

# **Development of AJAX – Based Inverse Auction Website**

By

Do Kim Dieu

Dissertation submitted in partial fulfillment of  
the requirements for the  
Bachelor of Technology (Hons)  
(Business Information Systems)

NOVEMBER 2008

Universiti Teknologi PETRONAS  
Bandar Seri Iskandar  
31750 Tronoh  
Perak Darul Ridzuan

# **CERTIFICATION OF APPROVAL**

## **Development of AJAX – Based Inverse Auction Website**

By

Do Kim Dieu

A project dissertation submitted to the  
Business Information System Programme  
Universiti Teknologi PETRONAS  
In partial fulfillment of the requirement for the  
BACHELOR OF TECHNOLOGY (Hons)  
(BUSINESS INFORMATION SYSTEMS)

Approved by,

---

(Mr. Mohd Hilmi bin Hasan)

Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

November 2008

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

---

DO KIM DIEU

## **ABSTRACT**

When a person is superfluous of something and another is lack of something, there is a need of exchanging. That was the time when commerce was born to act as a useful platform to satisfy the needs from both the sellers and buyers. Nowadays, with the rapid increase of Internet and all of its applications, E-commerce has no longer been an unfamiliar term to most of the world. E-commerce has been gaining more and more recognition and positive support from its users. There are various kinds of e-commerce scheme to be developed to meet the changing needs in this globalizing world.

The purpose of this report is to introduce a platform for the sellers and buyers to exchange goods effectively with the new mechanism applied, which is called “Inverse Auction”, or in specific, “lowest unique bid auction”. This “new-invented” mechanism is being developed as a new feature in the online shopping website to attract more user participations by bringing them more values and conveniences. The report presents how the system works, how better the proposing website can deliver the products, services to the users, as well as the methodology, tools, techniques needed to implement the project successfully within the timeframe. This paper also shows some researches on the existing websites that are applying the same concept into their business to help bring the deeper understand on lowest unique bid auction and contribute to the improvement in the project design and implementation.

## **ACKNOWLEDGEMENT**

This thesis arose in partial fulfillment of the requirements for the Business Information Systems Program – University Technology Petronas as a Final Year Project. It is a result of the two semesters researching and implementing with the continuous and tremendous guidance, help and support from a great number of people that I would be pleased to convey my gratitude to in my humble acknowledgement.

First of all, I would like to express my gratefulness and sincere thank to Petronas Sdn. Bhd for granting me a priceless scholarship. The scholarship has brought me a precious chance to approach and gain a huge amount of knowledge with all the needed facilities available in University Technology Petronas, Malaysia.

In the second place, I would gratefully acknowledge Mr. Hilmi Hasan – my project supervisor for his advice, supervision, guidance, crucial comments and support from the very early stage of this project as well as giving me extraordinary experiences throughout the work. I have always highly appreciated his support during my first starting days of the project when I was stuck in some issues. Without it, I may not have finished the project in time.

It is my pleasure to pay tribute also to Ms. Norshuhani for her crucial recommendations since the first stage of the project design that dramatically contribute to the whole success of the project.

My special thanks go to my two brothers, Hoang and Kien who have been assisting, guiding and fully supporting me throughout the project implementation. They have raised me up every time I felt down, taught me how to stand still after falling, and most importantly, how to deal with stress to resolve the problems effectively. They have also

provided me some useful references that contribute to the success of the project. I have been indebted in them more than they may know.

Words fail me to express my appreciation to my Dad and Mom, for all the love and care, tangible and intangible assets they have given me. They are the ones who have put the fundament to my learning character, inspiring me, and being sacrificed for my best in everything. They have always been lending me the shoulders to lean on any time I need. The success of the project, together with the success in my future career would be an invaluable present that they expect me to return them.

I was extraordinarily fortunate to have such good friends, who have always been beside me, sharing and understanding me, motivating me to keep going on with the project.

Last but not least, I would like to thank all lecturers from ICT/BIS department who directly and indirectly assessed and gave important comments/recommendations for me to complete this dissertation, as well as express my apology for not being able to thank personally one by one.

## TABLE OF CONTENT

<b>CERTIFICATION OF APPROVAL</b>	.	.	.	.	.	<b>i</b>
<b>CERTIFICATION OF ORIGINALITY</b>	.	.	.	.	.	<b>ii</b>
<b>ABSTRACT</b>	.	.	.	.	.	<b>iii</b>
<b>ACKNOWLEDGEMENT</b>	.	.	.	.	.	<b>iv</b>
<b>CHAPTER 1: INTRODUCTION</b>	.	.	.	.	.	<b>1</b>
1.1. Background of Study	.	.	.	.	.	1
1.2. Problem Statement	.	.	.	.	.	2
1.3. Objectives of the Project	.	.	.	.	.	3
1.3. Scope of Study	.	.	.	.	.	3
<b>CHAPTER 2: LITERATURE REVIEW</b>	.	.	.	.	.	<b>5</b>
2.1. Review on Lowest Unique Bid Auction.	.	.	.	.	.	5
2.2. Previous Implementation of Inverse Auction.	.	.	.	.	.	7
2.3. Innovations on the Development of AJAX – Based Inverse Auction Website	.	.	.	.	.	16
<b>CHAPTER 3: METHODOLOGY</b>	.	.	.	.	.	<b>19</b>
3.1. Procedure Identification.	.	.	.	.	.	19
3.2. System Design and Development.	.	.	.	.	.	19
3.2.1 Methodology	.	.	.	.	.	19
3.2.2 System Architecture	.	.	.	.	.	23
3.2.3 AJAX Architecture	.	.	.	.	.	28
3.2.4 Tools/Equipment required	.	.	.	.	.	29
<b>CHAPTER 4: RESULT AND DISCUSSION.</b>	.	.	.	.	.	<b>30</b>

<b>CHAPTER 5:</b>	<b>CONCLUSION AND RECOMMENDATION.</b>	<b>48</b>
5.1	Conclusion . . . . .	48
5.2	Recommendation . . . . .	48

**REFERENCES**

**APPENDICES**



## LIST OF FIGURES

Figure 1: Winning condition in Humraz Auction House. . . . .	14
Figure 2: Prototyping Methodology . . . . .	20
Figure 3: Use-case Diagram for UTP Bid System. . . . .	21
Figure 4: Flow Chart Diagram of UTP Bid System . . . . .	25
Figure 5: Logical Architecture of the UTP Bid System . . . . .	26
Figure 6: AJAX Interaction with XMLHttpRequest Object. . . . .	28
Figure 7: Comparison between Classic and AJAX Web Application Model. . . . .	28
Figure 8: Details of Results of Question A1 . . . . .	31
Figure 9: Details of Results of Question A2 . . . . .	32
Figure 10: Details of Results of Question A3. . . . .	33
Figure 11: Details of Results of Question A4. . . . .	34
Figure 12: Details of Results of Question B1 . . . . .	35
Figure 13: Tools used by UTP students when selling. . . . .	35
Figure 14: Tools used by UTP students when buying. . . . .	36
Figure 15: Awareness of Lowest Unique Bid concept. . . . .	37
Figure 16: Homepage of UTP Bid System. . . . .	40
Figure 17: Register Page . . . . .	41
Figure 18: Sell Page . . . . .	42
Figure 19: Site Fees Page . . . . .	43
Figure 20: Messaging Site . . . . .	44
Figure 21: Bidding Site . . . . .	44
Figure 22: Selling Site . . . . .	45
Figure 23: My Account Site . . . . .	45
Figure 24: Download Speed Comparison . . . . .	40
Figure 25: Effectiveness of the System . . . . .	47

## LIST OF TABLES

Table 1: Example of a possible result at the end of the Auction	12
---	----

## ABBREVIATION AND NONMENCLATURES

AJAX	Asynchronous JavaScript and XML
CMS	Content Management System
HTML	HyperText Markup Language
UTP	University Technology PETRONAS
WAMP	Windows Apache MySQL PHP
WWW	World Wide Web

# CHAPTER 1

## INTRODUCTION

### 1.1. Background of Study

No one can deny the fact that this is the era of information technology. Information technology, with Internet applications, has been growing rapidly. Sharing information, even to a large number of people, though in far distances, has never been easier. This impossible action in the past (before 90s) can now be done thanks to the World Wide Web (hereinafter referred to as WWW) development. WWW is the part of the Internet that consists of pages linked to each other around the world. Everything now is put in the WWW for the purpose of delivering the information to as many people interested as possible. Hence, WWW is the best way for advertising in which the information on the products can be delivered to a large number of customers with the lowest price.

Mentioning to the “price”, it is obvious that each customer wants to buy an item with the lowest price as possible with the same level of quality. Having been well aware of this psychologically feeling, a so-called inverse auction method has been “invented”. Inverse auction is implemented in the opposite way of normal auction. Inverse auction has been categorized into two sub-types: highest unique bid auction and lowest unique bid auction, whereby the latter is the most common and welcome. Lowest unique bid auction is an inverse auction method in which the winner of the bidding is the one that places the lowest but unique price for the products bidden.

The two marvelous things described above become a perfect tool when they are combined in one: A website with the inverse auction mechanism for advertising the products as well as bidding function in order to give a chance for a customer to buy a quality product with the cheapest price. This is most encouraged by students, who have high demand of buying things but limitation of money.

## **1.2. Problem Statement**

University Technology PETRONAS (hereinafter referred to as UTP) is a well-known university with quite a lot numbers of students. From years to years, many students are graduating from UTP to begin their career, and simultaneously, many new students are entering UTP to begin their university life. Students who are going to graduate, especially international students, have many used things that they would like to sell, and, on the other hand, students who have just entered UTP, would like to buy many things to settle up their own small lives. Currently there is no effective tool for them to find each other, the supplier, and the demander. Moreover, students often have limitation of money and they have a lot of things to spend money on. Especially to a new student, who has just moved from family to start his/her own uni-life, spending money is not easy. And, just like others, students obviously would like to buy things with the cheapest price with same level of quality.

Before the implementation of the project starts, a survey has been conducted properly. It shows that there are approximately six thousand (6,000) students in UTP and nearly ninety percent (90%) of them have a need of buying and selling things. Currently, what they often do when they have things to sell/buy is to inform/ ask around the housemates, course mates juniors, seniors... Some have posted advertising in the bulletins... But according to the study, all of these are not really effective due to the fact that it reaches to a limitation of people and the information posted in the bulletins must be approved by the Student Support Services and is limited in terms of duration of posting.

There have been several websites using lowest unique bid auction for shopping online but due to research, none of them have been targeted to the students in the universities, hence the categories of the products do not really meet the needs of the students. The result of the research also shows that there is a need for implementing an inverse auction website for students, in which students can have information on available things for sold, categorized accordingly and they can bid for the lowest price for the things they desire.

In terms of loading web page speed, it has always been a big problem to the small-scale environments like universities where the bandwidth usage is limited. Limited bandwidth can cause the slow response when transferring data or moving from page to page which brings lots of inconveniences to the users. In an e-commerce website, this should be strictly avoided in order to better compete with millions of other e-commerce websites offering the same products and services.

### **1.3. Objectives of the Project**

To develop an online shopping system that:

- *Acts as an effective and efficient platform between sellers and buyers:*
  - ✓ Available searching function allows users to search for products categorized accordingly in the website.
  - ✓ AJAX technology will be applied to enhance the response speed of the system.
- *Carries an easily manageable administration feature:*
  - ✓ Build Content Management System to bring ease and convenience to administrators to manage the site.
- *Inverse Auction Mechanism:*
  - ✓ Inverse Auction component helps attract more users to participate and use the site.

UTP Bid system is built with the aim to be a feasible solution for the problem stated. Firstly, it is a website which acts as a platform for the buyers and the sellers to meet each other, to share and view information on the products available to be sold. These products are listed into different categories with search engine available for more users' ease to find the desired products. Secondly, it carries the lowest unique bid auction mechanism which can help the buyer to buy a product with a fraction price compared to the one with same quality in the market. The winner of the auction is the one that places the lowest but unique price for the item bidden.

Besides introducing the concept of lowest unique bid auction; UTPBid, with the built-in search and categories simplifies finding ads, three-tier architecture, and especially being developed by AJAX technology, serves as an effective and efficient tool for buyers and sellers to find each other and the first one to implement in the university to meet the students' needs.

#### **1.4. Scope of Study**

The project should focus studying on the web service technology, especially client-server architecture. The study should also cover some components of a web service such as web server, database server, script to generate dynamic content, three-tier architecture... These are some main tools going to be used to implement the project in the next phases. The author also needs to study on ASP.NET and PHP as the main programming language, as well as AJAX as the main technology to build the system. Last but not least, a proper research on the existing lowest bid auction system on other current websites should be conducted in the process of choosing the best model to be implemented in UTP in particular and in universities in general. Considering real situation and the needs from students in UTP, the author has come out with the system architecture as well as the development life-cycle for the most effective plan. The project will be implemented in 3 phases with 3 particular versions:

- Phase 1: to set up the web platform for development.
- Phase 2: to do research on lowest unique bid auction system and how to integrate it into a website.
- Phase 3: to research on the payment system, create ad listing, search and categories simplifies finding ads, site administration using Content Management System (CMS), to convert the system(s) in the appropriate format supporting on the web server.

It should also be noted that inverse auction includes i) highest unique bid auction and ii) lowest unique bid auction, but due to time constraint and the feasibility of applying the technique to the real university environment, this project will only focus on implementing the lowest unique bid auction.

