



EX-SELL

Proposal

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Submitted to—

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Contents

Executive Summary	3
Statement of Problem	4
Objectives	5
Technical Approach	7
Needs of Customers	8
Target Specifications	8
Technology Consideration	10
System Architecture/Platform	10
Project Management	11
Deliverables	12
Budget	13
Communication and Coordination with Sponsor	15
Team Qualifications	15
Conclusion	16
References	16
Appendix A: Résumés of Team Members	17
Yiu Hong Sum	17
Bryan Lim Kian Hock	18
Cheng Yang Zhen	19
Lim Yan Jun	20
Soong Jie Ming	21
Chen Zhenni	22
Chang Keat Leung Aaron	23

Executive Summary

With the rising dominance of e-commerce, retailing is undergoing a seismic shift. With e-commerce such as Alibaba, Shoppe, Amazon, etc, E-commerce is becoming the preferred shopping method for many people. This convenience for users, in turn, brings about an easy and convenient way for people to buy products at the comfort of their own home. Internet sales are increasing rapidly as consumers take advantage of lower prices offered by vendors operating with less margin.

Ex-Sell is envisioned with this in mind, to integrate and provide a convenient online shop where everyone is able to buy and sell products from an organisation/school. Ex-sell aims to provide a platform where students and staff are able to sell past and current university resources, such as textbooks and previously used items. Ex-sell aims to provide a platform for students who are interested in Entrepreneurship to start off a small business using the platform we provide.

With these considerations in mind, Ex-Sell will be developed to accommodate every user and provide a convenient platform for them to access. In addition, Ex-sell can be moved further onward by providing the same service to different organisations and schools through different domains.

Statement of Problem

E-commerce has transformed the landscape of the world in the way things are done on a global scale. Never have people been able to interact in such a cost-effective and efficient way. Currently, there exist many of e-commerce platforms such as Carousell, Shopee, and Taobao targeting audiences in a larger scale both either locally or internationally.

Problems such as the ease of transaction for the buying and selling of past and current university resources, such as textbooks and previously used hall items, are some problems that NTU students commonly face. University modules often requires students to buy textbooks, which are often expensive and unused after a semester ends.

Presently, there exists no such application or website in Singapore that allow both students and staffs to make sales transactions within the NTU community itself. NTU provides a marketplace for in iNTU for students to buy old computer or computer parts that the school is no longer using. However, it does not provide a platform for students to make transactions among themselves.

An alternative application existed in the form of Carousell Campus Marketplaces, where users can join a closed group to buy/sell items. However, there are many limitations such as:

- Campus Group is not widely advertised
- There is no category filtering within the group
- Graduates are still able access the group

We believe that this idea could be developed further and better integrated to bring greater convenience to the users by allowing them to buy and sell and trade university resources via our E-commerce platform.

Objectives

The purpose of this project is to propose a comprehensive solution to the mentioned problem above. Ex-sell is an e-commerce platform, created mainly for the ease of transaction to facilitate the buying and selling of past and current university resources for existing NTU students and staff. Ex-sell will be implemented as a web application.

The target audiences for the web application's will be mainly for the NTU community, who will use the application to sell their unwanted hall items or textbook, or even purchase second hand hall items or textbooks. By setting the target audience to be the NTU community, transaction can be done within the compound of NTU, providing greater ease of convenience for buyers and sellers to complete the transaction. This movement will reduce the wastage of unwanted stuff and improving on the reusing of the resources.

For security purposes, this will be a closed platform which requires NTU students to create an account using their school email, and be verified in order to gain access to the website, ensuring that there will not be any hoax, suspicious accounts or illegal transaction appearing on the website.

The key features in the web application is:

1. Purchasing second hand hall items or textbooks
 - a. Users will select the item he/she decided to purchase
 - b. Item details will be displayed, including image and price and description
 - c. User click on purchase button
 - d. Application will notify seller that a user wants to purchase the item
 - e. After transaction, seller will have logged into platform to list item as sold.

2. Updating item on sale post
 - a. User can click on item on sale of the user
 - b. Application get data of the item from database and display to the user
 - c. User can make edits to the item
 - d. User click save button to make changes to database
3. Selling second hand hall items or textbooks
 - a. Seller will upload a photo of item on sale (from gallery or take a photo) with sales price and descriptions of the item.
 - b. Application will list the item as on sale with the server time as timestamp.
4. View purchase or sale history
 - a. User will click on history tab to view the past transaction
 - b. Application will retrieve the history's transaction, selling or buying.
 - c. Application will display the date of purchase and selling price and seller/buyer info
5. Live Support
 - a. User will be able to contact and have a live chat with the operator should there be a problem
 - b. For communication purposes between user and operator
6. Login and Registration
 - a. Login
 - i. Users will be able to login to their account through their school email and password
 - ii. The verification will be done server side
 - b. Registration
 - i. Registration is done on a secure site using HTTPS format.
 - ii. To ensure accountability and integrity, registration will use the school email of the user
 - iii. Application will validate the user's email with the school's email database

- iv. Once validated, application will send a 2FA authentication code for the newly-registered user to enter before activating the account.

