack of law enforcement is one of the factors that contribute to this phenomenon. Today, many of us are educated about the importance of recycling and its good impact on the environment. Indeed, recycling can definitely help in protecting our world from being destructed by pollutions, but it requires everyone to lead by example.

There are also many professionals who have put forward many proposals to solve the problem of garbage. One of a common solution that had been proposed is using Internet of Things (IoT) applications in waste management operations, an automated route optimizing of garbage pickup trucks (Writer, 2019). The working behind of this solution is about developing a sensor-enable and internet-connected garbage bins which can detect the level of garbage in bins, temperature, location or any information that sanitation department finds useful (Writer, 2019). With this implementation, garbage collectors are able to know the specific full garbage

bins and its location where they located, resulting reduce time wasting in collecting the garbage. Also, most importantly, garbage collectors able to collect garbage before it gets odor, thus improving the cleanliness of the environment. However, this solution is just solving a problem without stamping out its root cause, because it does not do any recycling functions. More and more garbage still will be produced.

In terms of recycling, it is never not just about the basic recyclable materials, including papers, plastics and aluminum cans. The normal way of recycling is about recycling on materials, which is processing the used materials into some new and useful products. Generally, the process included crushing the whole thing and melting it into its original form, then turn it into another new product. However, what if the item is actually can be reused again? This is the concept that this paper wanted to bring out, recycling on goods instead of recycling on raw materials. This concept is about "recycle" among people, recycling those usable products as the second-hand item, also known as preloved item, to a new owner, which can prolong the usage life span of that item. Examples for these usable items, which can become preloved item for other users, are such as mattresses, kitchen utensils, electronics, etc. Therefore, in this project, the purpose of proposing a web-based system is to create an online platform for people to let go their still-usable stuffs and to look for desired used item. This solution not only can reduce waste, but also practice recycling. When people start to have a habit to recycle things among themselves, this may lead to the manufacturer reduce the production of that particular products, due to people start to search second-hand stuff rather than buying a new one. Thereby reducing the mass of collecting our Mother Earth's resources, and also less garbage produced due to people do not simply throw any reusable things. This is the so-called butterfly effect; a simple decision or action can have a big impact. A simple recycling action can protect our Mother Earth from deterioration.

1.2 Problem Statement

Solid waste is one of the major environmental problems in Malaysia. Even though government had acted on this problem such as providing recycle bins in every household area or educate people to do recycling, but this problem still cannot be solved effectively. People are willing to throw litter properly, but only minimum of them will recycle the recyclable garbage. This may be because of feeling of troublesome, hence a lot of the so-called garbage are not fall into the three common recycling categories. Furthermore, not all garbage to be thrown away are truly garbage, they were thrown away because they no longer needed by the current owners. Some of the garbage to some people they still have usable values which can either be given to new owners of need or could still be sold off for some additional cash. Examples for these reusable items are such as mattresses, kitchen utensils, electronics, and so on.

Generally, recycling is a process of collecting and processing the used materials into a raw material that can be formed into a brand-new product or item. Common recyclable materials are paper, plastic and metal cans or aluminum but not all solid wastes are for recycle bin, some are still functional and can be “recycle” to a new owner if give a platform for such recycling. In my opinions, materials that still have good reused value can be recycled in another unique way which is recycle among people.

Let’s smaller the project target scope to University Malaysia Sarawak (UNIMAS). Campus students especially the graduated students are the target of this project because majority of them want to sell their unwanted but still reusable stuff to earn back some money, but there are owners may want to give away their old stuffs for free. There is no such platform available within the campus to allow them to interact for the recycling of still usable items.

1.3 Scope

The project target scope is University Malaysia Sarawak (UNIMAS) students and staffs. Also, the system is accessible via any web browsers.

1.4 Aims and Objective

i. To design a web based online platform for students and staffs to let go their still-usable stuffs and also to put up request and look for desired used item.

ii. To develop a system which can automatically inform interested students and staffs about the availability status of the posted items.

iii. To conduct functional and user testing to test the proposed system.