For the purpose of commercialization in the future, the project also has another achievement to obtain: the system should be developed as a web content management system which allows authorized person to submit the content of the web even without any technical knowledge of HTML or the uploading of files.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1. Review on Lowest Unique Bid Auction

As mentioned above, inverse auction is categorized into two types: highest and lowest unique bid auction. Within the scope of this project, we only discuss on the latter since it is more suitable to students. In lowest unique bid auction, the winner of the bidding is the one who has placed the *lowest* price for that item, and, that price must be *unique* (not duplicated). To facilitate this, these auctions have to accept bids that are exact to the pence (*Please refer to APPENDIX A – How to Win the Lowest Unique Bid Auction*). "We're more like a game," Rob Lawson, one of the San Mateo, Calif.-based of Limbo company's three founders told internetnews.com. "You can always win at eBay with the highest bid, but with Limbo you don't have visibility into what everyone else is doing." You can bid up to twenty times a day [1]. During the process, before the end of bidding time is set, all bidders normally will immediately see on the website if their current bid is lowest unique or not. The member will also get updates during the auction to know if their lowest bid is overridden or not. This feature also helps encourage the participants to continue bidding until they get the prize. The more they bid, the more chances they can win the prize with a fraction of price.

The variation from the traditional style auction system is that the auction result is awarded to the **Lowest Unique Bid** when the predetermined Required Number of Bids has been met and the auction is closed. Each Bidder is required to pay an Administration Fee in order to place a Bid. This is best illustrated with the following example:

Apple iPod Shuffle 1 gig - Recommended Retail Price: \$199

Required number of Bids: 200

Administration Fee: \$2.75

At the end of the auction the lowest ten bids may look like this:



Bid 1: \$0.01

Bid 2: \$0.01

Bid 3: \$0.02

Bid 4: \$0.02

Bid 5: \$0.02

**Bid 6: \$0.03 Lowest Unique Bid**

Bid 7: \$0.04

Bid 8: \$0.04

Bid 9: \$0.05 Unique, but not the lowest

Bid 10: \$0.06

Bid No.6 is the *Lowest Unique Bidder* and is awarded the auction result and would have to pay only 3c. (S)He has therefore purchased an article for \$3c (Bid Amount) + \$2.75 (Admin Fee) = \$2.78 = 1.4% of the Retail Price (\$199)!

You may raise a question “So how can the auction site get profit with the fraction price of the item?” It is understandable to raise up this question, but the idea for making this kind of business successful is equally simple as well. In unique bid auction, each bidder is charged for placing each of their bids. The auction site then will get the total payment from the bidding fees of every bidders participating for each bid, plus the value of the bid winning. In most cases, the number of participants is often huge enough to not only cover the cost of the item bidden, but also bring a lot of profit to the site. That is how the system works and how the site gain profit. On the other hand, the winning bidder also can buy the quality product with much cheaper price. Both parties gain benefit. That makes this kind of auction more interesting than others ever. The market for reverse auction websites continues to grow, one of the leading UK reverse auction websites is bringing in over £70,000 profit per month. [2]

We should also take into account that this kind of auction is not a sort of gambling or lottery. Based on a judgment by Ofcom (Office of Communications) the UK broadcasting

watchdog, (ref: Ofcom Broadcast Bulletin Issue number 68 - Sep 4, 2006 [3]) they may also be considered 'genuine auctions' as people bid to secure the purchase of a product, therefore the goods are for sale and not prizes.

“People say to avoid the obvious, like a penny. Well, if everybody knows to avoid that then nobody will actually bid it, making it the BEST possible choice! When something is so obvious that nobody will do it then you should be unique and give it a shot. Mathematically it's the only certain winner, and psychologically it's actually a pretty good bet as well. In a similar auction a bar of gold bullion was won with the bet of single pence because everybody thought that it was too obvious. I think mathematically the number picked vs. probability of winning would be algorithmic decay. The psychological graph would be a bell curve. You want to make your bid where the lines intersect. Obviously this is an art rather than a science. The number of entrants, how many times you can bid, and whether you know if you're winning or not are all variables that will affect your strategy.” [4]. This quote has shown that lowest unique bid auction is a “genuine auction” rather than a lottery. And this statement can be proved by the working paper **Unique Bid Auctions: Equilibrium Solutions and Experimental Evidence** [5]. They have done a very good analysis of this exact problem.

## **2.2. Previous Implementation of Inverse Auction**

According to Monderer & Tennenholtz, 2000 [6], “in a single-unit auction, an indivisible good is offered for sale to one of many potential buyers according to some commonly known rules for formulating the bidding procedures and determining the outcome of the auction”. Auctions may be considered a substitute to lotteries where the strategic uncertainty regarding the auctions taken by the other bidders serves as an implicit lottery mechanism (Monderer & Tennenholtz, 2004 [7]). Much has been written recently about the dramatic increase in auction-trade volume on the Internet and the growing popularity of the auction mechanism in Electronic Commerce (e.g., Bajari & Hortacsu, 2004 [8]). There has also been a sharp increase in the variety of online auction mechanisms that differ from the

classical auctions (e.g., Ivanova-Stenzel & Sonsino, 2004 [9]). In a recent survey of the field, Ockenfels, Reiley, and Sadrieh (2007) [10] remarked that “New features concerning the design of online auctions are proposed and discussed almost on a daily basis.”

The working paper named **Unique Bid Auctions: Equilibrium Solutions and Experimental Evidence** [5], as mentioned above, has presented a new type of auction that first appeared on the Internet a few years ago and has rapidly gaining widespread popularity in Great Britain, Australia, and the US. The feature of this type of auction, that sharply differentiates it from previous auctions, is the uniqueness of the winning bid. The necessary condition for winning the auction is for the bid to be unique.

**Auctionair.co.uk** is a well-known online shopping website that offers the lowest unique bid auction feature. Auctionair considers this as a promotion to persuade customers to try using the Auctionair sealed bid system. They earn income from the entry fees from bidding. Their costs are advertising and promotion, web site build & maintenance, sales & fulfillment plus the loss they take on the winning item. The Low bid cannot sell large volumes of Lots, so they set the number of bids required to cover their costs. Over 40% of their customers bid again, often using their other bidding systems. It is the repeat business from those customers that really sustains Auctionair and generates their sustainable profits. Auctionair emphasizes the importance of persuading customers to come back again.

*(Please refer to APPENDIX B – Auctionair website to get more information on steps of bidding in Auctionair.com)*

**BassaBids.com** (started in October 2006) also practices this kind of auction for their business. It offers only lowest unique bid auction but it is still judged as an interesting and attractive website for what it has been offering. The concept is the same as what Auctionair is doing, offering customers chances to buy brand new products with their own prices placed. *(Please refer to APPENDIX C – Interface of BassaBids website for more details).* BassaBids offers 2 ways to bid, online and using your mobile phone (not yet available).

### *Online bidding*

To bid online, first create an account, provide your email address and a password for you to use. Each bid costs £1.50, with no minimum amount to purchase. They use Paypal for all their online payments so your purchases are guaranteed and you can pay using most credit and debit cards.

### *SMS bidding (not yet available)*

To bid using SMS you don't need to create an account first, one will be created for you when you bid for the first time and your password will be sent to you via SMS.

To bid on the Mini, send "mini 118" or "mini 1.18" to BassaBids shortcode. This will set your bid to £1.18. You will receive a confirmation message soon after confirming your bid. Each bid through SMS costs the same as an online bid.

If you would like to check your bids and how they are going then you must login to the BassaBids online auctions site using your phone number and the supplied password.

### *How long do they run?*

There are two types of auctions on BassaBids, time and bid based.

Time based auctions have a set date for when the auction ends regardless of whether there is one bid or 1000 bids. When the end time is reached, the person with the lowest unique bid is declared the winner.

Auctions, with a limit on the number of bids, end when the last bid available is made. The winner is also the person with the lowest unique bid. The amount of bids left is represented as a percentage.

**Bimbaso** is an auction for the lowest unique price, which is organized and maintained by "MRC" Ltd. Information about auctioned items shall be posted on the BIMBASO website.

The following information about auctioned items is available: the name of the auctioned item, description of the auctioned item, the auction period, the auctioned item's code word, the participation fee, procedures for sending SMS messages. Auction participants take part in auctions by offering their bidding prices (by sending a paid SMS or using BIMBASO credit). Upon receiving the bidding prices, the organizer of BIMBASO shall inform the auction participants of the status of the bidding price. Information about the status of the bidding prices can be found in the section 'For participants' on the BIMBASO website, and in the course of an auction, participants can receive informative messages about changes to the status of bidding prices. After the end of the auction period, bidding prices will no longer be received and the auction winner will be declared as the person who has submitted the lowest unique price at the end of the auction. In cases where there is no single lowest unique price, no participant shall win the right to purchase the auctioned item and the auctioned item will be auctioned again in a subsequent auction.

BIMBASO credit allows you to take part in an auction using the BIMBASO Internet site (from the section 'For participants'), rather than via a paid SMS. Credit can be purchased in the section 'For participants' using a payment card or through Internet banking. BIMBASO credit can only be used in BIMBASO auctions. BIMBASO will not refund money for purchased but unused credit.

**Unique Bid Homes Auctions** is a website which offers properties for sale by a reverse auction process. Rather than the bidder with the highest bid winning (as is the case in traditional property auctions), the winner is the person who has the "Lowest Unique Bid". Bids may be any amount between \$0.01 and \$10,000, allowing people to buy a property at an incredibly low price. The cost of the property is covered by the \$10 administration/bid fee you pay to make a bid.

The "Lowest Unique Bid" is an amount of money between \$0.01 and \$10,000. The amount closest to \$0.01 where no other bidder has bid the same amount of money is deemed the "Lowest Unique Bid".

Refer to the table below:

Bid	\$0.01	Not Unique
Bid	\$0.01	Not Unique
Bid	\$0.03	Lowest Unique Bid
Bid	\$0.04	Unique, but not the lowest
Bid	\$0.05	Unique, but not the lowest
Bid	\$0.07	Unique, but not the lowest
Bid	\$0.10	Unique, but not the lowest

**Table 1: Example of a possible result at the end of the Auction.**

In this example the Bid of 3c is the Lowest Unique Bidder and is awarded the auction result and would have to pay only 3cents. He/she has therefore purchased a property for \$0.03 (Bid Amount) + the \$10 Admin Fee paid when he/she placed the bid.

If the Bidder of the successful bid had more than one bid they would need to add \$10.00 for each additional bid placed. Let's say as an example they placed a total of ten bids during the auction their total outlay to own the property would be  $10 \times \$10.00 = \$100.00$  (initial Admin Fees) + \$0.03 = \$100.03.

During the Auction the Lowest Unique Bid is constantly changing, if in this example someone else was to bid \$0.03, then \$0.03 would no longer be a "Unique" bid, meaning it would no longer be the Lowest Unique Bid, \$0.04 would now become the Lowest Unique Bid. However if someone Bid \$0.02, as this has not been bid previously by anyone else, it would then become the Lowest Unique Bid.

**GlobalBidders.com** offers many lowest unique bid auctions. The winner of an auction is the one who has the lowest unique bid when an auction closes.

The following rules apply:

1. The minimum bid is \$1 and bids may only be placed at increments of 10 cents (\$0.10).
2. There is a minimum number of bids required before an auction closes. i.e the Required Number of Bids
3. A bid fee is charged per bid. This fee will be charged in GlobalBidders.com credits (1 credit per bid), which can be purchased through GlobalBidders.com's secure server.
4. All bids are kept confidential during the course of auctions. You can, however, view the status of your personal bids by logging into your account.
5. When auctions close, the bidder who made the lowest unique bid can purchase the product/service at the cost of the lowest unique bid. All participants of an auction will be notified by email whether they won or lost once an auction closes.

In another well known auction website: **Humraz Auction House**, lowest unique bid auction is also applied. To succeed in one of their auctions your bid must be the lowest unique bid when the auction closes.



**Figure 1: Winning condition in Humraz Auction House**

In addition, “An Exploratory Study of the Introduction of Online Reverse Auctions” [11] has indicated that “Buyers are increasingly turning to online reverse auctions in their negotiations with suppliers. How do these price competition mechanisms affect buyer-supplier relationships? The author considers this question in the context of a quasi experiment involving six online reverse auctions conducted in the supply base of a major industrial buyer. The results indicate that these auctions increase both new and current suppliers’ beliefs that buyers act opportunistically, particularly in open-bid auctions. Current suppliers are generally more willing than new suppliers to make dedicated investments toward the buyer. Paradoxically, in sealed-bid auctions, both current and new suppliers increase their willingness to make dedicated investments toward the buyer. Although these auctions can yield cost savings, the savings are category specific and are not systematically related to an open- or sealed-bid format. The author also discusses implications for the use of online reverse auctions in industrial sourcing activities.”



There is also a company in Malaysia called **Mediate Communication Sdn Bhd** (664316-H) [12] offering this kind of auction. They call it “Bid to Win” reverse auction (the Auction). You may place a bid in the Auction if you are a mobile phone user in Malaysia, who is aged not less than 18 years except that the following people are not permitted to participate in the Auction: any employees of Mediate Communications Sdn Bhd, Mediate Publishing (M) Sdn Bhd and the agencies associated with the Auction, and members of their households or immediate families. The same concept is applied. The difference here is that to place a bid in the Auction, you must SMS a bid to the SMS number (as printed in the February issue of KLIA TIMES) and the appropriate code word (as printed during relevant bidding period). All SMS messages sent to bid in the Auction will be charged at RM1.00 per message. All bids must be communicated by SMS. Bids shall not be communicated via the Internet.