These objectives were taken in consideration based on the best-case scenario. Following that, we will be explaining the constraints and limitation of system.

One constraints will be getting access to the school's email database system. Due to security reasons, Singapore's Personal Data Protection Act, does not allow third party to access to personal data without the consent of the university and the users involved. Only on agreement from both the user and school, then would we be able to be allowed to access the database system.

Another constraint is that due to the limited time frame which we will be working with Web application for this system, this system will not be developed on the Android or Apple iOS platform. While this would limit and be counterproductive to the objective of this system, by being able to focus on one platform, we will be able to focus more resources and effort on the mobile application and move forward to the iOS or Android platform when the mobile development on Web is stable.

Technical Approach

Plan of Action

Our project will be adopting the Agile software development methodology. Agile will aid us in focusing on getting out an initial prototype for us to test and obtain feedback from. It also provides us the capability to include new functions or refine old ones. This way, we can ensure a more continuous delivery of our software product as well as ensuring quality work that targets the user requirements.

To provide an overview for the project, we will first list out the methods that we will be using to elicit our user requirements. Next, we will discuss how we would tackle the needs of our target audience, as well as providing a list of technology that we will be considering to incorporate into our systems. Finally, we will state briefly the architecture and platform that we will be utilising for our product.

Customer Needs

To understand our customer needs, we first inspect current implementations of commerce, both physical and digital. We will be looking at the limitations of two business models for the current university marketplaces used in NTU - box shops, and current online available e-commerce systems such as carousell or shoppee.

Our main source of information will come from crowd surveys on students in NTU. The questions will be targeted at the limitations of the above-mentioned business models. We will also be conducting short interviews with students to better understand the current scene of commerce in NTU. From the limitations of current commerce implementations, we will then design our solution to neuter each of these limitations.

Target Specifications

Based on the survey done by students of NTU, we are able to list down several limitations that our web application needs to tackle. The survey results will be divided into two subsections to better facilitate reading.

Limitations of box shops:

1. Pricey - Students must pay a certain amount of rent in order to put their items on display within box shops.
2. Inconvenient - Students must approach the shop to rent out display spaces and also bring their items physically with them.

3. Timing - Box shops are very limited to its opening hours and so items will only be on display or can be purchased during these hours, limiting sales potential.

Limitations of online e-commerce:

1. Present campus groups not widely advertised on other campus marketplaces
2. No specific e-commerce systems targeted at NTU.
3. E-commerce systems that presently contain groups for students have no category filters for products.
4. Past students are still able to remain in such groups.

After analysing these limitations, our present solution will include these new implementations:

1. Our system Ex-Sell will be hosted on a web platform to be available for buying, selling, and posting of trade items virtually all the time.
2. Only current students can access our Ex-Sell website. Accounts of old students will expire.
3. Ex-sell will include category filtering as well as search bar functions to aid users in looking for specific products.
4. We will utilise NTU communication channels such as NTU chronicles to advertise our e-commerce platform.

The limitations and solutions offered above will be taken into consideration. However, we have also noted that this list is non-exhaustive and will be added on in the future.

Technology Consideration

For our project, these are some of the technological considerations for consideration:

MySQL Server	Database to store User profiles
Digital Ocean	Web host
IIS Server on Windows	Web server
.NET framework 4.7	Framework for ASP.NET
Bootstrap	Framework for HTML & CSS
Visual Studio Enterprise 2017	Main Integrated Development Environment Software

System Architecture/Platform

We will be using Microsoft Visual Studio 2017 to develop our application based on the .NET 4.7 Framework. We are proposing to base the application off the 3-tiered architecture, which comprises of the Presentation, Business and Data Layer. This architecture decouples our project, allowing for software modularity and well-defined interfaces. This essentially allows upgrades and changes to be done to any of one module without affecting the system. We will also be using the Data Access Object Pattern will also be used in the retrieval of essential data from the database.

Also, it decouples the logics between the controller and the database, allowing upgrades and new logics to be included, without affecting the functionality of the system. As this is a web development interface, we would be including the use of Bootstrap, a front-end framework containing HTML and CSS templates. This is an essential choice as by using this framework, front-end development can be made simpler and quicker, while ensuring the quality of the interface due to the well-tested framework.

