Rapid Application Development of Fotheby’s Auction House

By

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| **Course: BSc Computing** | | | | **Year: 3** | | **Software Engineering 3** | | |
| **Assignment No: 1** | | **Title: The Design and Development of Client-Driven Software Solution Using a Rapid Application Development/Agile Hybrid Development Methodology** | | | | | | |
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8. INTRODUCTION

For the semester II assignment of CSY3013, we are given a task to design and develop software solution for Fotheby’s, which is an international auction house for the sales of fine arts. The software should be produced as number of prototypes following agile methodology or rapid application method of software development.

This report is produced to keep track of application development from beginning to end. This report is about the design and development of web-based application for the given company, comprising of project background justifying purpose of the project with aims and objectives, overview of elicitation activities performed through workshops and description of relevant problem domains, formulation of requirement specification, system analysis and design for its development, system construction notes, testing and evaluation strategy of the proposed system and conclusions of the proposed project.

* 1. Project Background

With the aim of digitalizing their system of working, ‘Fotheby’s Auction House’, an auction house for the sales of fine arts is contemplating towards effective solution for their hectic working due to manual system of working.

Fotheby’s Auction House is an auction house specializing in the sales of fine arts through auctions, involving interested buyers and sellers in the process, helping prospective sellers sell their items and buyers find reliable items. The company currently does catalogue distribution before auction as the means of advertisement of available items, items being classified into five categories.

The company is considering uplifting towards computerization to eliminate manual processes obstacles of auctions for the fast and effective search mechanism for its many clients.

Following Rapid Application design and development methodology of the required application, system requirements are collected through group workshop 1 from the conversation with given stakeholders of the company since given requirements are ambiguous and not enough. Through Workshop 1, we got to know about business needs and specific requirements and solutions for effective functions of events. And to ensure effective design of the system, workshop 2 was conducted with the given stakeholders, by which we all came to specific system designs conclusion and hence proceed then towards system construction.

* 1. Project Aims and Objectives
     1. Aims

The aims of this project are given below:

* To make it feasible for the Fotheby’s to switch manual system of working into digitalized system of operations.
* To make operations of the company fast and secure.
* To follow rapid application development methodology for the design and construction of the project.
  + 1. Objectives
* Identify and collect requirements for the project conduction by organizing workshops with the stakeholders of Fotheby’s, analyzing existing business operation, given basic specifications and comparable system in the market.
* Design the system as per the company requirements, going through workshops.
* Build the prototypes in the suitable environment, using suitable programming tools with company feedbacks.
* Authorize and authenticate user controls in the system.
* Make the prototypes feasible for performing required company operations.
* Test and validate every functionality adapted on the company behalf so that the prototype is usable and runs smoothly.
* Constantly apply company’s feedbacks and frameworks and needs in the development.
* Develop application prototype with as many functionalities as we can in the given time frame.

1. REQUIREMENTS ENGINEERING

To ensure the optimal requirements are received, I will first be conducting group **conversation** with given stakeholders of a company about the current system and the changes they would like to bring and the kind of functionalities they would like to incorporate as the specifications are left quite vague. Like problem domain investigation, the provided individuals related to company are examined, for which necessary steps are to be taken which are explained below:

* 1. Elicitation Activities

Elicitation activities are the way of obtaining information about the system requisites. There are many types of elicitation practices in the design and development of software. But since we are going to follow agile/ rapid application design and development of software, we are going to conduct related workshops in an account for the elicitation phase, followed by construction and testing of the system. Only the basic specifications have been provided, that is why we need to collaborate with stakeholders to gain full understanding of how the system should be. There are going to be two workshops carried out in a group. The first workshop, basically joint requirement planning, will be conducted in a group of 8 members who will eventually build software prototypes, in the presence of 3 stakeholders available who are **Mr. Max Fotheby** (owner of the company and writer of basic client specification), **Mr. Mark Jones** (buyer/seller client of the company), **Mr. Paul Smith** (potential client of the company). The intention of the first workshop is to find out the requirements of a system with the presence of important individuals from the company through member discussion and interviews, so that they will be there to give instant feedbacks and go-ahead to decisions, which in turn facilitates sound and dependable requirements. The next workshop will be conducted after the first one, with the intention of producing and finalizing good designs for the system, using mock-ups and wireframes. The stakeholders present can point out the mistakes in the designs, so that software prototype with good design can be constructed. At the later stages, we are going to review comparable systems in the market and relevant legislations.

* + 1. Individual Workshop 1 Plan

Various information was collected and plan for the workshop 1 was prepared individually which are described in the sub-sections below.

* + - 1. Rationale

This workshop is to be conducted to determine the system requirements in a way that ensures each requirement are properly aligned with Fotheby’s aims and objectives, which is why the stakeholders are present during the entire workshop. The ideas will be built upon the basis of basic requirements provided. This is one of the important tasks that needs to be carried out foremost because it will help to gain understanding of the company operations and necessary amendments for the solution prototypes, which will eventually become company application. This section will further point out aims and objectives of the workshop.

AIMS:

The fundamental goal for this client workshop (Workshop 1) between key stakeholders is to gain the proper understanding of the problem domain surrounding the given problem discourse, identify the depth of problems, study the given system requirements, discuss how feasible it is, identify, strategize, and develop more and high-level system requirements on the basis of needs of the company in order to give the project faster development mechanism facilitating RAD/ agile methodology of the software development process.

OBJECTIVES:

Some of the objectives to be established are as follows:

* To understand the business model of the current system of the company with the participation of the key stakeholders and developers. This will help to gain information surrounding services provided by the auction house, the type of products it specializes in and any other financial criteria.
* To identify, understand, and examine each problem domains related to the problem background with the available stakeholders’ feedback and expertise.
* To conduct effective communication, again between key people of the given company for the proper and reliable negotiation of the system specifications aiding company needs and growth. This will further ensure commitment and interest from all around.
* To develop implicit strategy for the fast and effective development of the required solution of the problem pinned down.
* To understand the need for digitalization of the current clerical-based system so that system specification could be enhanced in a way there occurs no to less errors technically, company is benefited along with the targeted clients, company expectations are met.
  + - 1. Agenda/ Tool Selection

This section will outline the number of activities and corresponding timeframes and tools and techniques for the workshop 1. The estimated overall duration for the workshop is 1 and half hour with the timeframe starting from 9:30 am to 11:00 am.

|  |  |  |  |
| --- | --- | --- | --- |
| Activities | Tools/ techniques (if required) | Time frame | Duration |
| Introduction of the group and group members and participant engagement rules discussion. |  | 9:30am-9:35am | 5 minutes |
| Project Background and current system discussion including problem domain. | Source: Project Brief | 9:36am-9:45am | 10 minutes |
| Understanding the company needs and strategizing the system specifications. |  | 9:46am-10:00am | 10 minutes |
| Comparable System Discussion. | Source: Internet and websites. | 10:01am-10:15am | 10 minutes |
| Align Items Discussion. |  | 10:16am-10:20am | 5 minutes |
| Phase Flow Discussion. |  | 10:21am-10:25am | 5 minutes |
| Interviews |  | 10:26am-11:00am | 30 minutes |

* + - 1. Participant Engagement Commitment

This section will describe the rules every participant needs to follow which will only enhance the workshop phenomenon and results. The rules are as follows:

1. Every participant should understand the role of other participants and their significance to every decision.
2. Should use inclusive language and any form of insults to each other will not be accepted.
3. Every participant should be given equal importance and silence should be maintained while one group member is serving.
4. Avoid unnecessary talks, always be specific to the main goal.
5. Try to bring facts to the table.
6. Ask for the clarification if anybody is unclear about one’s statement or ideas.
7. Keep the discussion constructive and positive.
8. Note down participants’ is important comments.
9. Try not to rush each other, maintain the effective discussion flow.
10. Should try and follow the estimated time frame for each activity.
    * + 1. Interview Plan

Various questions were prepared individually by the group members for each provided stakeholders. Here are the questions that are formulated by me before the workshop.