### **2.3 Innovations on the Development of AJAX – Based Inverse Auction Website**

Basically, the concept of the Development of AJAX – Based Inverse Auction Website is similar to the one being applied in the websites stated above. But Development of AJAX – Based Inverse Auction Website project carries on its own some innovational features to improve the weaknesses of those current websites and, to better suit the environment implemented, particularly, universities.

The first innovation that the author is trying to implement in this project is the programming language used, web development techniques to develop the system. Currently the programming language mostly used in other auction websites stated above is ASP.NET or VB.NET which has disadvantage in terms of page loading and bandwidth. This might cause a big problem if it is implemented in the small-scale environment like universities, in particular, UTP, where the bandwidth usage is limited. The author has come up a solution for this by developing the system using PHP as the main programming language, together with implementation of AJAX. “AJAX (Asynchronous JavaScript and

XML), is a group of inter-related web development techniques used for creating interactive web applications. A primary characteristic is the increased responsiveness and interactivity of web pages achieved by exchanging small amounts of data with the server "behind the scenes" so that entire web pages do not have to be reloaded each time there is a need to fetch data from the server. This is intended to increase the web page's interactivity, speed, functionality and usability. AJAX is asynchronous, in that extra data is requested from the server and loaded in the background without interfering with the display and behavior of the existing page. JavaScript is the scripting language in which AJAX function calls are usually made. Data is retrieved using the XMLHttpRequest object that is available to scripting languages run in modern browsers, or, alternatively, through the use of Remote Scripting in browsers that do not support XMLHttpRequest. In any case, it is not required that the asynchronous content be formatted in XML. AJAX is a cross-platform technique usable on many different operating systems, computer architectures, and web browsers as it is based on open standards such as JavaScript and the DOM. There are free and open source implementations of suitable frameworks and libraries." [13]

The core reason that the author comes up with the solution of using AJAX is to overcome the page loading requirement of HTML/HTTP-mediated web pages. Normal web pages usually require several applications to function. This creates a cumbersome operation in which users have to wait for the separate applications to refresh before interacting with the complete page. Being a quite "young" programming language, AJAX has been written with the aim to enhance page loading speed, and in turns, helps make Internet more and more pervasive.

Another advantage of AJAX is a decrease in bandwidth use. Bandwidth in web hosting refers to the amount of data that can be communicated between user and server/website. In AJAX, bandwidth is used only to accomplish specific demands without requiring that the page be re-loaded (which require bandwidth, every time a request is made. Contents are loaded on demand and HTML is produced locally from the browser. This technique

significantly cuts down the bandwidth consumption for web applications. In addition AJAX works on the client and shares some work of the server, so reducing the server load.

AJAX also allows programmers to separate methods and formatting for specific information delivery functions on the web. Programmers can use whatever languages or formats work for their specific goal. For example, raw data, usually obtained in XML from a server-side database is separated from the format or structure of the webpage, which is usually structured in XHTML. This allows for dynamic handling of DOM. CSS use allows for the separating of style elements on the page, like fonts and picture placement. AJAX also separates the functionality of web pages by combining different elements in different ways. For example, JavaScript on the client-side browser is combined with XMLHttpRequest to enable communication between client and server browsers. Then any server-side program or scripting language allows the programmer to quickly respond to client requests in a language and format they are familiar with. [14]

Apart from that, the system will be developed as a Content Management System (hereinafter referred to as CMS) in order to better manage the content of the website. Typically, a CMS consists of two elements: the content management application (CMA) and the content delivery application (CDA). The CMA element allows the content manager or author, who may not know HTML to manage the creation, modification, and removal of content from a website without much knowledge on IT. The CDA element uses and compiles that information to update the website. The features of a CMS system may include, but not limited to: web-based publishing, format management, revision control, and indexing, searching and retrieval. In short, Content Management System is designed to simplify the publication of web content to websites, in particular allowing the content creators/ administrators to submit the content without requiring technical knowledge of HTML or the uploading of files.

Different from other lowest unique bid auction websites, UTP Bid auction site does not take bidding fee from the bidders for each time they place a bid since according to Muslim perspective, it seems to be unfair for those who have participated but do not win in the

auction, they have paid but do not receive anything. There comes a question that how a seller can gain profit when they are selling their products for a fraction of price. Simply, the seller just posts the products for sale together with the minimum bidding price (reserve price), and this price is the price that the seller is willing to sell the product for. The system then will not allow the buyers to bid lower than that price. There is a chance where the seller does not have profit at all (if the winner of the bidding has bid for exactly the minimum price that the seller has set), but at least, the seller will never get loss. And the buyers always have opportunity to buy products with a cheap price. That is the beauty of the system's work.

## Chapter 3

### METHODOLOGY

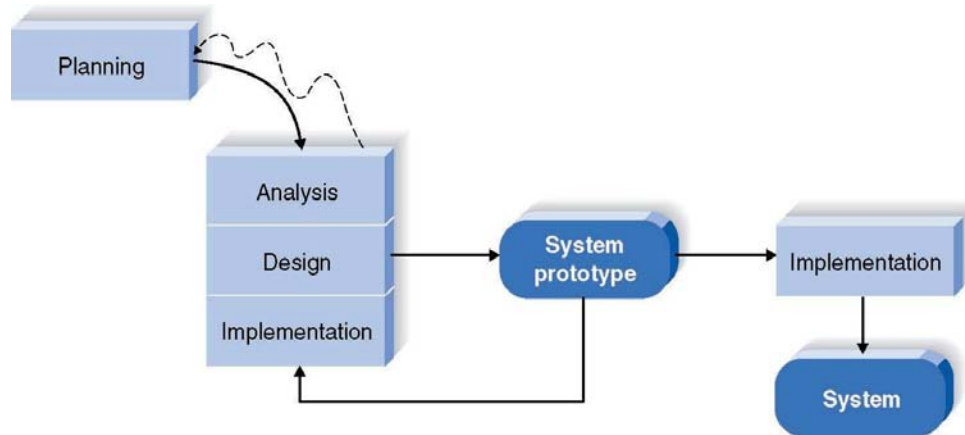
#### 3.1 Procedure Identification

Before the implementation of the project starts, a survey on the needs and feasibility of the proposing system has been conducted properly. The projects will be continuing along with lots of researches on the existing implementation of the same concept all over the world. In order to form an appropriate method to implement the project smoothly in next phases, the data should be collected; gathered carefully, suitable tools/techniques should be identified from the beginning phase and updated if necessary, constraints/limitation from the current environment should be analyzed thoroughly.

#### 3.2 System Design and Development

##### *3.2.1 Methodology*

To develop a system, one needs a specific methodology to guide the overall process flow. In developing this system, the author has chosen the prototyping development methodology. This method is most suitable since it moves of phases is from sequence to another sequence and it performs the analysis, testing and implementing phases concurrently. All the three phases are performed repeatedly within a cycle until the system is completed. The stages of the model are illustrated as following:



**Figure 2: Prototyping Methodology**

### **Planning**

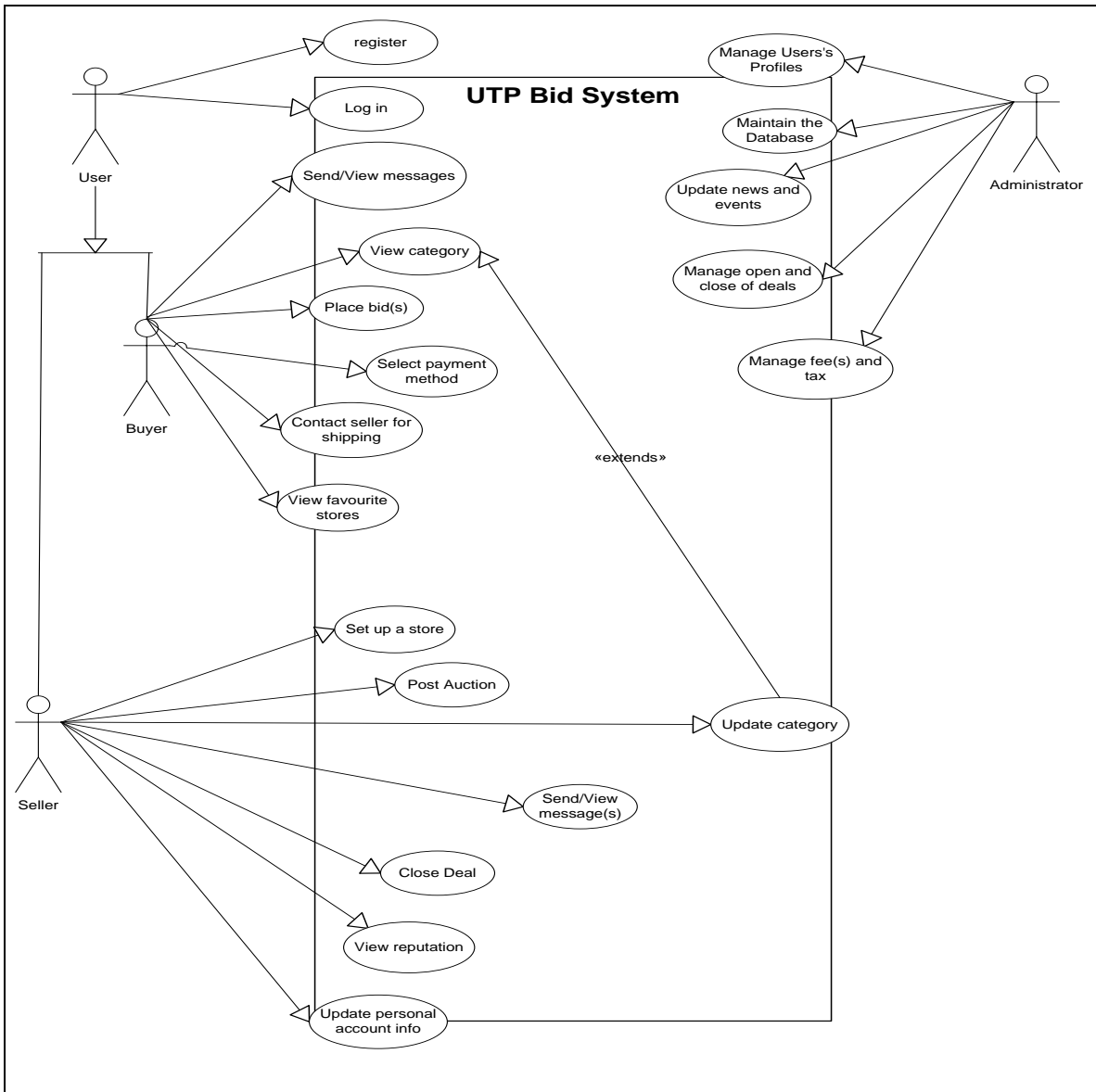
In this initial phase, all the activities according to the timeline must be planned. This phase will ensure all activities will be done along the development of the system will be on time. Resources and constraint must be also taken into consideration so that ample time can be allocated to any unexpected incident along the development process. The outcome for this phase is Gantt chart of activities. The important thing in planning is to meet the deadline with all or most of the requirement is in the system.

### **Analysis**

In analysis phase, the entire requirements need to be collected from the resource and from the requirements; the analysis for developing the system is the output. The analysis including defining the scope of the system, boundary of system, input and output process, and type of hardware and tools that will be use in develop the system. This phase will define the scope of he system and limitation of the system. After identifying all the elements of the system, the design process should start. In this analysis, all the elements will be put together to make up framework or the system. The framework/ modeling methods that will be used for this system are:

*Use – case diagram*

Use –case diagram will show the interaction between the system and the users. Basically, this diagram helps developer identify functions that the system should have. Use –case diagram helps not only developer but also end- user understand the behaviors of the use-case of the system.



**Figure 3: Use-case diagram for UTP Bid system**

The use-case diagram above shows us there are two categories of users: sellers and buyers. Each of them is provided with respective and unique user name and password after registering. Logging on the system, a seller set up his/her own store where the goods are arranged neatly according to the categories. (S)He then can post new auction by providing the information, images and the minimum bidding price of the product(s). The seller can send/view messages concerning about the product. The seller has the right to close the deal by setting the duration of the bidding. Sellers can also view their reputation (comments, rates) posted by others as well as update their profile.

The buyers, whereas, can view the category posted by the sellers, place bid(s), select payment methods (Credit Card, UTP payment, Buy Now...) as well as view/send messages and view their favorite stores.

The administrator of the bidding site is responsible for managing the users' registrations, maintaining the database, monitoring and controlling the opening and closing of deals as well as dealing with the accounting, fees payment.