Project Management

This section presents the timeline for our project and the list of duration estimated to complete each task for our project. We have also included the expected deliverables on fortnightly and monthly basis to allow our stakeholders to keep track with the progress that we have made.

The project will start from 29th January 2018 - 26th March 2018. Our team are divided into two teams - the Documentation & Design team and Developer team.

Tasks managed by the Documentation & Design team are such as:

- Creating the user case diagram and use case description
- Designing the dialog map, sequence diagram and user interface
- Specifying the hardware and software interfaces
- Creation of SRS that specify the overall descriptions of the product in details

Task managed by the Developer team are such as:

- Creating the Class Diagram, Sequence Diagram and Architecture Diagram
- Implementing the codes and functions to create the desired applications
- Performing multiple test runs to ensure that the apps function smoothly
- Releasing the Beta prototype and gather the feedback to further improve the apps

The overall project will be divided into several phases - Planning, Concept development, System-level design, Detailed design, Testing and Product release.

1. Planning phase - Roles & Responsibility assignment, Timeline & task scheduling
2. Concept Development phase - Brainstorming, creation of Use case diagram & description
3. System-Level Design phase - Task definition and estimation.

4. Detailed Design phase - creating the necessary features (database server & website UI, etc.)
5. Testing phase - perform White Box and Black Box test
6. Product Release phase - release of the beta version for public feedback before the official product release.

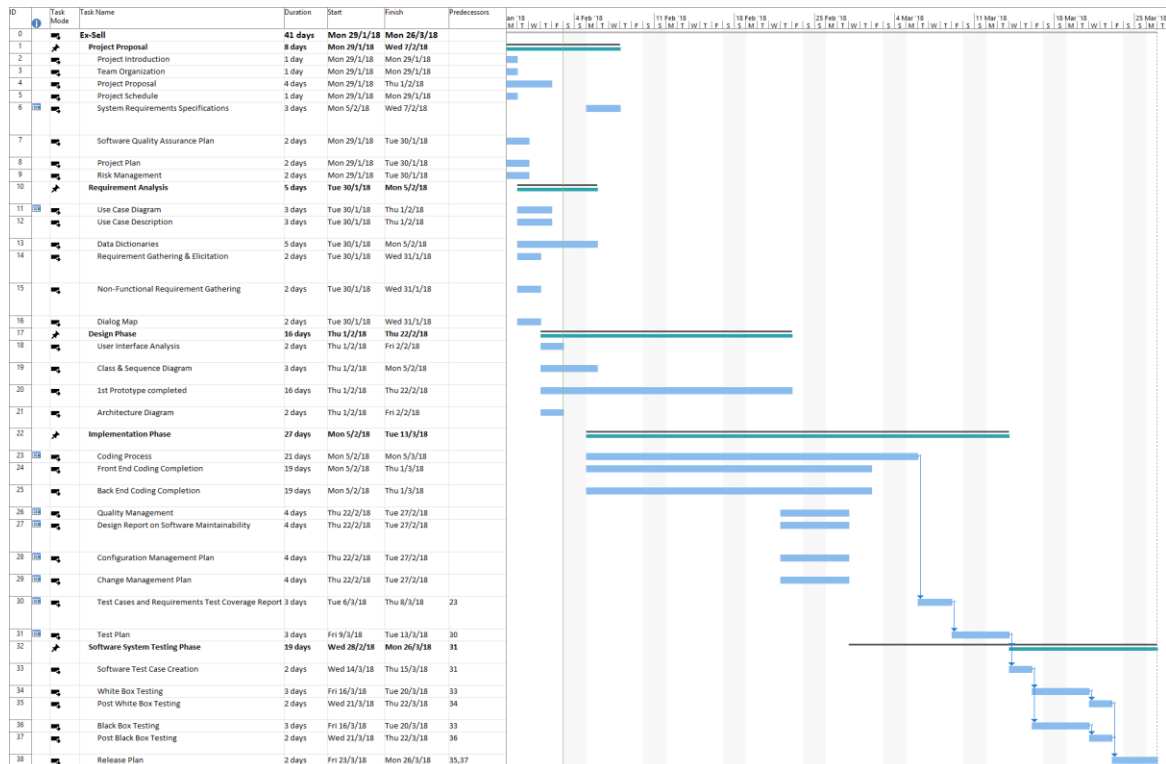


Figure 1: Gantt chart for the project. The solid bars indicate the portions of the tasks that we have accomplished.

Deliverables

The followings are lists of the deliverables the stakeholders can expect to see and the time when it is expected to be completed or delivered.