|  |  |
| --- | --- |
| Problem Domain Entities | Planned Questions (Individually) |
| **Mr. Max Fotheby** (owner of the company and writer of basic client specification) | 1. How did the past client or buyer/seller register for the events? 2. How was the bidding and price of the arts and artworks used to take place? 3. Depending on the auction how did the sellers/buyers participate remotely or have to attend physically? 4. Were there any difficulties of time constraints while organizing? 5. Was there any involvement of intermittent or mediator during the bidding process? 6. How strong was your security during the physical bidding? 7. How did you deposit the bidding cheque or money? 8. How was the arts and artworks were credited and how was their basic price indicated? 9. What used to happen if two people enter the same maximum bid? 10. Was there any limitation of amount during the bidding process? |
| **Mr. Mark Jones** (buyer/seller client of the company) | 1. How did you note the price of the artworks as higher or lower price? 2. Did every art piece information give detailed visualization? 3. How often the fake pieces or theft used to occur? 4. Would it be convenient for you to be bidding take place online or physical? 5. How hard it is if your client is from different time constraints or geographical location? 6. Which on do you think cheque, real money or credit card holds viable during this type of event? 7. How did you used to participate or register in these types of events? 8. Are timed auctions like eBay? 9. Will selling through auction helps you to maximize your profits? 10. How often do you have a problem during cooperating and negotiating price with sellers/buyers? |
| **Mr. Paul Smith** (potential client of the company) | 1. Do you think live online auction can replace traditional auctions? 2. Don’t you think there will be more technical problems when you go through online bidding? 3. How did you think online registration should take place? 4. How will you check the sellers/buyers’ authenticity? 5. How did you think can company benefits through online auctioning? 6. Will online auctions help to achieve the company more profits? 7. What happens to the payment during the online bidding and auctioning? 8. What happens to the items that are win by auction through online? 9. How does live auction work? 10. Will all the auctions proceed in same way? |

* + 1. Group Workshop 1 Plan

This section points out group plan for the workshop 1. This is produced with group discussion between group members, reviewing and finalizing each individual plan.

* + - 1. Rationale

For the software engineers involved to get the proper underlying knowledge, get into the root of the given system, company functionalities, various workshops need to be conducted.

This section further points out the aims and objectives of the workshop.

AIMS:

* To gain a proper understanding of the problem domain.
* To clarify ambiguities with the system clients.
* To follow agile approaches of software development, find the techniques for elicitation process.
* To understand the views of all stakeholders and deliver the prototype in accordance with the client’s need.

OBJECTIVES:

* Examine any pre-existing solution systems and identify their pros and cons.
* Identify proper elicitation techniques to conduct effective communication between key stakeholders.
* To accurately describe the problem domain and system specifications aiding company needs and growth.
  + - 1. Agenda/ Tool Selection

**Date**: December 18, 2021

**Venue**: Workshop 201

**Expected** **Duration**: 2 hours

|  |  |
| --- | --- |
| Time | Activity |
| 9:30 - 8:35 | Getting ready for the group discussion |
| 8:35 - 8:45 | Group discussion of the aims and objective |
| 8:45 - 9:05 | Group discussion of the questionaries |
| 9:05 – 9:10 | Meeting the stakeholder: Mr. Max Fotheby |
| 9:10 - 9:30 | Interviewing Mr. Max Fotheby with team members |
| 9:30 - 9:35 | Meeting the stakeholder: Mr. Mark Jones |
| 9:35 - 9:55 | Interviewing Mr. Mark Jones with team members |
| 9:55 – 10:00 | Meeting the stakeholder: Mr. Paul Smith |
| 10:00 - 10:20 | Interviewing Mr. Paul Smith with team members |

* + - 1. Participant Engagement Commitment

This section will describe the rules every participant needs to follow during the workshop, formulated in group. The rules are as follows:

1. All participants must be punctual and polite.
2. They should express all questions clearly in plain language.
3. They should attempt to put the interviewee at ease.
4. The conversation that disregards the purpose of the workshop should not be held.
5. The electronic device should not be used for unnecessary purposes while doing the workshop activities.
6. A workshop should be conducted as per the agenda made.
7. Agree on a time limit rule for disagreements.
   * + 1. Interview Plan

Various questions were finalised by the group for each available stakeholder. Here are the questions that are formulated by the group before the workshop.

|  |  |
| --- | --- |
| Problem Domain Entities | Planned Questions (Group) |
| **Mr. Max Fotheby** (owner of the company and writer of basic client specification) | 1. How did the past client or buyer/seller register for the events? 2. Were there any difficulties with time constraints while organizing an auction? 3. How much percent does the traditional method of record-keeping affecting in the overall growth of the company? 4. Was there any involvement of intermittent or mediator during the bidding process? 5. Can anyone bid on the behalf of others in the auction? 6. Did you use any kind of computerized system before? If yes, how was your experience using it? 7. What sort of data do you want to store in your database? 8. What is the estimated budget for the project? 9. What is the timeframe for the project? 10. Any suggestions for system interface design? 11. How many staffs do you employ currently? 12. What is the benefit of showing the record details of the buyer and sellers? 13. Is there any premium membership given to a regular buyer or seller? 14. Are there any opening bids, minimum bids, or any limit for bidding? |
| **Mr. Mark Jones** (buyer/seller client of the company) | 1. How long have you been doing business with the company? 2. How did you use to participate or register in these types of events? 3. Which specific category of the item do you sell or buy mostly? 4. What do you think of the current clerical inventory system? 5. What are the benefits you are receiving from the company while buying and selling the items? 6. What kind of security are you getting while doing a transaction of any buying/selling item? 7. How often do fake pieces or theft use to occur? 8. Would it be convenient for you to have bidding take place online or physically? 9. Do you think, switching from a clerical to a computerized system would benefit you and the company in any way? 10. Is the information of the items enough? Do you like to see some other information about the items? 11. Would you like to have training for a new computerized system? |
| **Mr. Paul Smith** (potential client of the company) | 1. How often do you see yourself using an online auction system? 2. What happens to the payment during the online bidding and auctioning? 3. Why do you think live online auctions can replace traditional auctions? 4. Don’t you think there will be more technical problems when you go through online bidding? 5. How do you think online registration should take place? 6. How do you check the sellers/buyers’ authenticity? 7. How do you think the company benefits from online auctioning? 8. What would be the bare minimum features a modern auction system must include? 9. Why do you think the web-based auction system will increase the sales price? 10. How do you contact the buyer/seller while selling items? |

* + 1. Workshop 1 Findings

This section is about findings of the workshop 1, which is basically an outcome of the discussion with the stakeholders.

Title: Discusssion with Mr. Max Fotheby

Date and Time: 2021-12-24 9:05am-9:30am

Duration: 25 minutes

Group members in attendance:

* Kushal Upreti
* Prawesh Gautam
* Shubham Singh Gurung
* Milan Khatiwada
* Pratima Phuyal
* Prajita Upreti
* Sweta Shrestha
* Bipashu Thakuri

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| --- | --- | --- |
| Question Number: | Question: | Client-Response: |
| 01 | How did the past client or buyer/seller register for the events? | Past buyers and sellers used to come to the auction house and sign the consent form. Their details are then examined, either they are true or false. And for certain events, they registered by using their details. |
| 02 | Were there any difficulties with time constraints while organizing an auction? | Yes, weather and space constraints while organizing advertisements and events. |
| 03 | How much percent does the traditional method of record-keeping affecting in the overall growth of the company? | Since all the operations are carried out manually, the auctions could not be carried out in bulks. For example, auction of only 20-30 items can be carried out per day. So yes, the manual thing has been affecting the company sales. |
| 04 | Was there any involvement of intermittent or mediator during the bidding process? | Yes, if it was for the behalf of certain company, an individual representative for that company could bid; but not on the behalf of another individual. |
| 05 | How do you think online registration should take place? | Yes, as I have mentioned before: An individual representing certain company can, an individual for another individual cannot. |
| 06 | Did you use any kind of computerized system before? If yes, how was your experience using it? | No, we have not. |
| 07 | What sort of data do you want to store in your database? | All the client records should be stored with proper encryption so that one user would not access another user information. |
| 08 | What is the estimated budget for the project? | 25,000 pounds. |
| 09 | What is the timeframe for the project? | 3-4 months, with demonstrating prototype models in between. |
| 10 | Any suggestions for system interface design? | User interfaces should be simple and eye-catching but not too loud. |
| 11 | How many staffs do you employ currently? | 10-12. |
| 12 | What is the benefit of showing the record details of the buyer and sellers? | It could be helpful in discovering remaining items and sold items in the company. |
| 13 | Is there any premium membership given to a regular buyer or seller? | Yes, like VIP cards to business icons. |
| 14 | Are there any opening bids, minimum bids, or any limit for bidding? | Minimum bids should be 10,000 pounds. |