Flow Chart Diagram

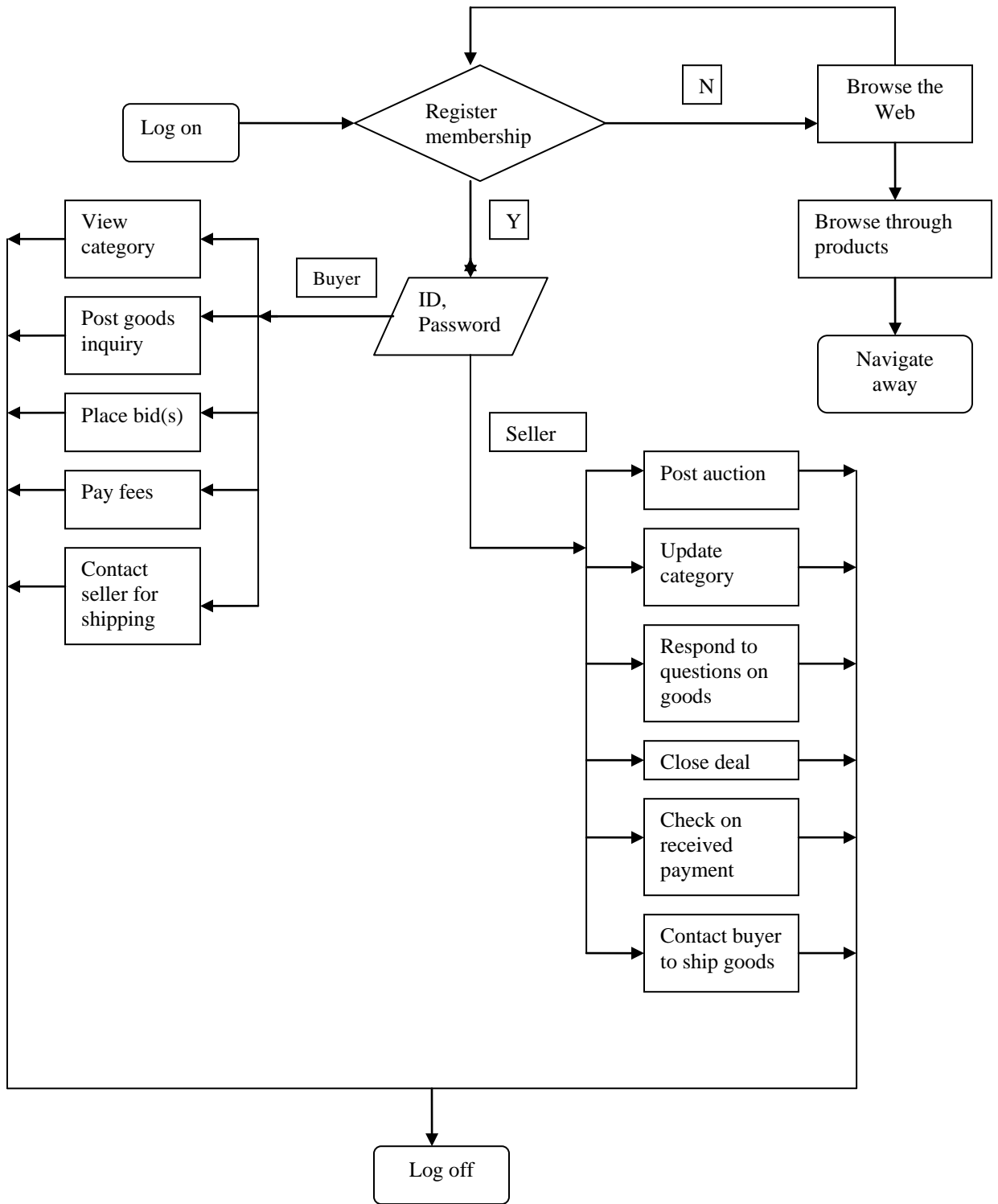


Figure 4: Flow Chart Diagram of UTP Bid System

Flow Chart Diagram shows us the flow of the activities that one should follow once interacting with the system (not including the administrator).

## **Design**

In this phase, the design of architecture and user interface happens. Architecture design process is process of designing the database, the platform or tool that will be use for the development of the system. In this process, the main important things is setting up the working architecture so that the system can be developed because without good setup architecture like database and server setting, the system may not working properly as expected. And at this phase, the basics of design are performed and work immediately begins on a system prototype, a “quick-and-dirty” program that provides a minimal amount of features.

## **Implementation**

The implementation is the phase where the system that already finished will be implemented either as pilot implementation or full implementation. Normally the implementation will be done through pilot implementation whereby the installation will be done on one site or selected computer and the users will use the newly installed systems. If everything goes well with the hardware and network setup, then the massive installation to other machine will be done

*(Please refer to Appendix D: Gantt Chart of FYP for more details)*

### *3.2.2 System Architecture*

The system is developed using three-tier architecture model which is the fundamental framework for the logical design model, segments an application's components into three tiers of services. These tiers do not necessarily correspond to physical locations on various

computers on a network, but rather to logical layers of the application. These layers can increase the reusability of codes. (1) Application layer is the form which provides the user interface to either programmer or end user. Programmer uses this layer for designing purpose and to get or set the data back and forth. (2) The application tier provides the business logic necessary to run and control the system. And the (3) data tier provides access to underlying SQL data storage of the whole system. SQL database access is controlled by a custom SQLDataProvider class that accesses information from the SQL server database via stored procedures. To effectively support these tiers, the Database Management Service (DBMS) will be used to handle all requests to query the database. In addition, the Business Logic Layer will take PHP into account to perform all the necessary functions of the system and generate the dynamic contents for author.

### **Data Access API Abstraction Layer**

Various kinds of applications will be integrated into the system. These include some applications which access to People Data directly while some may use Web-Service. Hence, the Data Access Application Programming Interface (API) Layer needs to be used to ensure all kinds of applications have a consistent view to People Data.

Abstract Data Access APIs layer contains all definitions for data functions. The Providers (SQL Data Provider, Web Service Provider) is implementation of the definitions in Abstract Data Access Layer. For example, SQL Data Provider uses SQL client to access to database while Web-Service Provider will get the data from Web-Services. In order to switch between these providers, we change configuration file.

### **Workflow Server**

The workflow server contains running business processes.

### **Business Process Controller Layer**

This is used to access business processes in Workflow Server

### **Business Entity Layer**

The Business Entities Assembly contains all data objects which will be passed around. It's also called Model object in Model-View-Controller pattern. A **Business Entity** may be a participant, a new request-for-register...

### **Business Logic Layer**

This layer has the responsibility to coordinate components of the system in a logical function. For example, when administrator create a new request-for-register, the Create New Register function at this layer will receive the New Request Business Entity from Presentation Layer, call Security Service to authorize the request, then call Data Access layer to save the Entity, and finally call Workflow Controller layer to start a New Register Process on Workflow Server.

### **Web Control Lib**

A library of web control to reuse like: Grid Control, ASP.NET 2.0 Data Source Control ...

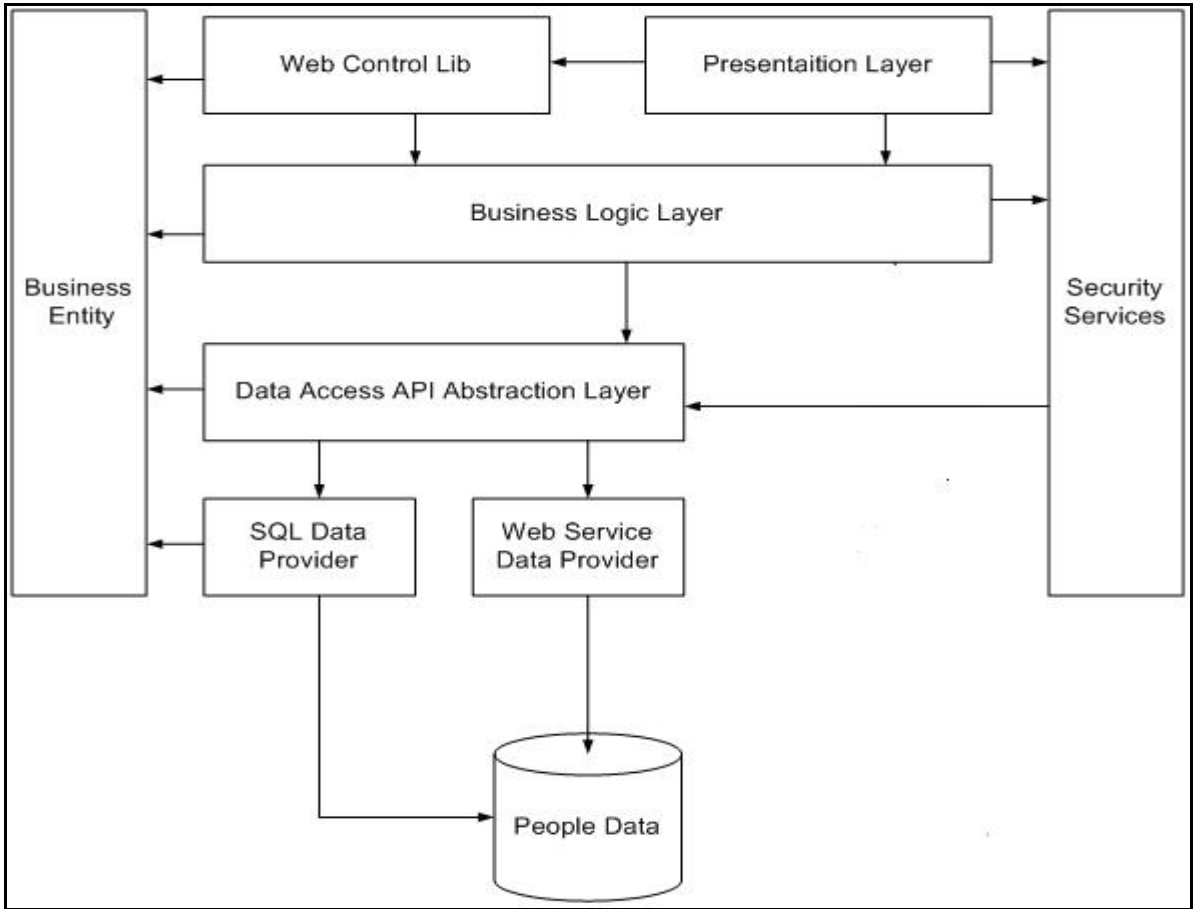
### **Presentation Layer**

ECR 2.0 Website

### **Security Services**

The services help other components to authenticate and authorize user. For example in Business Logic Layer, when creating a New Register Request, we need to make sure that the current user has enough permission to do so (only the administrator of the site can do this). The Security Service checks to see if the current user has this permission or not, if not, redirect user to a default security warning page.

The Security is also in charge of ensuring the security for the transaction taken place during the bidding.