1.5 Brief Methodology

The goal of this project is to propose a web-based system for users to post and request items. In order to achieve this goal, good programming skills is needed. Also, for this project, 20 students will be randomly selected as the tester to test the proposed system. The only restriction on choosing the participants as the project tester is he or she must be a UNIMAS student or staff. This is because this web-based system is purposely designed for the UNIMAS users. The participants will learn to use the system and give feedbacks after used. The testing phase of this project will be at least two to three weeks.

Waterfall model is used as a methodology in completing this project. Waterfall model is a cascade Software Development Life Cycle (SDLC) model, the development process is like

a water flow, a sequential order, moving step by step via the phases of analysis, design, implementation, testing, deployment and support. Every phase has its own objective and mission to be done in order to move to next phase. The reason of using this SDLC model is because it is simple to use and easy to understand, in addition, it is ideal for a small project where the requirements are clear and not equivocal. Of course, the benefits of one things must have its shortcomings. One of its biggest drawback is even a small detail left incompletely in the one of the phase, it can totally delay the progress of the whole process. Therefore, this system proposed should be plan cautiously. Not only that, waterfall model is not suitable for any long-term or complex project because it is quite a straightforward methodology. Despite of the drawbacks that brings by waterfall model, it still considers the best methodology for this project because it is a short-term individual project and the requirements for proposed system is simple and clear. Figure below show the phases in waterfall model.

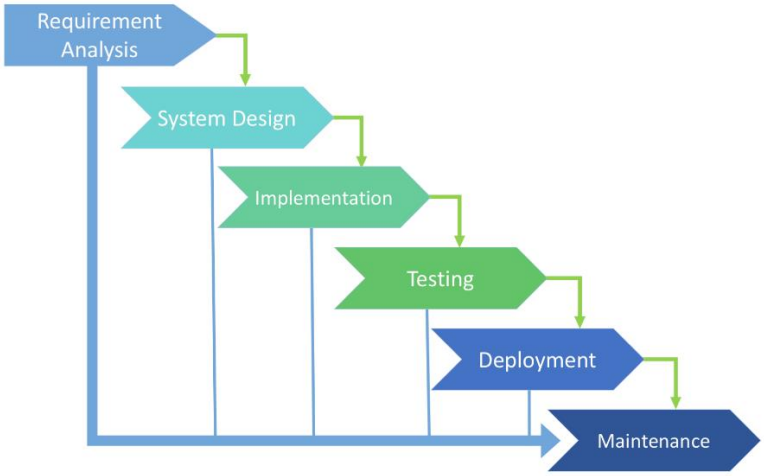

Figure 1. 1 Waterfall model. Reprinted from SDLC models explained: Agile, waterfall, V-shaped, iterative, spiral, by V. Osetskyi, 2017, Retrieved from https://medium.com/existek/sdlc-models-explained-agile-waterfall-v-shaped-iterative-spiral-e3f012f390c5. Copyright 2019 by A Medium Corporation. Reprint with permission.

Throughout these six phases in waterfall model, the first four phases will be carried out in this project which are requirement analysis, system design, implementation and testing. The last two phases are not relevant for this project because the system proposed is just a working prototype.

1.5.1 Requirement analysis

Possible requirements of the system developed are analyzed and drop down in a specification document. This phase also involves understanding the needs of system design, the system's functions or features and the system's purpose. Item sorting is one of an important feature that need to be considered in this phase. Also, analyze the types of input and output that needed to be include in the system database are considered in this phase.

1.5.2 System design

System design is prepared according to the requirements specification that studied from the first phase. Data flow diagram and entity relationship diagram (ERD) will be designed for the flow of system and contents of system database. In addition, programming languages and software are decided in this phase. Wireframe will also be designed as a blueprint of the proposed system. Specify the system requirements will helps in defining the overall system architecture. Besides, the software code to be written in the next phase is created.

1.5.3 Implementation

The actual development of the web-based system take place in this phase. With the inputs from the system design phase, the system is first developed in small programs or units. Unit Testing is used to test the functionality of every developed code unit.

1.5.4 Testing

Integrate the unit tested code and test it to make sure if it works expected. Test case is used in testing all the testing activities to make sure that the system meets the requirements. 20 randomly selected students will test the system. Report the testing activities.

1.6 Significance of Project

The result of the project will be of great benefit to the following:

UNIMAS students and staffs. The result of the project will assist students and staffs to handle their unneeded but still reusable stuff in a more effectively way. For sellers, they can sell their old stuff to earn back some money or give away for free, also they are being able to learn how to promote their items effectively via the designed platform, at the same time, help those people who in need. For buyers, they can buy their needed items in a lower price or even getting free.