Title: Discussion with Mr. Mark Jones

Date and Time: 2021-12-24 9:30 am-9:55 am

Duration: 25 minutes

Group members in attendance:

* Kushal Upreti
* Prawesh Gautam
* Shubham Singh Gurung
* Milan Khatiwada
* Pratima Phuyal
* Prajita Upreti
* Sweta Shrestha
* Bipashu Thakuri

|  |  |  |
| --- | --- | --- |
| Question Number: | Question: | Client-Response: |
| 01 | How long have you been doing business with the company? | I have been working with them for 25 years. |
| 02 | How did you use to participate or register in these types of events? | First, if I want to buy or sell, we need to fill up the agreement form, which will be made available by Mr. Fotheby. If I want to sell the products, I need to wait for 4-5 hours which is mostly the hectic task. Next thing, the clients are less so there might not be higher bids which leads to profit decrease. |
| 03 | Which specific category of the item do you sell or buy mostly? | There are no specifics. I explore through the catalogues provided by the company. Nonetheless, I mostly deal with paintings. |
| 04 | What do you think of the current clerical inventory system? | It is a total hectic task. The worst part is regarding the payment, converting paper into money taking 10 days minimum and delivery of the products. |
| 05 | What are the benefits you are receiving from the company while buying and selling the items? | Commissions. |
| 06 | What kind of security are you getting while doing a transaction of any buying/selling item? | It is totally cheque dependent. So, the security is optimum. |
| 07 | How often do fake pieces or theft use to occur? | No, that does not occur. Because all the items are investigated and then only authorized for the auction. There are legal teams which will identify if the products are illegal. If the item is fake, it is penalized as per the current rules of the company. |
| 08 | Would it be convenient for you to have bidding take place online or physically? | Online. |
| 09 | Do you think, switching from a clerical to a computerized system would benefit you and the company in any way? | Yes. Maximum people have lost their interests because they need to be physically present at the auction house and it might not be easier for them to reach on time. When it is online, it is easier because it is just a work of clicking buttons and bidding. Notifications can be provided based on area of interests immediately. |
| 10 | Is the information of the items enough? Do you like to see some other information about the items? | Catalogues only provide limited information. If you go online, you can include more information in detail. |
| 11 | Would you like to have training for a new computerized system? | Yes, because I am myself new to the technology. It would be helpful for us if there are some auto suggestions or instructions demo videos. |

Title: Discussion with Mr. Paul Smith

Date and Time: 2021-12-24 9:55 am-10:20 am

Duration: 25 minutes

Group members in attendance:

* Kushal Upreti
* Prawesh Gautam
* Shubham Singh Gurung
* Milan Khatiwada
* Pratima Phuyal
* Prajita Upreti
* Sweta Shrestha
* Bipashu Thakuri

|  |  |  |
| --- | --- | --- |
| Question Number: | Question: | Client-Response: |
| 01 | How often do you see yourself using an online auction system? | Well, talking about the online auction system which is comparatively new for me. So, I think if the system is user-friendly, there is a high chance that I would use the system. |
| 02 | What happens to the payment during the online bidding and auctioning? | I think providing the option of online payment available in the system that will help the client to make an instant payment and also the auction house will get benefitted. |
| 03 | Why do you think live online auctions can replace traditional auctions? | In my opinion, I do not think online auctions can completely replace traditional auctions until and unless proper information of the items, the expected price range are provided online. |
| 04 | Don’t you think there will be more technical problems when you go through online bidding? | Well, being a user, the technical way can be difficult to adapt. So, the primary focus of you guys should be implementation of features and usability of the system. Talking about technical problems, the devices we are using right now might not be able to support the system. |
| 05 | How do you think online registration should take place? | Talking about the online registration, basic information could be included in the registration process and furthermore, client information could be filtered or can be changed based on the any events auction house host. |
| 06 | How do you check the sellers/buyers’ authenticity? | If you are talking about the online system, providing information about the total sales of the seller or the information of products buyer is interested in along with the basic details or the verification form could be helpful for users like us to verify or trust buyers or sellers. |
| 07 | How do you think the company benefits from online auctioning? | Just like I mentioned earlier, if you could provide information about the items through online catalogues, then some users might get interested in those items and participate in the auction process. So, that will eventually benefit the auction house. |
| 08 | What are the bare minimum features a modern auction system must include? | There are certain features like I mentioned earlier like online payment, detailed product catalogue, information about the auction date. Also if you could provide interactive tool of the auction house itself, it will be helpful for users like us to visit the auction house without visiting the auction house physically. |
| 09 | Why do you think the web-based auction system will increase the sales price? | I do not think it will completely help increase the sales price but there are certain aspects because of which it will help overall increasing of price during the auction as there might be more buyers interested in the products, eventually increasing sales price of the items. |
| 10 | How do you contact the buyer/seller while selling items? | I do not want any other users to see my contact information. There is a auction house as a common point of contact. |

* + 1. Individual Workshop 2 Plan

Various information was collected and plan for the workshop 2 was prepared individually which is described as below.

* + - 1. Rationale

This workshop is to be conducted to produce system designs in a way that ensures all the users and important stakeholders are happy with, which is why the stakeholders are present during the entire workshop. Prototyping tools such as FIGMA will be used to produce wireframes and mock-ups of the required system, individually. All the individual prototypes are examined during the workshop and modified until all the users and stakeholders are satisfied. The available stakeholders will be presented throughout the workshop to pour their needs on the user-designs. This is one of the important tasks that needs to be carried out after the understanding of the problem domain has been gained because it allows clients to have full accountability in project design, by giving them chance to share their views. This section will further point out aims and objectives of the workshop.

AIMS:

The fundamental goal for this client workshop (Workshop 2) between key stakeholders is to develop system designs in a way that solves the problem Fotheby is facing, by getting deeper into the cause of the problems, learning further company needs from the available stakeholders and encapsulating it in the product designs conducted after the requirements are identified from the workshop 1in order to give the project faster development mechanism facilitating RAD/ agile methodology of the software development process.

OBJECTIVES:

Some of the objectives to be established are as follows:

* To use stakeholders’ involvement and group dynamics to accurately depict user’s view of the business needs and to jointly develop a solution.
* To review system requirements and negotiate system interfaces between the available users and develop a prototype using prototyping tools. Wireframes and Mock-ups are developed using FIGMA.
* To potentially remove all the risks, by integrating teamwork between engineers and stakeholders of the company and produce a design from users’ perspectives, minimizing development time, costs, and errors.
  + - 1. Agenda/ Tool Selection

This section will outline the number of activities and corresponding timeframes and tools and techniques for the workshop 1. The estimated overall duration for the workshop is 1 and half hour with the timeframe starting from 10:30 am to 12:00 pm.

|  |  |  |  |
| --- | --- | --- | --- |
| Activities | Tools/ techniques (if required) | Time frame | Duration |
| Introduction of the group and group members and participant engagement rules discussion. |  | 10:30am-10:35am | 5 minutes |
| Reviewing the company needs and strategizing the system specifications incorporating user designs. | Source: Workshop 1 Findings | 10:36am-10:55am | 20 minutes |
| Finalize and set the vision for the project. |  | 10:56am-11:05 am | 10 minutes |
| Evaluating individual designs. | Source: Group Members | 11:06am-11:35 am | 30 minutes |
| Design Tool Discussion. | Source: Internet | 11:36 am-11:40am | 5 minutes |
| Finalizing system design. |  | 11:41am-12:00pm | 20 minutes |