**Figure 5: Logical Architecture of the Inverse Auction System**

### 3.2.3 AJAX Architecture:

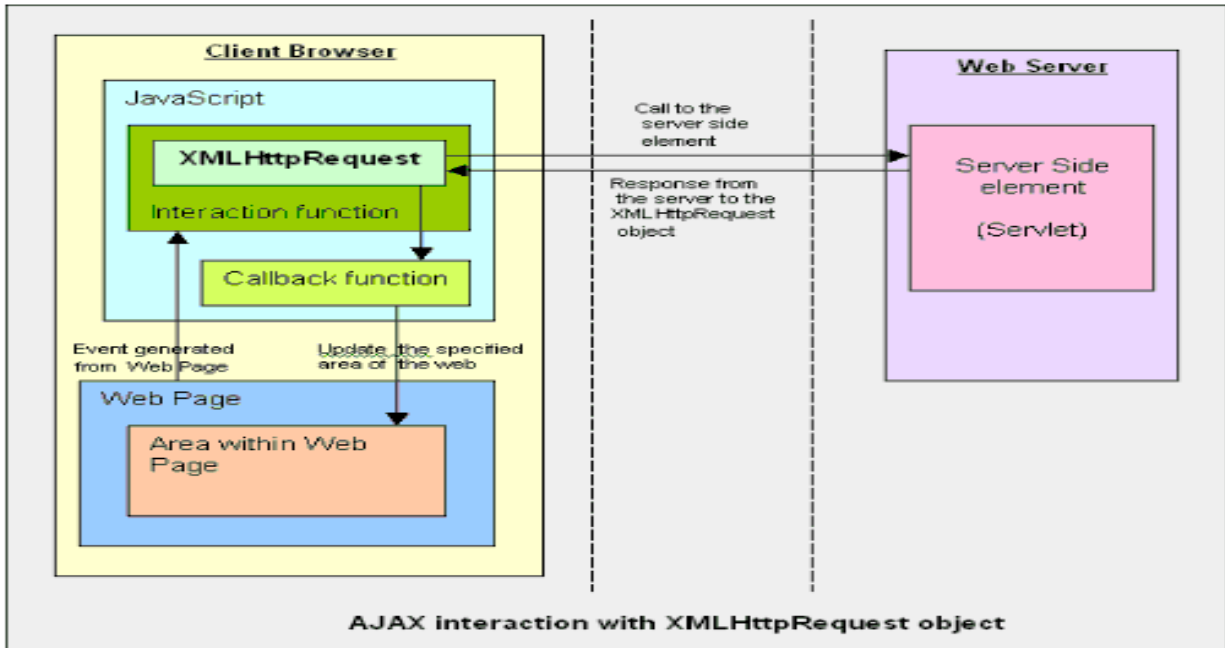


Figure 6: AJAX Interaction with XMLHttpRequest Object

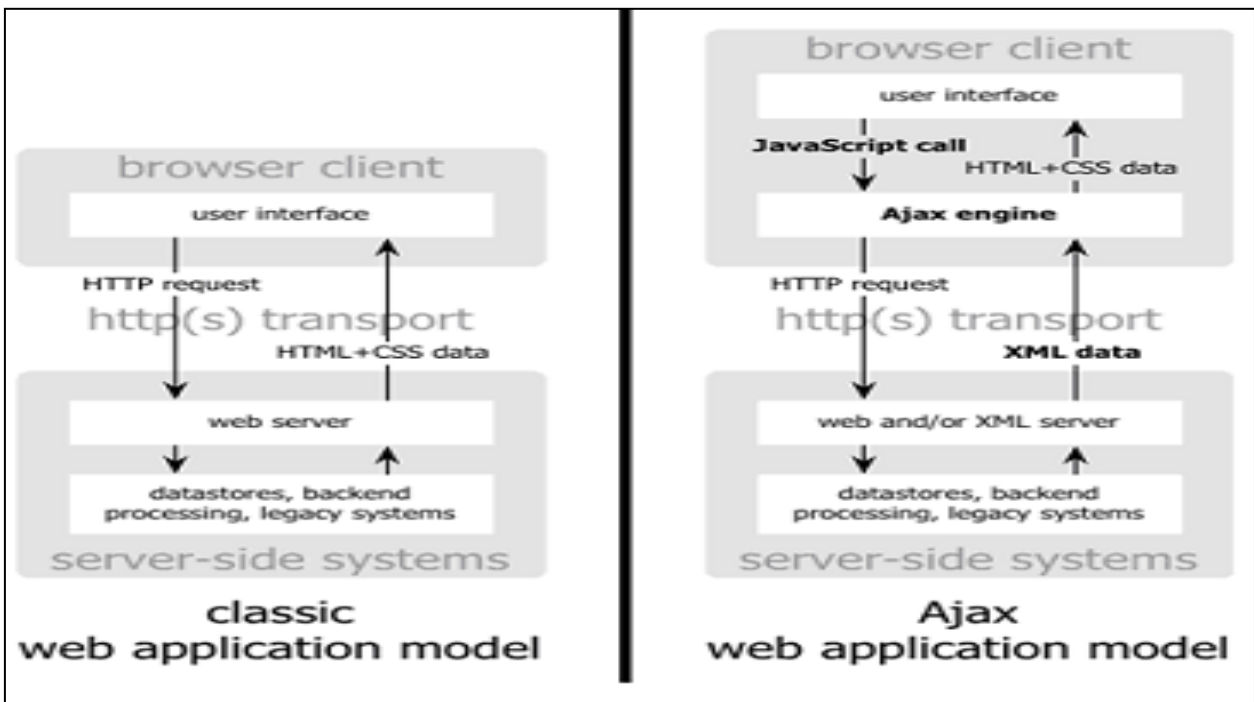


Figure 7: Comparison between Classic and AJAX Web Application Model

*Classic Web:* Web Browser sends HTTPRequest to server and Server returns HTTPResponse. Then the web page is rendered on the client browser. This is 1 round trip between client and server. In the classic way, if you want to update any part of your page (e.g: get subcategory of a main category from database and display on the page), you need 1 more round trip => It takes more time to render unnecessary items (unchanged items on the web page) and causes more network traffic.

*AJAX Web:* Web Browser only sends request of a small part of the webpage which needs to be updated via XMLHttpRequest. Then the server processes that request and return only the changed items. (The data exchange between client and server is XML format data in comparison with HTML/CSS format data in classic web) => less items need to be processed by server and the client browser only renders the small part of the web page, not the whole page

#### *3.2.4 Tools/ equipment required:*

- ✓ PHP
- ✓ WAMP (Windows Apache MySQL PHP)
- ✓ AJAX
- ✓ My SQL server – database management system.

## **CHAPTER 4**

### **RESULT AND DISCUSSION**

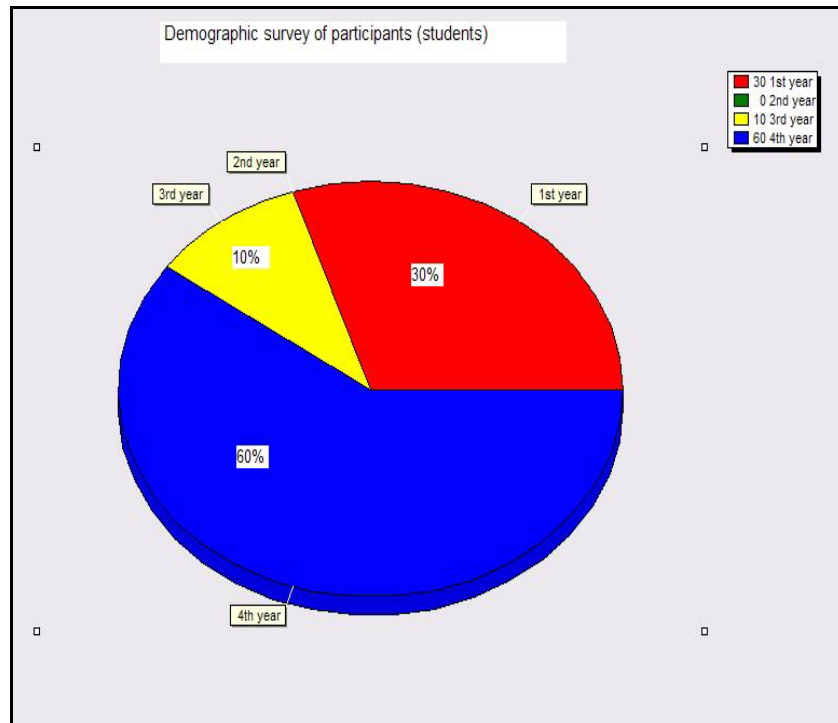
#### **4.1 Survey Result and Discussion**

The objective of distributing this questionnaire is to get information on the trend and method being used when UTP students want to sell/buy things and how they think about the lowest unique bid auction concept. *(Please refer to Appendix E – FYP Questionnaire for more details)*

The questionnaire is divided into four distinguished sections, each carries different purpose. Section A contains all general questions about students and their habit of commerce.

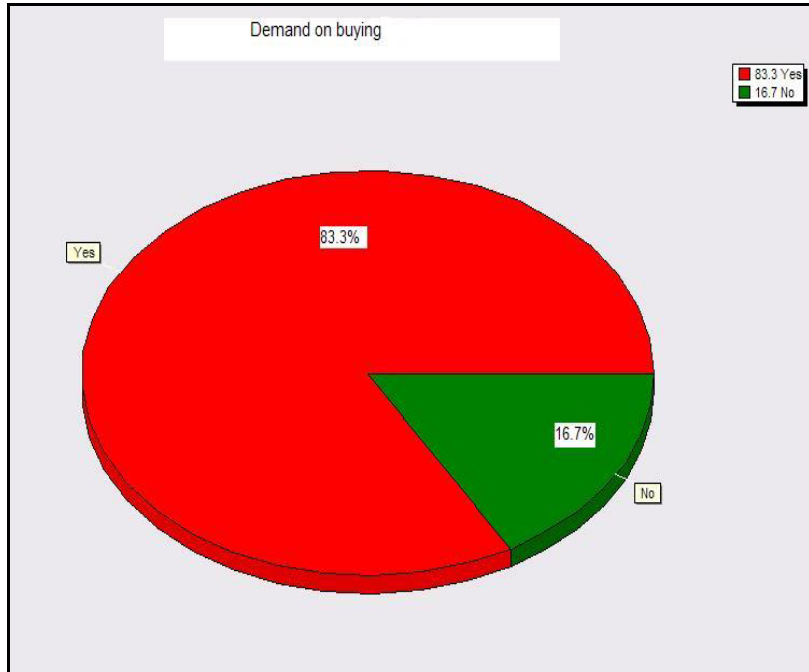
The first question provides the information of the year of the students surveyed. It acts like a filter to help the author have a fair view on demand of each segment.





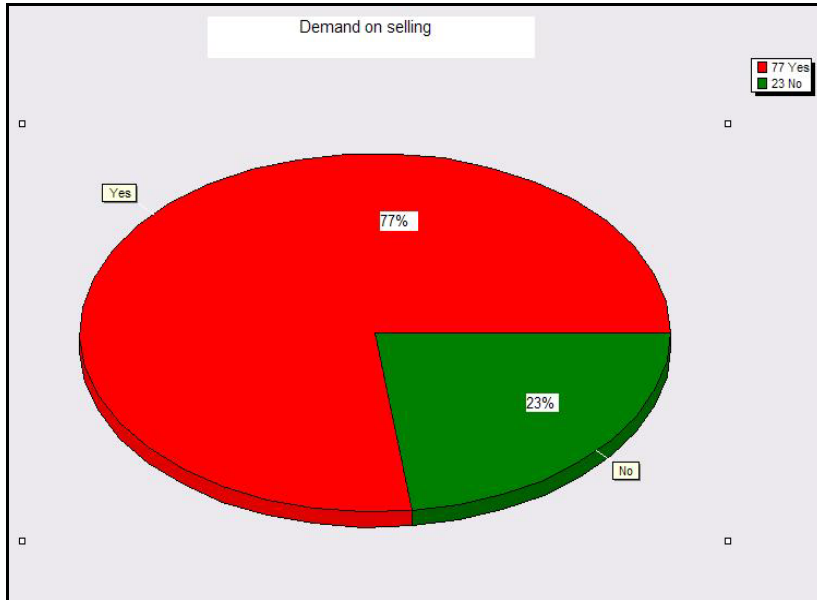
**Figure 8: Details of Results of Question A1**

The second question provides the information on buying demand of UTP students. Based on the result, 83.3% saying “Yes” to the question shows that there is a high demand of buying things among UTP students.



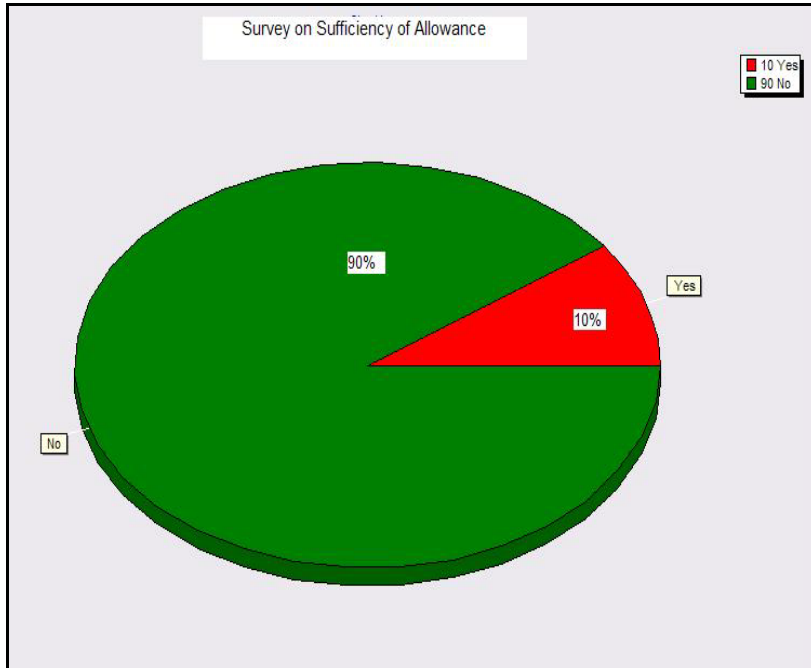
**Figure 9: Details of Results of Question A2**

The third question, on the other hand, provides information on the demand of selling things of UTP students. 77% of the surveyed students saying “yes” shows UTP students also have a high demand of selling things.



**Figure 10: Details of Results of Question A3**

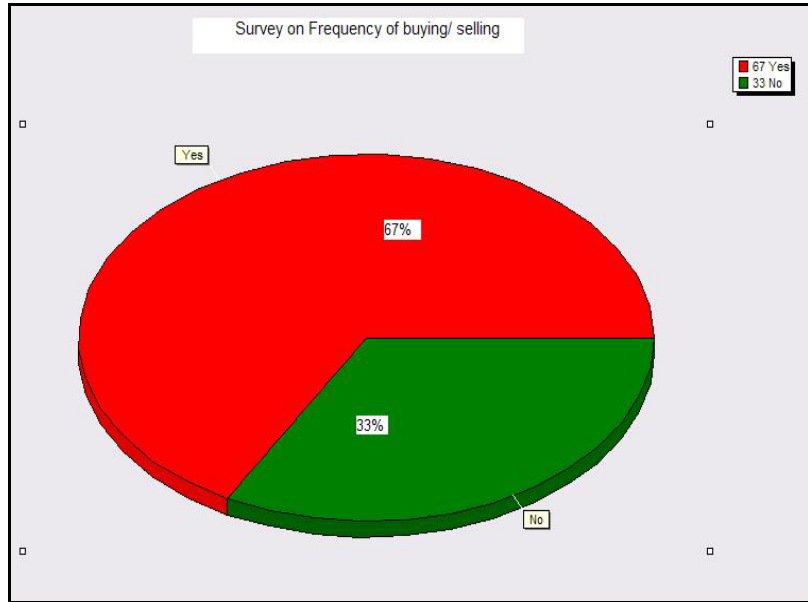
For Question Four, most of the answer (90%) is “NO” when they were asked about the sufficiency of the allowance. Most of UTP students are scholars, and they receive RM500 as monthly allowance. Another survey conducted by International Student Committee 1 year ago has figured out 97% of students surveyed considers RM500 is not enough for their lives in UTP.