Item Deliverables	Estimated completion date	Final deadline date
Project Proposal	29th January 2018	7th February 2018

First round design draft and Use case diagram & Use Case description	12th February 2018	15th February 2018
Software Requirement Specification	Reviewed on every first day of final week of the month	26th March 2018
Quality Management	Reviewed every Monday	26th March 2018
Software Model Prototype	22nd February 2018	26th February 2018
Risk Management	22nd February 2018	26th February 2018
Design report	22nd February 2018	23rd February 2018
Configuration Management Plan	22nd February 2018	27th February 2018
Change Management Plan	22nd February 2018	27th February 2018
Release Plan	23rd March 2018	26th March 2018
Test Plan and Documentation	23rd March 2018	26th March 2018

Budget

The followings are the requested items and the amount of funds required to assist in the initial stage and later stage of the design process. The total cost estimation for the whole project is expected to not exceed \$44,000 dollars. This includes the administration and software development cost.

We will be separating the cost of the application into three parts, mainly Software, Hardware, and Human Resource Costs. Also, as this project will span

three months, we will be breaking the costs down into 'One-Time Costs' and 'Monthly Costs'.

Table 1: Requested items and funds for initial design

Tools/Item	Details	Quantity	Estimated One Time Cost	Estimated Three-Month Cost
Hardware				
Web Server	Digital Ocean	1	\$7,000	\$0
PC	HP Pte Ltd	7	\$7,000	\$0
Network Attached Storage	Western Digital	1	\$1,000	\$0
Software				
MySQL Management Tool	Oracle	1	\$2,000	\$0
Microsoft Visual Studio 2017 Enterprise License	Microsoft	7	\$7,000	\$0
Human Resource				
Project Manager		1	\$0	\$5,000.00
System Developer		3	\$0	\$9,000.00
Quality & Release Manager		3	\$0	\$6,000.00

Cost			\$24,000	\$20,000
Total Cost			S\$44,000	

Communication and Coordination with Sponsor

The communication and coordination with the sponsors will be done throughout the whole project duration by the various channels such as: Teleconferences, Face-To-Face meetings & Meetings.

Team Qualifications

Our team is made up of a group of professionals who have strong soft and technical skills that is relevant to the project. The resumes of each individual member can be found in Appendix A.

Hong Sum is a ScrumMaster certified project management professional with 7 years of experience. He has accomplished 8 different projects while working with both PriceWaterHouseCooper LLP and Accenture which were all completed on time and within budget. He oversees the project to ensure that there are no delays in development and the desired result is achieved.

Bryan has shown great understanding of software architecture while working at A*STAR where he helped to bring the projects to completion. He also has a strong knowledge in programming languages like C# as well as source control and management tools.

Yang Zhen is an experienced UI/UX Designer with strong knowledge on HTML5, CSS3, bootstrap, Javascript frameworks and jQuery. She was in charge of the front-end development while in XXX.

Yan Jun have a strong knowledge of back-end programming languages such as PHP, .NET and Javascript. He is also equipped with a strong background in developing web applications and using relational database systems.

Jie Ming is an experienced QA Manager with a ISO 9000 quality control certification. He has also demonstrated strong knowledge of methodologies of quality assurance and standards while working with Jewel Paymentech.

Zhenni have demonstrated her quality assurance capabilities during her stay in Websparks where she was in charge of creation of well-structured test plans and test cases as well as reporting bugs in great detail.

Aaron is a professional who has scripting experience in Linux as well as strong programming background. He also has a strong knowledge in using Git and great communication skills.

Conclusion

Ex-Sell will be a breakthrough to accommodate every user and provide a convenient platform for them to access. It can be moved further onward in the near future by providing the same service to different organisation and schools through different domains.

References

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- SimplyJesMe: Qoo10 vs Lazada vs Carousell vs Shopee - A comprehensive guide to online platforms. (2018). Simplyjesme.blogspot.sg. Retrieved 1 February 2018, from <https://simplyjesme.blogspot.sg/2018/01/qoo10-vs-lazada-vs-carousell-vs-shopee.html>
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Appendix A:

Résumés of Team Members

Yiu Hong Sum

Blk 447 Bright Hill Drive, #19-119

Singapore 570447

Contact: 96693127

Email: YIUH0001@e.ntu.edu.sg

Project Manager

Profile

ScrumMaster certified project management professional with 7 years of experience

Education

Bachelor's Degree in Computer Science
Nanyang Technology University, Singapore
2013

Skills

- Proficient in Microsoft Office
- Proficient in C#, Java and HTML

Work Experience

IT Project Manager

Accenture

June 2013 – December 2017

- Responsible for creating and managing individual project budgets.
- Track progress against timeline, milestones and budget, revise as needed.