* + - 1. Participant Engagement Commitment

This section will describe the rules every participant needs to follow which will only enhance the workshop phenomenon and results. The rules are as follows:

1. Every participant should understand their roles and should be presented with their designs.
2. Every participant should be given equal importance and silence should be maintained while one group member is serving.
3. Avoid unnecessary talks, always be specific to the main goal.
4. Try to bring facts to the table.
5. Ask for the clarification if anybody is unclear about one’s statement or ideas.
6. Keep the discussion constructive and positive.
7. Note down participants’ is important comments.
8. Try not to rush each other, maintain the effective discussion flow.
9. Should try and follow the estimated time frame for each activity.
   * + 1. Wireframes

Wireframing is used in the designing of the system layouts. Wireframing of the key system elements are as follows:

Graphical user interface, text

Description automatically generated

Fig 1: Buyer Bidding Specification (Wireframing)

Graphical user interface, text

Description automatically generated

Fig 2: Sold Item details with calculated commission (Wireframing)

Graphical user interface, application

Description automatically generated

Fig 3: Item details (Wireframing)

Graphical user interface, application

Description automatically generated

Fig 4: USER LOGIN (Wireframing)

Graphical user interface

Description automatically generated

Fig 5: Item Registration (Wireframing)

* + - 1. Mock-ups

Mockups of the various system elements are as follows:

Graphical user interface

Description automatically generated

Fig 6: User Login (Mock-up)

Graphical user interface, text, website

Description automatically generated

Fig 7: Seller items (Mock-up)

Graphical user interface, text, website

Description automatically generated

Fig 8: Seller pending-sales items (Mock-up)

Table

Description automatically generated

Fig 9: Seller Sold items (Mock-up)

Table

Description automatically generated

Fig 10: Fotheby’s bided items (Mock-up)

Graphical user interface, text

Description automatically generated

Fig 11: Bids Review (Mock-up)

Graphical user interface, text, website

Description automatically generated

Fig 12: Catalogue (Mock-up)

Table

Description automatically generated

Fig 13: Item verification (Mock-up)

Graphical user interface, text, website

Description automatically generated

Fig 14: Auctions (Mock-up)Graphical user interface, text, application, email, website

Description automatically generated

Fig 15: Search items (Mock-up)

Graphical user interface, website

Description automatically generated

Fig 16: Buyer’s Bidding Facility (Mock-up)

Graphical user interface, text, website

Description automatically generated

Fig 17: Bought Items (Mock-up)

* + 1. Group Workshop 2 Plan

This section points out group plan for the workshop 2. This is produced with group discussion between group members, reviewing and finalizing each individual plan.

* + - 1. Rationale

The aim of this workshop is to utilize the feedback and findings of the previous RAD workshop to finalize a blueprint of the UI to help developers think and communicate about the flow and structure of the solution system.

Objectives:

1. To describe the layout of the website using wireframes.
2. To create screen mockups to finalize the fonts, colors, brand assets and navigation flow of the solution system.
3. To identify the pros and cons of the system’s design.
4. To talk about the next steps in the system design process.
   * + 1. Agenda/ Tool Selection

|  |  |  |
| --- | --- | --- |
| Activities | Timeframe | Tools |
| Verify that all members of the group and stakeholders are present at the workshop. | 10:00- 10:05 (5 minutes) |  |
| Explain participant rules. | 10:05 – 10:10 (5 minutes) |  |
| Examining the user interface of comparable auction house system. | 10:10-10:20(10 minutes) |  |
| Present individual wireframes. | 10:20-10:55 (35 minutes) | Figma |
| Combine wireframes to produce outcome. | 10:55-11:15(20 minutes) | Figma |
| Derive mockups from the wireframe output | 11:15-11:45 (30 minutes) | Figma |
| Discuss the system design. | 11:45-11:55(10 minutes) |  |
| Absorb the feedback to further develop the system. | 11:55 – 12:00 (5 minutes) |  |

* + - 1. Participant Engagement Commitment

1. Stress that all participants are equal regardless of job code.
2. Respond to ideas, not to people.
3. No “speeches” or side conversations.
4. All team members are required for the entire duration of the JAD.
5. Full participation from all the team is required throughout the JAD
6. Follow the prescribed session agenda.
7. Agree on a time limit rule for disagreements.
8. Gain consensus.
   * + 1. Wireframes

Graphical user interface

Description automatically generated

Fig 18: Add Items (Wireframing)

A picture containing shape

Description automatically generated

Fig 19: Auction (Wireframing)

Graphical user interface, website

Description automatically generated

Fig 20: Editing (Wireframing)

Graphical user interface

Description automatically generated

Fig 21: User Login (Wireframing)

* + 1. Workshop 2 Findings

Following the Workshop 2, the result from this workshop suggests that company wants simple yet eye catchy interface for user-interaction. By going through comparable system interfaces, we found out that simple interface is always intriguing. The prototype should contain dashboard for each user: buyers, sellers, and admin. The system should be of simple color, with not many color variants. All the users that are interested in company operations shall be able to register into the system as a buyer or seller, the registration form should be simple and should contain important areas specified for the users such as email address and password. There should be login system. All the users should be able to login into the system with correct credentials. All the sellers should be able to register their items through their personal dashboard. The item registering criteria should contain all the essential attributes. The company should be able to login into their dashboard and review all the items registered by seller and then only verify to the auctions. The buyer should also be able to login through safe interface. Nonetheless, all the interfaces should be clear in language and understandable. Unnecessary elements should be avoided: only the key factors should be given importance in the prototype development. The layout should be consistent through-out the interfaces in prototype which will make the potential users of the system learn the system working easily since many are still new to web technology. The texts should be of correct size so that it is understandable and versatile in audience grabbing. Alert boxes, buttons, notifications, icons should be provided so that users can be guided. The labels used should be informative.

Hence, the best design for the company is same as of what other companies usually require: simple and informative.

* + 1. Workshop Observation Critical Review

The workshops done by all the groups were observed by the other groups as a part of the assignment. All the workshops are to be critically reviewed, considering both the negative and positive aspects with necessary feedbacks for improvement.

* + - 1. Workshop 1 Observation 1

This observation inspects the first workshop of the Group A which was held on 24th December 2021 at the morning time. The group members were Salina Khadka, Sonam Renzei Sherpa, Krishna Khadka, Samir Lama, Sonam Tamang, Phurten Jung Sherpa and Prakash Tamang.

The first workshop was organized for drawing out company requirements and better understanding of problem domain, collaborating with key stakeholders. The stakeholders provided by Fotheby’s were:

**Mr. Max Fotheby** (owner of the company and writer of basic client specification)

**Mr. Mark Jones** (buyer/seller client of the company)

**Mr. Paul Smith** (potential client of the company)

All the group members were present during the workshop, and the workshop began with an introduction by every individual there. And then one of the group members introduced participant engagement rules and the discussion started. Soon, Mr. Max Fotheby started introducing his company and existing business operations such as registration of interested users and transaction of items. The environment was quiet boring till then: nobody was interrupting Mr. Fotheby, everybody was busy jotting down his sayings. He then began explaining about the basic specifications and his expectations and needs for the company. Then came the part for the discussion of problem domains. After then, some of the participants seemed involved in the discussion. After Mr. Fotheby, Mr. Mark Jones highlighted his part as persistent client of the company since many years. He then explained the processes he had to go through as a buyer and a seller of the company. After Mr Jones, Mr. Paul Smith came to the discussion about his expectations from the application as a potential client of the company: he gave his suggestions for the system processes, necessary amendments for the current business operations. The workshop was concluded after 30-40 minutes.

Some of the positive aspects of the workshop 1 of Group A can be:

1. All the 7 group members were present at the given time and given chance to introduce themselves and present their views, which shows everyone were given equal importance and the workshop was conducted with equal participation, ensuring everyone are bound about the discussion points and ideas from the workshop for the further design and development.
2. The participants did not try to unnecessarily interfere the discussion. All necessary topics were discussed carefully according to plan formulated.
3. Other than that, no one tried to violate the rules, everyone were there till the end.