**Figure 11: Details of Results of Question A4**

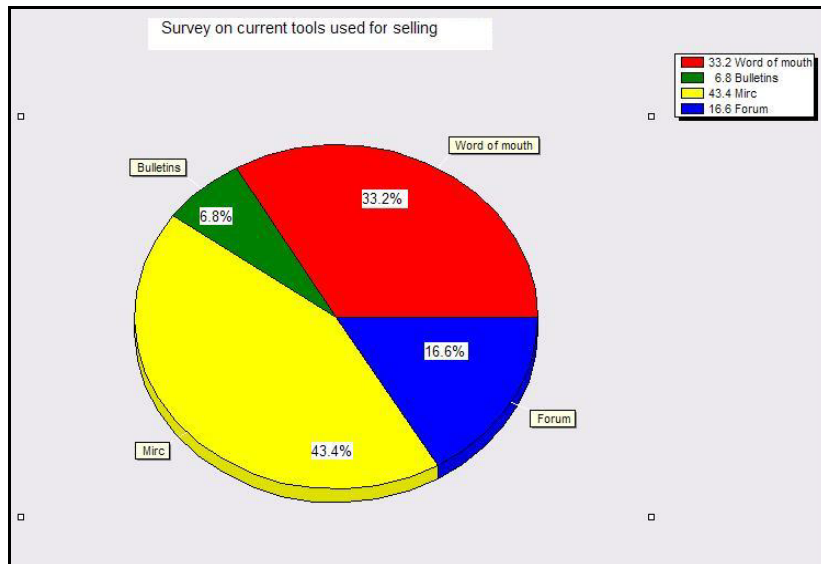
The purpose of section B is studying about the current methods used by UTP students when they have demand on buying/selling things, the effectiveness and the efficiency of these tools.

Result of the first question in the first question in section B shows that the students have quite high frequency of buying/selling things. 67% of the surveyed students have said "Yes".

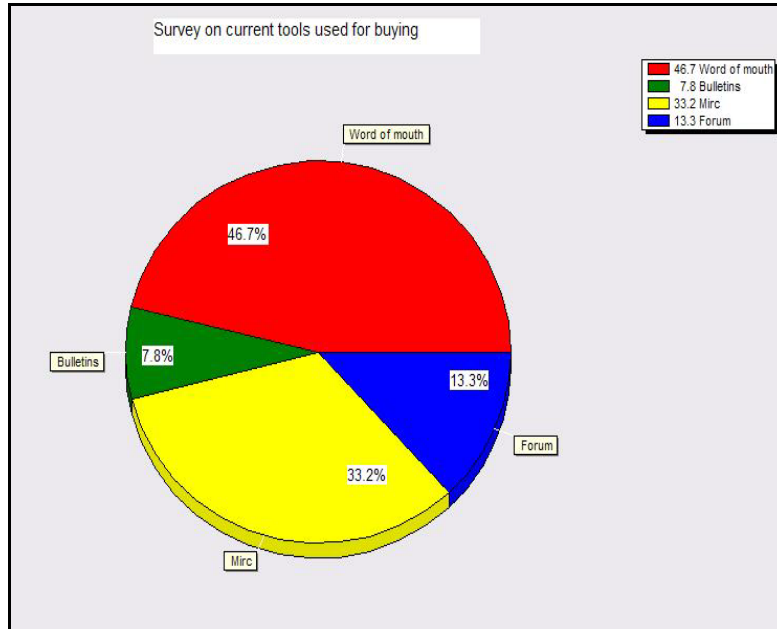


**Figure 12: Details of Results of Question B1**

Questions 2 and 3 of Section B gather information of the tools UTP students are currently using when they have things to sell/buy.



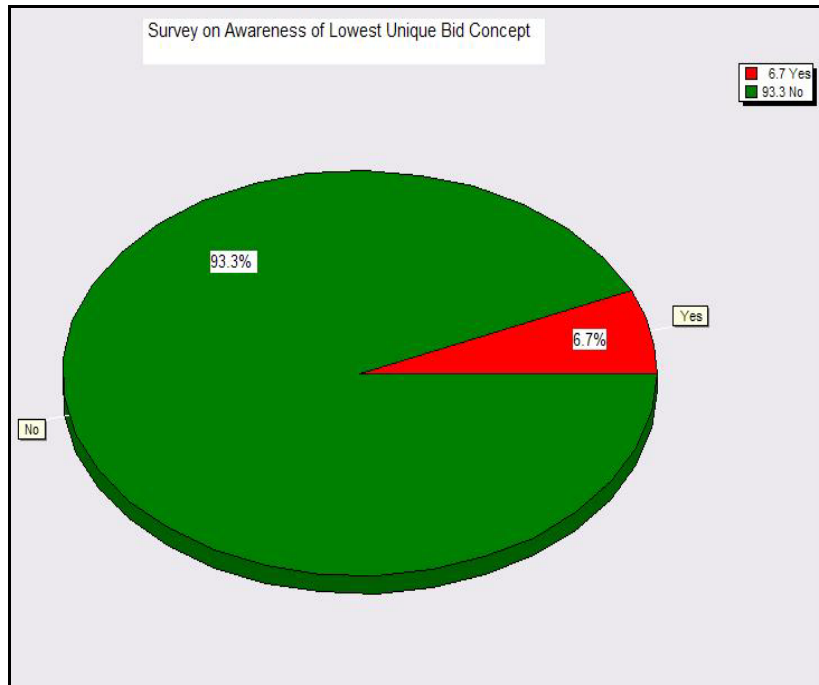
**Figure 13: Tools used by UTP student when selling**



**Figure 14: Tools used by UTP student when buying**

The last question in section B shows the satisfactoriness of the students towards these tools. Most of the students judged these tools below average in terms of effectiveness and efficiency. The most popular way to buy/sell things is based on their relationships. They ask around their housemates, course mates, seniors, juniors...which might be considered effective but not efficient and not reach big number of persons.

Section C of the questionnaire studies on the awareness and the acceptance of UTP students toward lowest unique bid auction. Only 6.7% of the students participating in the survey know about the concept but majority of them encourage for the “platform that buys things you want to sell and offers you things with fraction price” which is so called Inverse Auction Website.



**Figure 15: Awareness of Lowest Unique Bid concept**

From the survey above, it has been shown that selling and buying things; especially with the affordable price is a concern to all UTP students. It is necessary to implement the lowest unique bid auction system, which is totally supported by students.

## **4.2 Prototype of UTP Bid System**

### **4.2.1 Basic Functionalities**

#### **E-commerce capability**

UTP Bid system successfully acts as an effectively, efficiently and secure platform for the sellers and buyers to conduct business transaction.

### **Fully functional system at high speed**

The system has been designed using AJAX technology in order to overcome the weaknesses of loading and limited bandwidth of other current websites. UTP Bid system can respond effectively and efficiently to any query.

### **Easy to manage**

As discussed earlier, Content Management System allows administrators to create, edit, manage and publish content in a consistently organized fashion. The content managed may include computer files, image media, audio files, video files, electronic documents and Web content. The site manager, even though might not have much knowledge on IT, can also modify the content of the web upon necessary without the help of the software developer. From within the admin area, administrator can:

- ✓ Manage users
- ✓ Manage auctions
- ✓ Set fees
- ✓ Customize categories
- ✓ Enable/Disable varieties of features and settings
- ✓ Review accountancy
- ✓ Update the site content

### **Simple and user-friendly navigation scheme**

With the navigation bars provided both on top of the page and in the left frame menu, users can navigate around the web easily and conveniently without being lost.



## **System Security**

The access authority is granted differently among the administrators, registered users and visitors. The information provided by the users is ensured to be kept confidential. The password is highly protected by a mechanism requesting for more than six characters. The system also asks for the PIN when critical actions are to be performed to prevent the feigning of the hackers/ spy software. The system also offers Secure Socket Layer (SSL) to work along with as long as you have the SSL certificate installed.

## **Other functionalities**

*“Make an offer”*: Buyers can make offers on listed items. As one item has not received any bid, this feature allows potential buyers to make an offer to the seller. The seller has the right to decide whether to accept the offer(s) or not and may set the price (or price range) that (s)he is willing to sell the item at.

*Wanted Ads*: This feature allows users to post advertisements on the items they want. The site administrator may charge fees for posting wanted ads as well as for a successful sale.

*Media Upload*: Sellers can upload up to 9 pictures or media files together with their listing. Site administrator can charge fee for this service.

*Custom Listing Fields*: UTP Bid system allows administrator to add new custom fields for sellers to use when listing. For example, if the seller wants to open a car auction, the admin can add custom fields for the engine size, color, age, condition and so on. And all fields can also be set to be searchable.

## 4.2.2 User Interface and Navigation Scheme

### Top menu

The top menu is on the top of the page and contains navigation to:

**Home** – Homepage (Figure 16): The homepage shows the latest bids, the ending soon auctions as well as wanted ads.

The screenshot shows the UTP Bid System homepage. At the top, there is a blue navigation bar with the site logo and menu items: HOME, SELL, REGISTER, LOGIN, STORES, WANTED ADS, HELP, SITE FEES, ABOUT US, and CONTACT. Below the navigation bar is a search bar and a 'BROWSE' dropdown menu. The main content area is divided into several sections: a 'MEMBERS AREA' with login fields for Username and Password, a 'Featured Auctions' section for 'Business Ethics' with a 'NO IMAGE AVAILABLE' placeholder, 'Recently Listed Auctions' table, 'Ending Soon' table, and 'Recently Listed Wanted Ads' table. A right sidebar contains a 'WELCOME NEW USERS' banner, a 'REGISTER TO' button, and a 'Site News' section with several news items dated Sep. 01, 2008.

Start Time	Start Bid	Item Title	
Sep. 09, 2008 19:34:54	MYR 10.00	Business Ethics	BUY OUT!

Time Left	Currently	Item Title	
10 days, 5h 33m	-	Business Ethics	BUY OUT!

Figure 16: Homepage of UTP Bid System

On the left-hand side of the homepage, there's an area for the existing members of the system to log in. If you are not yet a member of the system, you can navigate to the following bar:

**Register** – non-member can register here (Figure 17) the system will require new users to submit some personal information and the system will provide the terms and conditions for users to be aware of.

The screenshot shows the 'New User Registration' page on the UTP Bid website. The page has a blue header with navigation links: HOME, SELL, REGISTER, LOGIN, STORES, WANTED ADS, HELP, SITE FEES, ABOUT US, and CONTACT. Below the header is a search bar and a 'BROWSE' dropdown menu. The main content area is titled 'New User Registration' and includes a 'Main Details' section with the following fields:

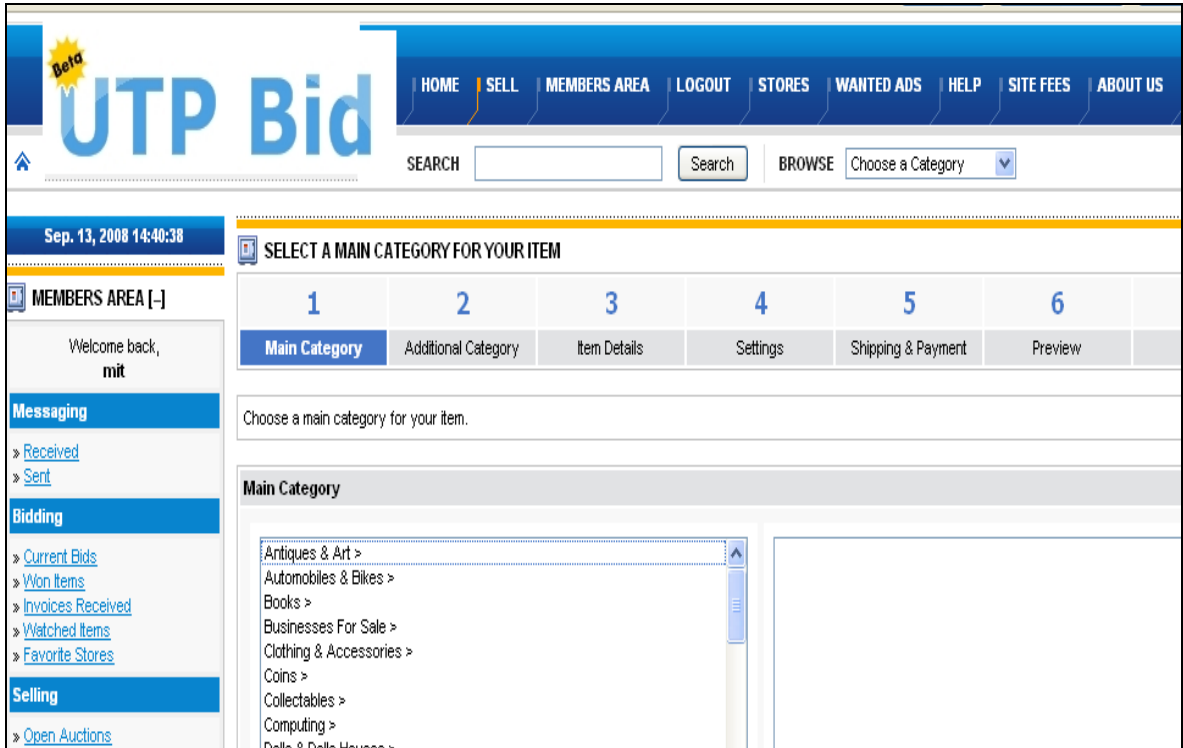
- Register As:  Individual  Business
- Full Name:
- Address:
- City:
- Country:
- State/Province:
- Zip/Post Code:
- Phone:

On the left side, there is a 'MEMBERS AREA' sidebar with a 'login' button and a list of categories:

- Antiques & Art (0)
- Automobiles & Bikes (0)
- Books (1)
- Businesses For Sale (0)
- Clothing & Accessories (0)
- Coins (0)
- Collectables (0)
- Computing (0)
- Dolls & Dolls Houses (0)
- Electronics (0)

**Figure 17: Register page**

**Sell** – area specifically for sellers/ Once the user has logged in, (s)he can go to this area to open a new auction by following up to the instructions on categorizing and providing the information of the products (Figure 18)