Project Executive

PriceWaterHouseCooper LLP

Jan 2010 – May 2013

- Assisted company in manual verification to ensure that there is no false positive

Reference

Available on request.

Bryan Lim Kian Hock

Blk 411 Pasir Ris Drive 6, #10-391

Singapore 510411

Contact: 91371197

Email: KLIM050@e.ntu.edu.sg

Lead Developer

Profile

Skilled professional with strong understanding of software architecture

Education

Bachelor's Degree in Computer Science
Nanyang Technology University, Singapore
2015

Skills

- Proficient in C# and Java
- Proficient with Microsoft SQL

Work Experience

Back-end Developer

A*STAR

June 2015 – December 2017

- Helped with the software architecture of a web application for resource management and increasing productivity for company
- Oversee the whole development, and involved in the code development of the web application

Reference

Available on request.

Cheng Yang Zhen

Blk 578 Hougang Ave 4, #07-644

Singapore 530578

Contact: 81288836

Email: YCHENG021@e.ntu.edu.sg

Front-end Developer

Profile	UI/UX Designer with 2 years of experience
Education	Bachelor's Degree in Computer Science Nanyang Technology University, Singapore 2019
Skills	<ul style="list-style-type: none">• Proficient in BootStrap, CSS3, HTML5, Javascript, JQuery
Work Experience	UI/UX Designer Singtel June 2015 – December 2017 <ul style="list-style-type: none">• Responsible for UI design for all web-based projects
Reference	Available on request.

Lim Yan Jun

Blk 363 Tampines Street 34, #06-353

Singapore 520363

Contact: 81683800

Email: YLIM085@e.ntu.edu.sg

Back-end Developer

Profile	Experienced Developer with strong knowledge of programming languages
Education	Bachelor's Degree in Computer Science Nanyang Technology University, Singapore 2020
Skills	<ul style="list-style-type: none">• Proficient in .NET, PHP, AJAX, Java and C
Work Experience	Full Stack Developer GroupStar December 2015 – December 2017 <ul style="list-style-type: none">• Contributed to full stack development for projects which emphasize on browser manipulation.
Reference	Available on request.

Soong Jie Ming

Blk 296D Compassvale Link, #09-87

Singapore 544269

Contact: 90289372

Email: JSOONG004@e.ntu.edu.sg

QA Manager

Profile

Experienced Test Lead with a ISO 9000 QC Certification

Education

Bachelor's Degree in Computer Science
Nanyang Technology University, Singapore
2019

Skills

- Skilled in Test Automation
- Proficient in C#

Work Experience

QA Test Lead

Jewel Paymentech

June 2015 – December 2017

- Performing and assigning of quality assurance testing activities
- Assigning QA engineers with tasks
- Ensuring testing is done within the deadline with all bugs reported in clear detail

QA Engineer

Paypal Singapore

Jan 2014 – May 2015

- Perform test assignments given
- Responsible for recording steps to encounter bug

Reference

Available on request.

Chen Zhenni

Blk 685 Race Course Road, #10-332

Singapore 210685

Contact: 97365716

Email: ZCHEN035@e.ntu.edu.sg

QA Engineer

Profile

Experienced QA tester who is familiar with user acceptance tests and creation of test cases

Education

Bachelor's Degree in Computer Science
Nanyang Technology University, Singapore
2020

Skills

- Proficient in C#, .NET, Java & C++

Work Experience

QA Engineer

Websparks Pte Ltd

June 2016 – December 2017

- Responsible for creation of test cases
- Responsible for internal testing for bugs in any way that may affect user.

QA Tester

Dyna Q Asia Pte Ltd

Jan 2015 – May 2016

- Perform QA tests according to test cases/ test plan
- Produce clear and concise bug reports

Reference

Available on request.

Chang Keat Leung Aaron

Blk 194 Kim Keat Ave, #10-390

Singapore 310194

Contact: 98551266

Email: ACHANG007@e.ntu.edu.sg

Release Engineer

Profile	Experience Release Engineer with strong knowledge of programming languages
Education	Bachelor's Degree in Computer Science Nanyang Technology University, Singapore 2020
Skills	<ul style="list-style-type: none">• Proficient in Git• Experience with scripting in Linux• Proficient in C++, C, C#, Java & Lua
Work Experience	Release Engineer Pangaea Interactive August 2015 – December 2017 <ul style="list-style-type: none">• Responsible for maintaining source control branches and performing integrations with merge conflicts.• Responsible for releasing pipeline from code compilation, automated testing, to deploying releases to multiple environments
Reference	Available on request.