Some of the negative aspects of the workshop 1 of Group A can be:

1. Although the participants did not try to unnecessarily interfere the discussion, they did not talk enough during certain topics discussion which can show that they did not do proper research about those topics.

Some of the suggestions for the fellow group can be:

* 1. There could have been more discussions intrigued by group members rather than just listening to stakeholders and jotting down the points, as every workshop discussion should be. It could have been more fun, and they could have been clearer about the topics discussed.

Other than this, everything was fine. I think the group A workshop 1 was good. It could have been made more fruitful if certain points were focused like more participation in discussion.

* + - 1. Workshop 1 Observation 2

This observation inspects the first workshop of the Group B which was held on 24th December 2021 at the morning time. The group members were Safal Sharma, Manisha Sharma, Menshi Ojha, Soman Maharjan, Tenzin Metok Sherpa, Yojita Khadka, Bibek Singh.

The first workshop was organized for drawing out company requirements and better understanding of problem domain, collaborating with key stakeholders. The stakeholders provided by Fotheby’s were:

**Mr. Max Fotheby** (owner of the company and writer of basic client specification)

**Mr. Mark Jones** (buyer/seller client of the company)

**Mr. Paul Smith** (potential client of the company)

All the group members were present during the workshop, and the workshop began with an introduction by every individual there. And then one of the group members introduced participant engagement rules and the discussion started. Soon, Mr. Max Fotheby started introducing his company and existing business operations such as registration of interested users and transaction of items. Everyone was involved in the discussion: presenting their ideas, stressing necessary points. He then began explaining about the basic specifications and his expectations and needs for the company. Then came the part for the discussion of problem domains. The pace remained same for every discussion points afterwards. The discussion about problem domain also run smoothly. After Mr. Fotheby, Mr. Mark Jones highlighted his part as persistent client of the company since many years. He then explained the processes he had to go through as a buyer and a seller of the company. After Mr Jones, Mr. Paul Smith came to the discussion about his expectations from the application as a potential client of the company: he gave his suggestions for the system processes, necessary amendments for the current business operations. The workshop was concluded after 50-60 minutes.

Some of the positive aspects of the workshop 1 of Group B can be:

1. Every time group members were not clarified about certain things, they tried to ask for clarifications which made them know more about the company in detail.
2. Although everyone was trying to put out their thoughts, the discussion was liberal and handles peacefully, in a systematic manner.
3. The group members also came up with new ideas for the discussion, trying to expand the scope of workshop because of which the stakeholders seemed quite impressed.

Some of the negative aspects of the workshop 1 can be:

* + - 1. Although there was enough participation in discussion from the group members, there were some points where they would just query about obvious facts which seemed quite annoying.

Some of the suggestions for the fellow group regarding workshop 1 can be:

1. The outcomes from the Workshop 1 could have been more favourable if they would just focus on the important topics and would not waste so much time which delayed the workshop for the other groups.

Regardless, the workshop seemed fun, and the group members were able to excite the stakeholders which is always a good point.

* + - 1. Workshop 2 Observation 1

This observation inspects the second workshop of the Group A which was held on 4th January 2022 at the morning time. The group members were Salina Khadka, Sonam Renzei Sherpa, Krishna Khadka, Samir Lama, Sonam Tamang, Phurten Jung Sherpa and Prakash Tamang.

The first workshop was organized for formulating requirement specification and finalizing the interface design of the system, collaborating with key stakeholders. The stakeholders provided by Fotheby’s were:

**Mr. Max Fotheby** (owner of the company and writer of basic client specification)

**Mr. Mark Jones** (buyer/seller client of the company)

**Mr. Paul Smith** (potential client of the company)

All the group members were present in the workshop with mock-ups and wireframes. The workshop began with introduction of the participants engagement rules from one of the group members. Then all the mock-ups and wireframes were reviewed by every participant, along with the stakeholders. Then the stakeholders, one-by-one, gave suggestions about the amendments that can be made on the system design. The discussion was further taken longer with more discussion on company needs since the first workshop, necessary company operations, amendments from the current system that needs to be addressed and with such the requirement specification was formulated. The group seemed more involved this time since last workshop. The workshop then finished after 30-40 minutes.

Some of the positive aspects of the workshop 2 from Group A can be:

1. All the group members were active during the workshop.
2. The pre-formulated participants rules were not violated.
3. The workshop was conducted in the given time and was concluded within the given time frame. It did not affect the other workshops afterwards.
4. All the group members were sincere and were not just jotting down the ideas as they did last time.

Some of the negative aspects of the workshop 2 from Group A can be:

1. There were no such major negative aspects from this workshop. However, there were some invalid points made by some of the members during the workshop which confused the remaining participants and it seemed like not all the members did enough research.

Some of the suggestions for the fellow group from workshop 2 can be:

1. There could have been proper preparation beforehand. All the members should have been ensured about the required knowledge and basic system specifications from the last workshop. Other than that, no rules were violated.

Nonetheless, the workshop 2 for Group A was good as in it was conducted successfully without no major violation of rules within given time frame and everyone was punctual.

* + 1. Other Problem Domain Research
       1. Comparable Software System Review

The study of comparable pre-existing system helps to know more about the usability of the system. The study of comparable systems is as follows:

**Sotheby’s Auction House**

Sotheby is an auction house specializing in the sales of fine art, jewels, watches, and wines. This website is being used by many users around the world. We can go to the website by clicking here: <https://www.sothebys.com/en/> .

Graphical user interface

Description automatically generated

Fig 22: Sotheby’s website

The review of Sotheby’s website is described as points below:

* 1. It has the notification features which gives information about upcoming auctions so that every user remains updated with company events.
  2. The product in the company shows clear picture and description.
  3. We can view products based on categories, locations, and departments, all of which has sub criteria which is helpful for those looking for specific items.
  4. We can view private sales from different parts of the world.
  5. Buy Now feature is included.
  6. We also get notified about the auction results.
  7. We can sort the available items by dates.
  8. The website has varying range in types of products.
  9. It has the search criteria showing the top searches, making it easy for the users to search for specific items.

**Invaluable Auction House**

Invaluable Auction house is an auction website specializing in the sales of fine and decorative arts, antiques, estate jewelry, coins, and stamps, collectibles. This website is being used by many users around the world. We can go to the website by clicking here: <https://www.invaluable.com/>

Graphical user interface, text, application, email

Description automatically generated

Fig 22: Invaluable website

The review of Invaluable website is described as points below:

1. It provides various auction types such as live auctions, timed auctions and view only auction where we do not have to bid.
2. Auction Items can be sorted according to dates with the far most happening in next 90 days.
3. Items can be of varying categories like Arts, Automobiles, Real Estates, Farms, Storages, Dolls, and many others.
4. Items can be sorted according to registered sellers and locations.
5. Items can be saved as a user for future purposes.
6. Registered Users can get notification about any updates in the system.

**Ram base Auction Software**

Ram base Auction Software is an auction website which aids various auction houses in the sales of fine arts, collectibles, numismatics, and stamps. This website is being used by many users around the world. We can go to the website by clicking here: <https://rambaseauction.com/>

A screenshot of a computer

Description automatically generated with medium confidence

Fig 23: Ram base auction software

The review of RamBase website is described as points below:

1. It has advance sorting functionalities for combined auctions.
2. It facilitates multiple ways of bidding. It also supports group bidding and maximum amount on bid notes.
3. After objects are sold, buyers are invoiced, and sellers are automatically paid by RamBase.
4. It handles wide logistics functionality for handling and shipping of items.
5. It supports auction balance which is a tool for handling account settlement when client is both seller and buyer at the auction house.
   * + 1. Development Relevant Legislation

**Data Protection Act**

Data Protection Act (2018) is the law implemented by UK which controls how your personal information is used by organizations, businesses, or the government. It states that everyone using personal data should follow certain rules such as the information should be used fairly, lawfully, and transparently, it should be used for specified, explicit purposes, it should be used in a way that is adequate, relevant, and limited to only what is necessary. All the information should be accurate and up to date. It should be handled in a way that ensures appropriate security, including protection against unlawful or unauthorized processing, access, loss, destruction, or damage.