**Figure 18: Sell page**

*Site Fees* – list the fees that the users should pay for some certain services provided by the site managers. (Figure 19)

TP Bid

HOME SELL MEMBERS AREA LOGOUT STORES WANTED ADS HELP SITE FEES ABOUT US CONTACT US

SEARCH  Search BROWSE Choose a Category

18 14:44:18 >> SITE FEES

Choose a Category : General

Listing Fee	
From MYR 0.01 To MYR 1.00	10.00%
From MYR 1.00 To MYR 5.00	7.50%
From MYR 5.00 To MYR 25.00	5.00%
From MYR 25.00 To MYR 100.00	4.00%
From MYR 100.00 To MYR 500.00	3.00%
From MYR 500.00 To MYR 5,000.00	2.75%
From MYR 5,000.00 To Above	2.40%

Additional Category Fee MYR 1.00

Images Upload Fee MYR 1.00

Highlighted Item Fee MYR 1.00

**Figure 19: Site Fees page**

**Main Menu:** The main menu is located in the left frame of the page. It contains links to other sections of the site:

*Messaging* – divided into two sub-sections: Received and Sent

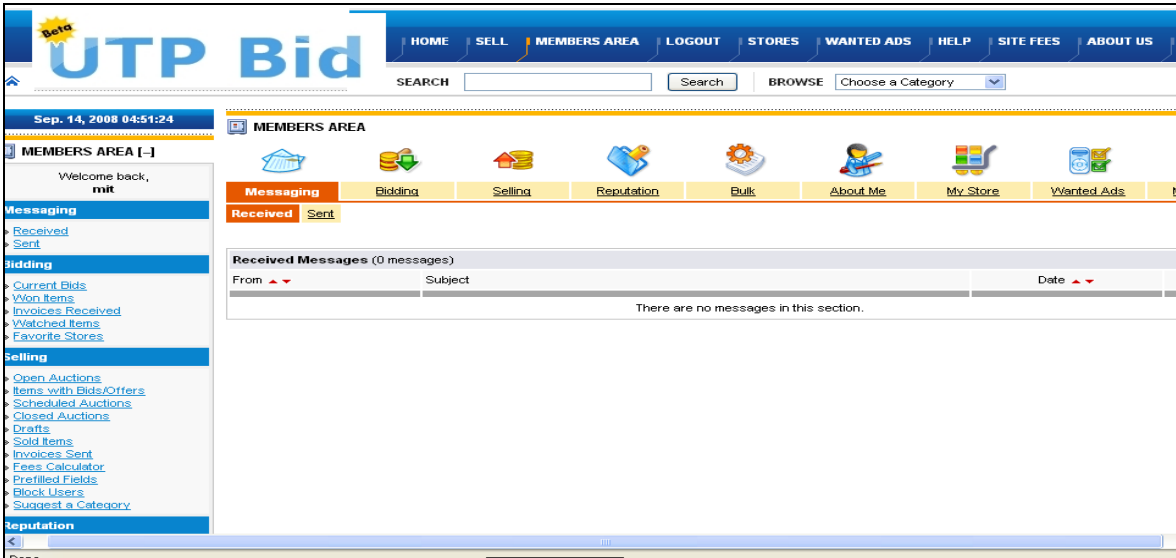


Figure 20: Messaging site

*Bidding* – shows the current bidding, won items, invoices received, watched items, and favorite stores.

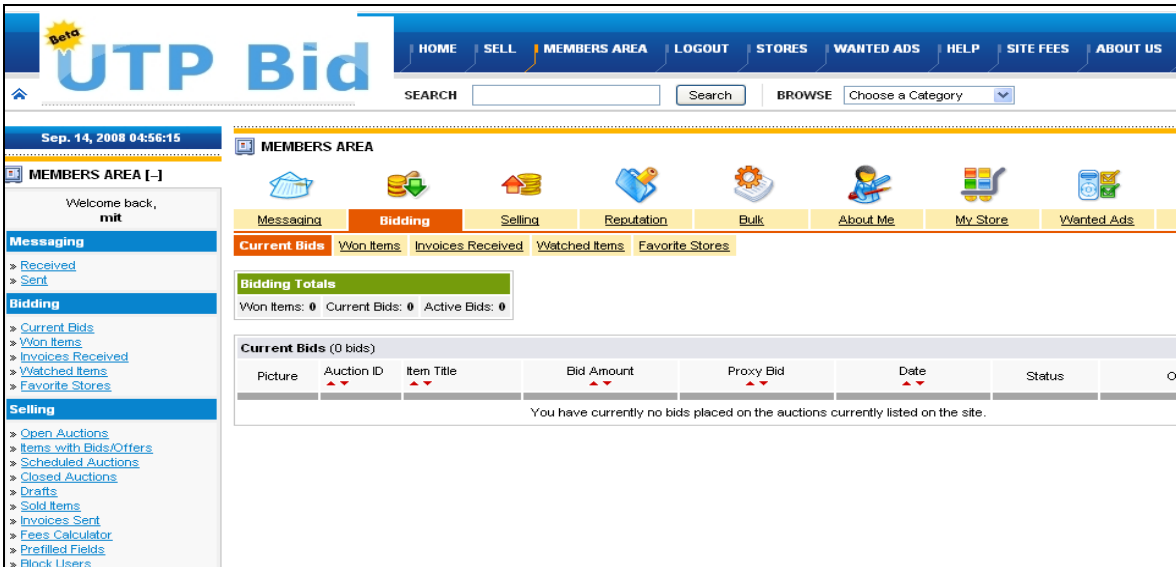


Figure 21: Bidding site

**Selling** – where a seller can view/manage the opening auctions, items with Bids/offers, scheduled auctions, closed auctions, drafts, sold items, invoices sent, fees calculator, prefilled fields, block users, suggest a category.

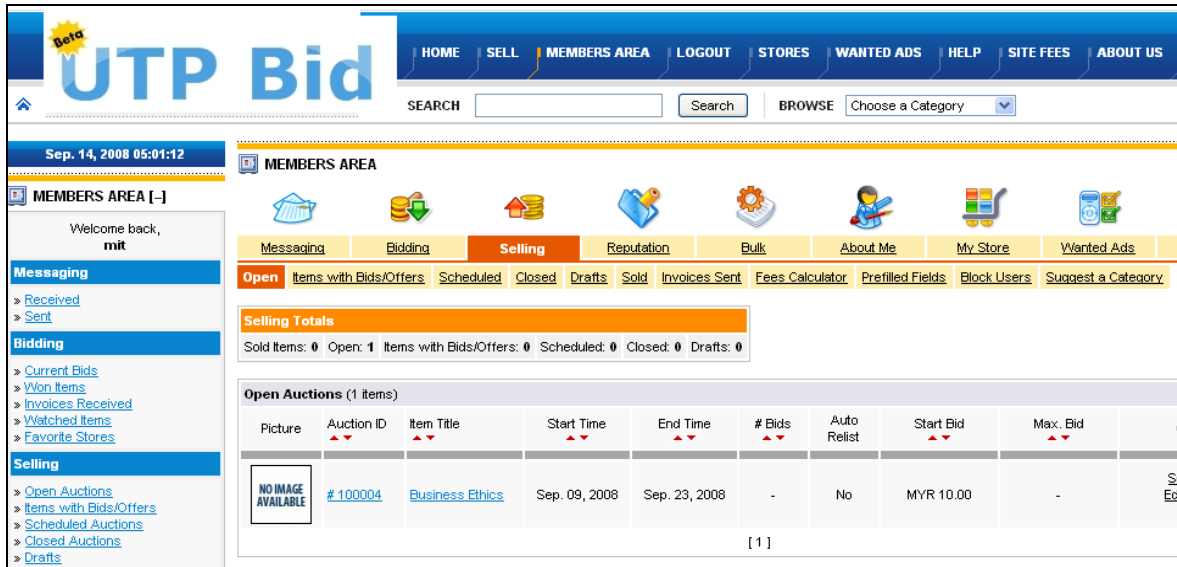


Figure 22: Selling site

**My Account** – section for registered and logged in user to view and edit the personal information if necessary.

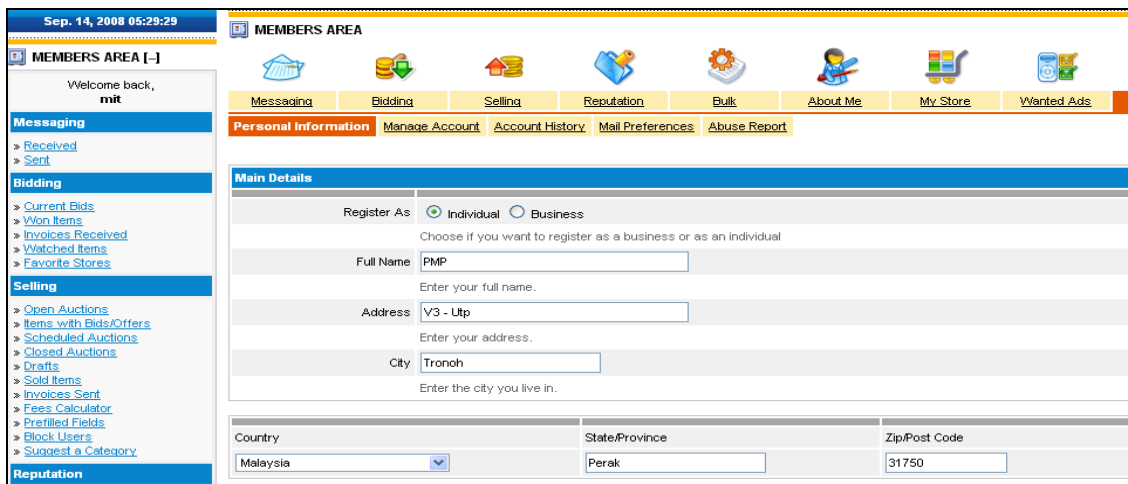


Figure 23: My Account site

### 4.2.3 Usability Testing

After the Planning, Analysis, Design, and Implementation phases have been conducted successfully, the author of the project continues with the Usability Testing. The results of the testing are best illustrated by the (i) Download speed comparison (See Figure 24: Download Speed Comparison) and (ii) Effectiveness of the system (See Figure 25: Effectiveness of the System)

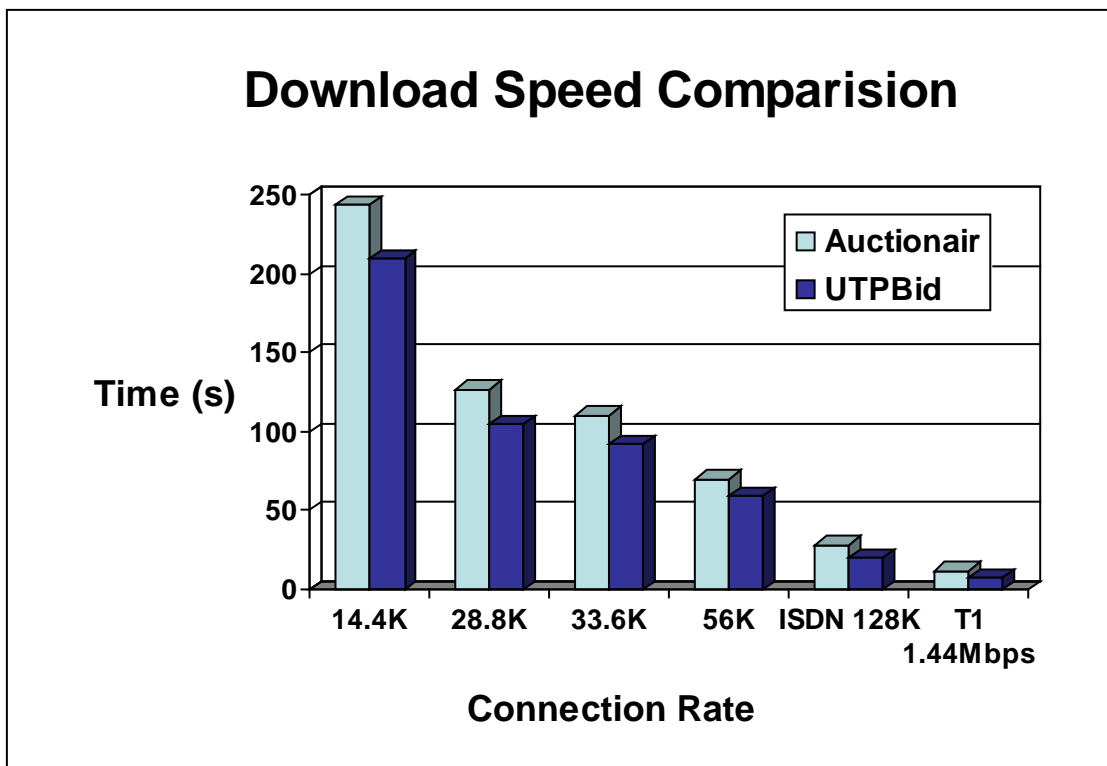
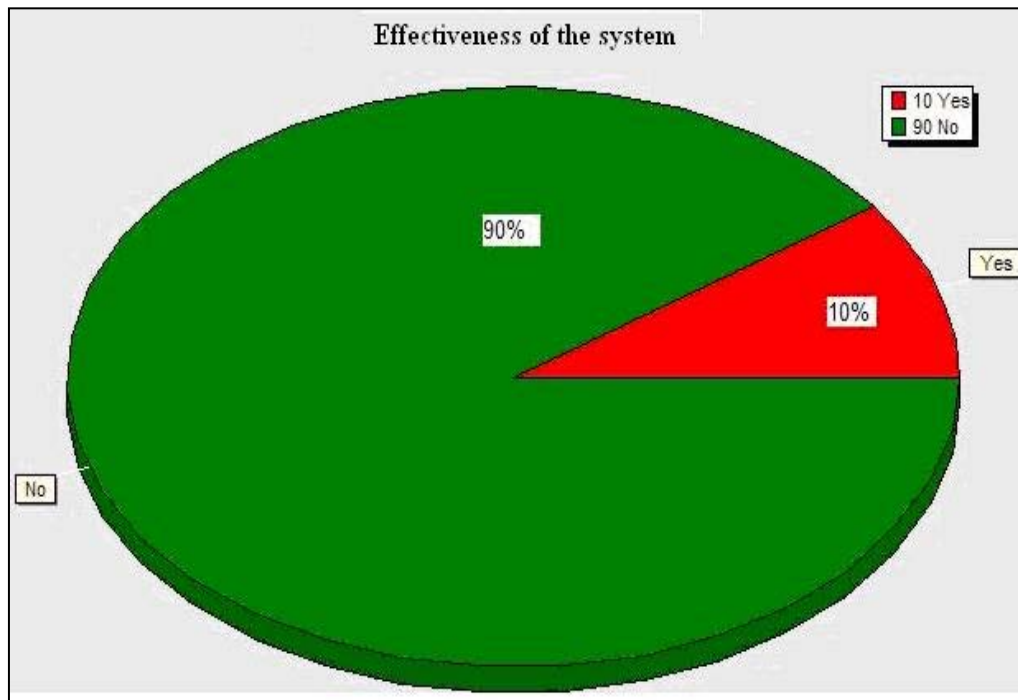