UNIMAS. The result of the project will improve the environment of university, a clean environment for both students and workers. Also, the university authorities do not need to spend extra money in solving the garbage problem.

1.7 Project outline

The report will be split into five chapters.

Chapter 2: Literature Review

This chapter reviews researches done, facts and existing systems that are related to the project. The resources are taken from books, journals, web documents, conference papers and so on.

Chapter 3: Methodology

This chapter is about the methods and overall framework taken in building the web-based system. Software requirements are included in this chapter also. Besides, waterfall model will be explained in more details.

Chapter 4: Implementation and Testing

This chapter reports on the implementation and testing of the system proposed. The testing is made based on the unit testing and test case to test the functionalities of the system.

Chapter 5: Conclusion and Future Works

This chapter is about the summary of the final year project 1 and the future progress that need to be done in order to complete the whole project. The summary is based on the chapters that have been discussed in the project.

Chapter 2: Literature Review

2.1 Overview

This project is proposed for the main purpose of providing an online platform for UNIMAS students and staffs, where both seller and buyer can do posting and requesting their desire preloved items, in addition, advocating the spirit of waste recycling among students in order to reduce the increasing of garbage. The goal of this chapter is to bring insight of the existing online shopping web-based systems, which is consumer-to-consumer (C2C) eCommerce, as well as the study on how the system works and the system's features. Albeit the literature covers a wide area variety of such system, the review will be focus on three existing online shopping systems, which are eBay, Mudah.my and carousell, and the project proposed system, UNIMAS Online Preloved System. Moreover, comparison between the three existing systems and the proposed systems will be discuss in this chapter also.

2.2 Existing System Review

2.2.1 eBay

eBay was originally an online auction site, which allows users to list items for sale and to bid on them in auctions and the highest bidder won the items (Brunelli, 2019). However, it is becoming more than just an auction platform for users, eBay became a worldwide online marketplace, where a place for sellers to list items at a fixed price or even start their career as operating a virtual online "shop" (Brunelli, 2019). In eBay, there are both new and preloved items can be sold. The way that eBay works, au fond, is a seller lists an item, following by adding photos and descriptions for the selling item, then decide a price for it and choose the desire shipping options (Brunelli, 2019). Also, seller able to set the terms of the auction,

including the shipping method, payment method and return policy (Frost, 2018). On the other hand, the buyer can choose whether want to bid on the sale item or just straightly choose “Buy It Now” option, which not include any auction sale items. A variety of payment methods can be chosen by the buyer when a deal has made, and lastly, the seller ships the sold item to the buyer. When the transaction is over, feedback is given by both seller and buyer, to each other, about the process of sales and the quality of the item sold (Brunelli, 2019).

As a seller, he or she need to be registered as an eBay member in order to sell items. After register successfully, click “Sell”, at the top of left corner of main page, to start selling items. Then, eBay will provide form for seller fill up the selling items’ details. After that, click “List”, at the bottom of the page, to post the items to the sale platform.

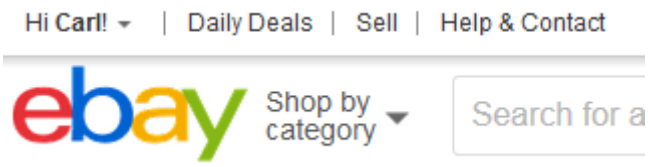

Figure 2. 1 Press “Sell” to if want to start creating platform to sell items.

For buyer, there are search bar and two drop down list options for them to search desire items (shown in figure 2.2). By default, eBay will show users all the relevant listing based on what they searched. Near the top of the page, there are two options for user to choose, which are “Auction” and “Buy It Now”. If the user wants to buy the item right away, click the “Buy It Now” button. This will narrow the search so that user can only see items being sold for buy it now option (show in figure 2.4). Some sellers will allow buyers to make offers on items they have for sale. Auction is chosen if users want to search items for bid on to try and get a good deal. This will narrow the search so that user can only see items being sold in auctions. The seller will decide the date and time for each eBay auction to end (show in figure 2.5). The