**Digital Economy Act**

The Digital Economy Act (2017) is also implemented by UK. The digital economy is **the worldwide network of economic activities, commercial transactions and professional interactions that are enabled by information and communications technologies (ICT)**. It can be succinctly summed up as the economy based on digital technologies. This act states that the people and sectors are highly encouraged to be involved and digitalize their own sectors in order to empower consumers with quality product.

* 1. Requirements Specification

The application functional requirements were specified in this section and specification of the system was made according to the client requirements observed from the previous workshops.

* + 1. Problem Domain Description

Problem Domains are the set of areas which are needed to be examined to solve the problem extracted. The set of problem domains in our field would be the **current auction system in the company, individuals involved in the company such as the key stakeholders, documents regarding current system process, given basic client specification, information regarding every type of employees in the company.** This section will introduce key processes/ problems within the current system.

* + - 1. Existing Business Operation

This section will describe some of the activities company runs on the daily basis.

* + - * 1. User Registration

The interested user (buyer or seller) comes to the auction house and fill up the agreement/ consent form which is made available by the auction house itself. Their details are then examined. The users must wait for 4-5 hours. For certain events, verified users register by using their agreed details.

Diagram

Description automatically generated

Fig 24: Flowchart Showing User Registration in the company.

* + - * 1. Item Registration

Items are registered with their details by the registered users/ sellers. The registered items are then investigated by the company itself. There are legal teams in the company who will verify if the item is legal or illegal. If the item is legal, then item is authorized for the auction. If the item is illegal, the item is penalized as per the current rules and regulations.

A picture containing text

Description automatically generated

Fig 25: Flowchart Showing Item Registration in the company.

* + - * 1. Auction Process

The company at first provides catalogue of items before the day of auction that will be available at the auction. The interested buyers then register for the auction and be present physically. All the items are showcased one after another and the users can bid. No single individual can bid for another individual, but one can bid as a representative for a certain company. Then the person who won the bid would make the payment to the company. And the company then proceeds the amount to the respective seller and item to the buyer.

Graphical user interface

Description automatically generated with low confidence

Fig 26: Flowchart Showing Auction Process in the company.

* + - 1. Summary of Existing Business Limitations

The limitations addressing help in giving overview on the parts where the system needs to focus and develop. All the processes studied above suggests the limitations below:

* Since all the processes are manual, there is weather and space constraints in organizing events.
* Manual Auction could not be carried out in bulks: only 20-30 can be included, which is affecting company sales.
* All the clients’ records are stored manually, so the system is not secure.
* The user registration process is a hectic task. From the sellers’ perspective, they need to wait for 4-5 hours just for the registration.
* When the operations are manual, the clients are limited, which in turn leads to lesser bids, decreasing company profits.
* Catalogue does not provide enough information about items.
* The worst part is payment, for converting cheque into money, and the delivery of the items since it takes up to 10 days.
* Maximum people have lost their interests because they need to be physically present at the auction house and it might not be easier for them to reach on time.
  + 1. Functional Requirements

Functional requirements specify function of a proposed system that needs to be applied to solve the existing business problems. This portion of report will give overview about core system functionality and the specification of the parts of the system that I intend to develop.

Following functionalities are to be adapted for the current business limitations:

* + - 1. Database and Backup

As the current operations in the Fotheby’s are manual, there has been difficulty in managing auction-related records. There have been space constraints in organizing auctions and advertisements. Auctions could not be carried out in bulks: not so many items can be preserved for each auction. Also, all the client records are stored in the paper documents which have not been providing enough security and there’s lot of issues in accessing data for registering for certain events, which is why the proposed prototype will completely store all the company related data in database, enabling all the users to register by themselves and enter the system as soon as they want. This feature will solve the space constraints that has been affecting the company. The company need of encrypting certain data will also be possible while they are stored in the database.

* + - 1. Clients Record

The prototype application will have the feature where interested clients could register into the system as a buyer or a seller within some seconds which will solve the issue where the past buyers and sellers would have to come physically to the company and sign the consent form and then wait for certain hours till their details get interrogated and then register for the events. This has been hectic task both for the company and its clients. So, the system with self-register and login features would be beneficial in managing time constraints. Also, they could easily enter the system whenever they like. And their records will be encrypted which will again enhance security.

* + - 1. Items Record

Although there has not been much theft occur regarding items in the company, it will save a lot of time for the company if the proposed system has feature for recording its items with proper sub-details, where only registered seller can register the items, so that all the item registered will have enough information with their picture and can be examined thoroughly for the further processes.

* + - 1. Auction Records

The prototype will have feature for recording the auction and its details with the date regarding the respective auctions so that the buyers could get notified about the auction event and the items present there.

* + - 1. Auction Records Management
* The company administrator will be able to modify and delete the recorded auctions.
* The recorded auctions will either be on/off/upcoming. The on auction is the happening auction, the off auction is the auction that has already happened or is going to happen after some days and the upcoming auction is the auction that will be happening tomorrow.
* Admin will only be able to modify/ delete or archive /unarchive the future auctions expect the one with the tomorrow’s date.
* Admin will be able to attach catalogue to each auction. No more than one catalogue could be attached.
* Admin will be able to view auction details with catalogue and item details.
* Admin will be able to delete/view the added catalogue within the auction record.
  + - 1. Catalogue Records Management
* The company administrator will be able to add catalogue details to the database with unique lot number.
* The company administrator will be able to add verified items to the catalogue and archive/unarchive, delete, or view individual details within the catalogue.
* The company administrator will only be able to delete/archive/unarchive/edit the catalogues which has not been proceed for the auction.
* Admin could also search for items within the catalogue.
  + - 1. Registered Item Verification
* The registered items by the sellers will be verified by the company administrator. Only the verified items could get proceed to the catalogue.
* The company administrator will be able to view individual details for each registered item.
  + - 1. Admin Search Item Criteria
* The company administrator will be able to search for items based on their name, category, classification etc.
* Only the items that are unsold could be browsed.
* It will help the company to keep track about the sold and unsold items.
  + - 1. Client Record Details
* Admin will be able to view registered client records with the number of purchases for the buyer and number of sales for the sellers.
* This will help the company to keep the track of user involvement and progress.
  + - 1. Track Ongoing Auction
* Admin will be able to track the ongoing auction and view the bids with the buyer information such as email address, name and bid amounts.
* Admin will be able to sell the items to one of the bidders.
* Admin will be able to view sold items for the ongoing auction with the details of commissions earned from both the buyers and sellers.
* Admin will be able to view commissions earned from deleted items.
  + - 1. Search criteria for buyers
* Buyers will be able to login into the system and view the unsold items in the company thoroughly, interpreting their item details.
* Buyers will be able to search for the certain items according to auction date, category, names, artist name, classification, combination of item name and the category etc. and view their details
* This will help the buyers to remain informed about the items they are interested in.
  + - 1. Bidding and Advance bidding facility for the buyers
* Buyers will be able to bid for the items within the ongoing auction, viewing their details.
* Buyers will also be able to put advance bids on the items for the auction of day after tomorrow.
  + - 1. View Bought Items
* Buyers will be able to view bought items in their criteria with the information like amount spend on that item and commission given to the company.
  + - 1. View Profile
* All the registered clients, both the buyers and sellers, will be able to view their profile, where their personal information is shown.
  + - 1. Item Management
* Registered Sellers will be able to view their personal items.
* Registered Sellers will be able to modify their item details, delete, archive, and unarchive them when needed.
* Registered Sellers will be able to keep track of verified, catalogued, and pending sales items of their own.
* Registered Sellers will be able to delete the pending-sales items, cutting off certain money as commission to the company.
* Registered Sellers will be able to browse for their personal items.
  + - 1. Generate Report
* Reports will be generated for each auctions showing commissions earned for the sold items and details about the unsold items.
  + 1. Proposed Prototype Development Blocks/ Priority of Development

This section will show the functionality priority listing showing highest priority functionality at the top and the lowest priority functionality at the bottom.