Figure 24: Download Speed Comparison

Figure 22 represents the comparison of the speed response between the [www.auctionair.co.uk](http://www.auctionair.co.uk) and UTPBid system. [www.auctionair.co.uk](http://www.auctionair.co.uk), as mentioned above, is currently a well-known online auction website that is applying inverse auction



method. To ensure for the accuracy and fairness of the comparison, UTPBid System has been uploaded to a free web hosting: <http://www.hostmonster.com>. Figure 22 has been extracted from the report on the web download speed measurement taken by the software called OpenWebLoad. We can clearly that there is always a considerable difference of the response speed between the two websites. UTPBid system has been proved to respond faster than auction.co.uk no matter what the connection rate is.



**Figure 25: Effectiveness of the System**

There were 10 respondents for the survey on the effectiveness of the system. 90% of them (9 persons out of 10) have been pleased with the effectiveness and efficiency of the system. Only one out of ten respondents felt that the system is not really effective since he is not interested in trading.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Conclusion**

The report presented one of the new mechanisms, business models so called “inverse auction” or in specific, Lowest Unique Bid Auction applying in Ecommerce recently but has not been introduced to universities widely. The report brought an overview of this interesting method and the need of applying it into universities. Some researches on existing websites using the same concepts have also been discussed in the report in order to understand it deeply and make necessary changes to suit the needs and situation of the environment that the project is going to be implemented.

UTP Bid System, being implemented and designed by PHP as well as applied AJAX technology, has overcome the limitation of other current website in terms of loading speed, especially in a small-scale environment like universities where the bandwidth usage limitation is low. Last but not least, Content Management System has been used to bring more ease and convenience for the administrators who might not have much IT knowledge to manage the site without the help of the programmers. CMS promotes for the commercialization of the system in the near future since different customers can modify the system differently to suit their needs and want without difficulty.

#### **5.2 Recommendation**

The author has judged that this topic is very interesting and would attract a large number of people once it is developed successfully. Within the limited timeframe (two semesters) the author does not have enough capability to enhance the topic further. But the enhancement on this topic in terms of mobile application can be done in the near future which can bring more convenience to the users.

## REFERENCES

1. <http://www.ecommerce-guide.com/essentials/ebay/article.php/3577471>
2. <http://marketplace.sitepoint.com/auctions/14276>
3. [http://www.ofcom.org.uk/tv/obb/prog\\_cb/obb68/](http://www.ofcom.org.uk/tv/obb/prog_cb/obb68/)
4. <http://answers.yahoo.com/question/index?qid=20071123091212AA1Shtd>
5. Amnon Rapoport – University of Arizona and Hong Kong University of Science and Technology, Hironori Otsubo – University of Arizona, Bora Kim – University of Arizona, William E. Stein – Texas A&M University, July 17, 2007
6. Monderer & Tennenholtz, 2000
7. Monderer & Tennenholtz, 2004
8. Bajari & Hortacsu, 2004
9. Ivanova-Stenzel & Sonsino, 2004
10. Ockenfels, Reiley, and Sadrieh, 2007
11. Associate Professor of Marketing, Goizueta Business School, Emory University, American Marketing Association, July 2003
12. Mediate Communication Sdn Bhd. Data access: 13 February 2008  
[http://www.kliatimes.com.my/pdf/Bid\\_To\\_Win\\_Terms\\_and\\_Conditions.pdf](http://www.kliatimes.com.my/pdf/Bid_To_Win_Terms_and_Conditions.pdf)
13. Advantages of AJAX. Date access: 27 March 2008  
<http://en.wikipedia.org/wiki/AJAX>
14. Other advantages of AJAX. Date access: 27 March 2008  
<http://www.ajaxwith.com/Ajax-Advantages.html>
15. Overview on inverse auction. Date access: 12 February 2008.  
<http://ask.metafilter.com/30893/Reverse-price-auctions>
16. Online shopping website applying lowest unique bid auction. Date access: 12 February 2008  
<http://www.bassabids.com/>
17. Well-known website on highest and lowest unique bid auction. Date access: 12 February 2008.  
<http://www.auctionair.co.uk/>

18. Rapoport, A., Otsubo, H., Kim, B., & Stein, W. E. (2007). "Unique Bid Auctions: Equilibrium Solutions and Experimental Evidence", working paper.
19. Östling, R., Wang, J., Chou, E., & Camerer, C. (2007). "Field and Lab Convergence in Poisson LUPI Games", SSE/EFI Working Paper Series in Economics and Finance No. 671
20. [http://en.wikipedia.org/wiki/Content\\_management\\_system](http://en.wikipedia.org/wiki/Content_management_system)

## APPENDICES

### APPENDIX A: How to Win in a Lowest Unique Bid Auction



## APPENDIX B: Interface of Auctionair website

The screenshot displays the Auctionair website interface. At the top, the logo "Auctionair™" is in red. A navigation bar includes links for "Testimonials", "FAQs", "Charity partners", and "About us". Below this, a menu highlights "HIGH BID Auction" and "LOW BID Auction", with "SALE - Unclaimed Wins" also visible. A secondary menu lists categories: "Holidays", "Weekends", "Technology", "Adventure", and "Style". A search bar with a "GO" button is on the right. The breadcrumb "You are here: Home" and the date "Thu, 21 Feb 2008 10:10:56 UK time" are shown.

The main content area features a "Welcome to Auctionair" message: "Hand-picked Lots. Easy-to-use sealed bidding. Low Entry Fees. Just name your price...". Below this, five featured items are displayed with their respective images and minimum bid prices:

- Sony 40in LCD TV (Min Bid £740.00)
- TN6 sailing watch (Min Bid £50.00)
- Orient Express Blenheim (Min Bid £20.00)
- Nikon Coolpix P50 (Min Bid £20.00)
- Bentota, Sri Lanka (Min Bid £50.00)

Two main auction sections are highlighted:

- HIGH BID Auction**: "Highest bid wins!" on Wednesday 3rd March. A featured lot is "Eight nights in the land of sun, sea and sapphires - Sri Lanka - staying at Taj Exotica Bentota (5 star)".
- LOW BID Auction**: "Reverse Auction" with "Lowest unique bid wins!". A featured lot is "The new Mini Cooper S Mark II (140MPH)" with a "MIN BID: £1.00".

A left-hand navigation sidebar contains buttons for "How does it work?", "Bidding Tips", "Results", "Browse The Lots", and "My Account".

## LOW BID AUCTION - Lot:3781

### Bid now for The new Mini Cooper S Mark II (140MPH)

[Click here to place a bid !](#)

So far 16 Mini Cooper S's have been sold. The most any one of those winners paid was £126 and the cheapest was £5.

WORTH UP TO £16,900 (OTR RRP)  
Goes to the Lowest Unmatched Bid.  
Minimum bid: £1.00

Max number of bids	945
Bids placed so far	320
Bids still required	625
Max bids per person	10
Entry fee / bid	£25.00
Minimum bid	£1.00
Lowest ever win	£5
Winners so far	7

[Index of Lots](#) | [Previous results](#)

**Bid here!**

The lowest **unmatched** bid wins  
- BID NOW

## 1. Enter your bids

There is an entry fee for bidding, as indicated. Please note:

- Preset number of bids makes **high chance of winning**
- **Your bids are "sealed"** - no one else will be able to see them until the auction is closed.

You may use this form to place <b>bids</b> . Bids must be in <b>whole numbers</b> of £ GBP only.	
Your 1st Bid:	£ <input type="text"/> .00
Your 2nd Bid:	£ <input type="text"/> .00
Your 3rd Bid:	£ <input type="text"/> .00
Your 4th Bid:	£ <input type="text"/> .00
Your 5th Bid:	£ <input type="text"/> .00
Your 6th Bid:	£ <input type="text"/> .00
Your 7th Bid:	£ <input type="text"/> .00
Your 8th Bid:	£ <input type="text"/> .00
Your 9th Bid:	£ <input type="text"/> .00
Your 10th Bid:	£ <input type="text"/> .00
	<input type="checkbox"/> I have read and agree to the <a href="#">Terms &amp; Conditions here.</a>
	<b>Place bid</b>
	<i>N.B. There is an entry fee of <b>£25.00</b> per bid as indicated above.</i>



### MY LOW BIDS

Lot #	Lot Name	Worth up to	My Bid	Entry Fee Due	
3781	Mini Cooper S (MKII) ( <a href="#">Lot details</a> )	£16,900 (OTR RRP)	<input type="text" value="6"/> <a href="#">Amend Bid</a>	£25.00	<a href="#">X</a>

### ENTRY FEES

Total LOW Bid entry fees before discount:	£25.00
Total LOW Bid entry fees:	<b>£25.00</b>

### AMOUNT DUE

Total HIGH Bid entry fees:	£0.00
Total LOW Bid entry fees:	£25.00
Total Buy-It-Now purchases:	£0.00
<b>TOTAL DUE:</b>	<b>£25.00</b>
I have read and agree to the Terms & Conditions <a href="#">here</a> :	<input checked="" type="checkbox"/>
	<a href="#">Checkout</a>
Special Promotion Code (if any)	<input type="text"/>

## APPENDIX C: Interface of Bassabids website

Online Auctions at BassaBids.com - Mozilla Firefox






File Edit View History Bookmarks Tools Help

http://www.bassabids.com/

Getting Started Latest Headlines Mozilla Firefox Start P...

lowest unique bid auction - Google Se... Unique bid auction - Wikipedia, the fr... Reverse price auctions | Ask MetaFilter Online Auctions at Bas

The Market Place ))
number of online auctions **6**

	<p><b>MacBook Pro</b></p> <p>Started: Apr 30th, 2007   Bids remaining until auction ends: 71.4 %</p> <p>Top of the line 17 inch Apple MacBook Pro online auction</p> <p>Value of goods: \$ 2799.00</p> <p style="text-align: right;"><a href="#" style="background-color: #0056b3; color: white; padding: 2px 5px;">BID NOW</a></p>
	<p><b>Sony 46" TV</b></p> <p>Started: Apr 30th, 2007   Bids remaining until auction ends: 80.0 %</p> <p>The latest Sony 46" Bravia HDTV</p> <p>Value of goods: \$ 3799.99</p> <p style="text-align: right;"><a href="#" style="background-color: #0056b3; color: white; padding: 2px 5px;">BID NOW</a></p>
	<p><b>Buell Lightning</b></p> <p>Started: Apr 30th, 2007   Bids remaining until auction ends: 94.2 %</p> <p>The fast Buell Lightning Super TT XB12STT</p> <p>Value of goods: \$ 10295.00</p> <p style="text-align: right;"><a href="#" style="background-color: #0056b3; color: white; padding: 2px 5px;">BID NOW</a></p>
	<p><b>MINI Convertible</b></p> <p>Started: Apr 30th, 2007   Bids remaining until auction ends: 97.5 %</p> <p>The fast and mighty MINI Cooper S Convertible</p> <p>Value of goods: \$ 27299.20</p> <p style="text-align: right;"><a href="#" style="background-color: #0056b3; color: white; padding: 2px 5px;">BID NOW</a></p>
	<p><b>IPOD Touch</b></p> <p>Started: Dec 10th, 2007   Bids remaining until auction ends: 44.9 %</p>

**Past Winners!**

Auction	Winning Bid:
IPOD Shuffle J S from Australia	\$ 0.02
Apple TV M M from USA	\$ 0.21
IPOD Shuffle M M from USA	\$ 0.05
IPOD Touch T P from UK	\$ 0.30
IPOD Shuffle M M from USA	\$ 0.14
IPOD Shuffle T A from Spain	\$ 2.19
IPOD Shuffle M M from USA	\$ 0.06
Apple TV R J from USA	\$ 5.91
IPOD Shuffle J P from Brazil	\$ 0.11
IPOD Touch J P from Brazil	\$ 0.59
IPOD Shuffle S P from United Kinadom	\$ 0.32