First row shows the first development block with the top priorities functionalities, second row shows the second development block with less priorities functionalities.

|  |
| --- |
| Database and Backup, Development Block 1  Clients Records,  Items Records,  Items Management,  Auction Records,  Auction Records Management,  Catalogue Records Management,  Registered Item Verification,  Admin Search Item Criteria,  Search Criteria for Buyers,  Bidding and advance bidding facility for buyers,  Track Ongoing Auction,  Client Record Details,  View Bought Items,  View Profile,  Generate Report, |
| Development Block 2  online client areas to display essential information for existing clients (both buyers and sellers) |

1. SYSTEM ANALYSIS AND DESIGN
   1. System Analysis

To gain the better understanding about Fothebys’ required functionalities, system analysis is an important procedure in system design and development. The correct analysis helps us to find necessary classes for the system, proper implementation of classes as objects, attributes and operations performed by those objects and the interaction between 2 or more objects. There are many techniques to carry out system analysis. Out of which, I will be using textual analysis and significant event analysis. System Analysis can be considered as preliminary design stage. System Analysis and Design for the software development block 1 are given below:

* + 1. Textual Analysis

It is one of the system analysis procedure useful for identification of candidate classes. At first, items and users in the system were identified which are admin, seller, and buyer and furthermore classes were identified based on these classes. Candidate class identified and their responsibilities are given below:

|  |  |
| --- | --- |
| Candidate Classes | Responsibilities of the candidate classes. |
| Admin | Add auctions, edit auctions, delete auctions, view auction details, archive auction, unarchive auctions, attach catalogue to the auction, add catalogues, edit catalogues, delete catalogues, view catalogue details, archive catalogue, add items to the catalogue, delete items from catalogue, view item details from catalogue, archive items in the catalogue, unarchive items in the catalogue, verify seller items, review ongoing auction, view bids from buyers, accept one bid from buyer bids, calculate commission, review buyers and sellers profile, view verified items, search particular items in the database, generate auction report. |
| Buyer | Review ongoing auction details, review ongoing auction catalogue details, review catalogue items and their details, put bids on pending items, put advance bid, view pending items, view sold items, view bought items with amount spend in total, view own profile. |
| Seller | Add items in the system, delete items, view item details, edit items, archive items, unarchive items, view verified items, view catalogued items, view pending sales items, delete pending sales items (if necessary), calculate commission for deleted Pending sales items, view personal sold items with sold price and commission to the company, view own profile. |
| Item | Item add, item edit, item delete, item archive, item unarchive, item details. |
| Catalogue | Catalogue add, Catalogue edit, catalogue delete, catalogue archive, catalogue unarchive, catalogue details, add items, delete items, view item details, archive items, unarchive items, search items. |
| Auction | Auction add, Auction edit, auction delete, auction archive, auction unarchive, auction details, add catalogue, view catalogue, delete catalogue, add items to catalogue, delete items from catalogue, archive and unarchive items in the catalogue |
| Bid | Add bid for each buyer and items, add verified bid to the bought item. |
| Commission | Add commission for each sale, add commission for each pending-sales items deletion. |

* + 1. Significant Event Analysis

Significant Event Analysis helps in the system design flow which leads to proper and efficient mapping of the event flow of the software. The events are said to be candidate class methods, performers are said to be candidate system classes and candidate attributes are said to be attributes of the candidate system classes.

|  |  |  |
| --- | --- | --- |
| Events | Performers | Candidate attributes |
| Registration | * Seller * Buyer | * ID * Name * Email address * Password * Address * Phone Number * Bank Account No. * User type |
| Login | * Admin * Seller * Buyer | * ID * Name * Email address * Password * Address * Phone Number * Bank Account No. * User type (Seller and Buyer) |
| Logout | * Admin * Seller * Buyer | * ID * Name * Email address * Password * Address * Phone Number * Bank Account No. |
| Add/ delete/ edit / view / archive/ unarchive item | * Item * Seller * Catalogue | * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name |
| View verified/ pending-sales/ sold items | * Seller | * ID * Name * Email address * Password * Address * Phone Number * Bank Account No. |
| Add/ delete/ edit / view / archive/ unarchive auction/Attach catalogue to auction | * Admin * Auction | * Email * Password * Id (Auction) * Auction date * Auction status * Catalogue id * Lot Number * Auction id |
| Add / delete / archive / unarchive items to/from catalogue | * Catalogue * Item * Admin | * Email * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Id (Catalogue) * Lot number |
| Verify items | * Admin * Item | * Email * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image |
| Search items | * Admin * Item * Catalogue | * Email * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id |
| View Ongoing / Day after tomorrow Auction/ Catalogue and Item for those auction | * Item * Catalogue * Auction * Admin | * Email * Password * Id (Auction) * Auction date * Id (Catalogue) * Lot Number * Auction id * Email * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name |
| View Sold items | * Admin * Item * Commission * Bid * Buyer | * Email * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name * Bid id * Id (Bid) * Bid amount * Item id * Buyer id * Id (Commission) * Commission amount * Bid id * Item id * ID * Name * Email address * Password * Address * Phone Number * Bank Account No. |
| View Bids/ Sell Item | * Commission * Bid * Item | * Id (Commission) * Commission amount * Bid id * Item id * Id (Bid) * Bid amount * Item id * Buyer id * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name * Buyer id |
| View pending-sales and bought items | * Item * Buyer | * Email address * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name |
| Download auction report | * Admin | * Email * Address |
| Bid item | * Buyer * Item | * Email address * Password * Id(item) * Item name * Artist name * Item status * Lot Reference Number * Item description * Item category * Item classification * Start Price * Subject Classification * Dimension * Image * Catalogue id * Owner id * Owner name * Bid id |

* 1. System Design

After system analysis, System design is done.

* + 1. Use Case Diagrams

Use case diagrams show how the system will look from the users’ perspectives.

* + - 1. Admin Use Case Diagram

Diagram

Description automatically generated

Fig 27: Figure showing Admin Use Case Diagram

* + - 1. Seller Use Case Diagram

Diagram

Description automatically generated

Fig 28: Figure showing Seller Use Case Diagram

* + - 1. Buyer Use Case Diagram

Diagram

Description automatically generated

Fig 29: Figure showing Buyer Use Case Diagram

* + 1. Class Diagram

Diagram

Description automatically generated

Fig 30: Figure Showing Class Diagram

1. SYSTEM BUILD AND TECHNICAL NOTES
   1. Diagram showing software components composition

Laravel Technology have been used to build the required application prototype. The various components of larvae working together to build the application is shown by the diagram below:

Diagram

Description automatically generated

Fig 31: Figure showing different software components composition

* 1. Software Resources References List

The software resources which are utilized to develop the application are given below:

* The System was constructed on the windows operating system with the available RAM space of 4/8 GB.
* For the back-end database and application development,
  + 1. **Laravel 8** Framework based on php language is used. Laravel is a free, open-source PHP web framework for building web-applications, using routing, models, views, and controllers.

<https://laravel.com/> (Laravel- The PHP Framework for web Artisans)

* + 1. **XAMPP package**, which provided **Apache and MySQL server**, has been used to manage **MySQL Database in phpMyAdmin**, which it does by accepting http request.

<https://www.apachefriends.org/index.html> (XAMPP Installers and Downloads for Apache Friends)

<https://www.mysql.com/> (MySQL)

<http://localhost/phpmyadmin/db_structure.php?server=1&db=fothebys> (phpMyAdmin)

* For the front-end development, **HTML, Bootstrap 5, and some CSS** has been used.

<https://www.w3schools.com/html/> (HTML) Html is a markup language for designing documents that are to be used in web application.

<https://getbootstrap.com/docs/5.0/getting-started/introduction/> (Bootstrap 5). Bootstrap 5 is HTML, CSS and JavaScript Framework used for creating responsive websites.

<https://www.w3schools.com/css/> (CSS) CSS is the styling language used for decorating web pages.

* All the codes were constructed on Visual Studio Code application.

**Visual** Studio **Code** is a **code** editor redefined and optimized for building and debugging modern web and cloud applications. <https://code.visualstudio.com/> (Visual Studio Code)

1. SYSTEM TESTING AND EVALUATION STRATEGY

System Testing and Evaluation helps in providing knowledge to assist in Risk Management that's involved in developing, producing, operating, and sustaining systems and capabilities. Sub-sections below will give brief overview on testing and evaluation strategy used.

* 1. Ongoing Test Strategy used

For the system testing, Black-box testing method is used where test cases are considered and expected, and actual outputs are compared which will confirm whether the respective functionality works or not. Black-Box testing for Software Development Block 1 is given below:

5.1.1. Seller Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.N. | Test Cases | Expected Output | Actual Output | Result |
| 1 | LOGIN | | | |
|  | Login with correct credentials. | Directed to manage items page. | Directed to manage items page. | Successful 🗸 |
|  | Login with incorrect credentials. | “Password do not match” should be shown. | “Password do not match” is  shown. | Successful 🗸 |
| 2 | Add new Item/view details | | | |
|  | Click create new item. | Directed to Choose category page. | Directed to Choose category page. | Successful 🗸 |
|  | Choose Category. | Item Fill up Form should appear. | Item Fill up Form appears. | Successful 🗸 |
|  | Create item filling all the boxes. | Item should be created and shown in the table. | Item is created and shown in the table. | Successful 🗸 |
|  | Click details icon. | Item details should be shown. | Item details is shown. | Successful 🗸 |
| 3 | Edit/Delete/Archive/Unarchive Existing Item | | | |
|  | Click the edit icon in the table. | Directed to Edit item page. | Directed to Edit item page. | Successful 🗸 |
|  | Click the edit button by filling all the fields. | Item should be edited. | Item is edited. | Successful 🗸 |
|  | Click the delete button. | Item should be deleted. | Item is deleted. | Successful 🗸 |
|  | Click the archive button. | Item should be archived. | Item is archived. | Successful 🗸 |
|  | Click on the view archived items. | All the archived items should be displayed. | All the archived items are displayed. | Successful 🗸 |
|  | Click on the unarchive button. | Item should be unarchived. | Item is unarchived. | Successful 🗸 |
|  | Click on the view unarchived Items. | All the unarchived  items should be displayed. | All the unarchived items are displayed. | Successful 🗸 |
| 4 | Browse Verified Items | | | |
|  | Click the browse verified items. | Should be Directed to page where there are verified items. | Directed to page where there are verified items. | Successful 🗸 |
| 5 | Browse Catalogued Items | | | |
|  | Click the browse catalogued items. | Should be Directed to page where there are catalogued items. | Directed to page where there are catalogued items. | Successful 🗸 |
| 6 | Manage Pending Items | | | |
|  | Click the browse pending items. | Should be Directed to page where there are pending-sales items. | Directed to page where there are pending-sales items. | Successful 🗸 |
|  | Click the details icon. | Item details should be shown. | Item details is shown. | Successful 🗸 |
|  | Click the delete icon. | Item should be deleted. | Item is deleted. | Successful 🗸 |
| 7 | View Sold Items | | | |
|  | Click the browse sold items. | Should be Directed to page where there are sold items. | Directed to page where there are sold items. | Successful 🗸 |
| 8 | View Profile | | | |
|  | Click the profile. | Should be Directed to profile page. | Directed to profile page. | Successful 🗸 |
| 9 | Logout | | | |
|  | Click the Logout. | Should be Directed to home page. | Directed to home page. | Successful 🗸 |

* + 1. Admin Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.N. | Test Cases | Expected Output | Actual Output | Result |
| 1 | LOGIN | | | |
|  | Login with correct credentials. | Directed to manage items page. | Directed to manage items page. | Successful 🗸 |
|  | Login with incorrect credentials. | “Password do not match” should be shown. | “Password do not match” is  shown. | Successful 🗸 |
| 2 | Verify items/ view details | | | |
|  | Click the right icon. | Item should be verified. | Item is verified | Successful 🗸 |
|  | Click the view details icon. | Item details should be shown. | Item details is shown. | Successful 🗸 |
| 3 | View Verified Items | | | |
|  | Click the Browse Verified Items. | Directed to Page where there are verified items. | Directed to Page where there are verified items. | Successful 🗸 |
| 4 | Search Items. | | | |
|  | Click the search items. | Should be Directed to page where we can search for items. | Directed to page where we can search for items. | Successful 🗸 |
|  | Search for items. | Searched Items should be shown. | Search items are shown. | Successful 🗸 |
| 5 | View Ongoing Auction | | | |
|  | Click the ongoing auction. | Should be Directed to page where there is ongoing auction. | Directed to page where there is ongoing auction. | Successful 🗸 |
|  | Click Items Catalogue. | Should be directed towards auction items. | Directed towards auction items. | Successful 🗸 |
|  | View Bids. | Should be able to look all the bids for that item. | all the bids for that item are shown. | Successful 🗸 |
|  | Sell Item. | Item should be sold. | Item is sold. | Successful 🗸 |
|  | View Sold items. | Sold items should be shown. | Sold items are shown. | Successful 🗸 |
|  | Click commission from deleted items. | Commission from deleted items should be shown. | Commission from deleted items are shown. | Successful 🗸 |
|  | Click pdf icon. | Report should be generated. | Report is generated. | Successful 🗸 |
| 6 | Manage Auction Catalogues | | | |
|  | Click create one. | Should be directed to create catalogue page. | Directed to create catalogue page. | Successful 🗸 |
|  | Click create catalogue. | Catalogue should be created. | Catalogue is created. | Successful 🗸 |
|  | Click details icon. | Catalogue details should be shown. | Catalogue details is shown. | Successful 🗸 |
|  | Click edit icon. | Catalogue should be edited. | Catalogue is edited. | Successful 🗸 |
|  | Click archive icon | Catalogue should be archived. | Catalogue is archived. | Successful 🗸 |
|  | Click View archived catalogues. | Archived Catalogues should be shown. | Archived Catalogues are shown. | Successful 🗸 |
|  | Click unarchive icon. | Catalogue should be unarchived. | Catalogue is unarchived. | Successful 🗸 |
|  | Click View unarchived catalogues. | Unarchived Catalogues should be shown. | Unarchived Catalogues are shown. | Successful 🗸 |
|  | Click add items. | Verified items should be shown. | Verified items are shown. | Successful 🗸 |
|  | Click verify icon. | Item should be added to catalogue. | Item is added to catalogue. | Successful 🗸 |
|  | Click details icon. | Item details should be shown. | Item details is shown. | Successful 🗸 |
|  | Click view catalogue. | Catalogue items should be shown (if any) | Catalogue items are shown (if any) | Successful 🗸 |
|  | Click remove icon. | Item should be removed from the catalogue. | Item is removed from the catalogue. | Successful 🗸 |
|  | Click hide icon. | Item should be hidden within the catalogue. | Item is hidden within the catalogue. | Successful 🗸 |
|  | Click view hidden ones. | Hidden items within the catalogue should be shown. | Hidden items within the catalogue are shown. | Successful 🗸 |
|  | Click eye icon. | Item should be unarchived within the catalogue. | Item is unarchived within the catalogue. | Successful 🗸 |
|  | Click view unhidden ones. | Unhidden items within the catalogue should be shown. | Unhidden items within the catalogue are shown. | Successful 🗸 |
| 7 | Manage Auctions | | | |
|  | Click create one. | Should be directed to create auction page. | Directed to create auction page. | Successful 🗸 |
|  | Click create catalogue. | Auction should be created. | Auction is created. | Successful 🗸 |
|  | Click details icon. | Auction details should be shown. | Auction details is shown. | Successful 🗸 |
|  | Click edit icon. | Auction should be edited. | Auction is not edited. | Not Successful × |
|  | Click archive icon | Auction should be archived. | Auction is archived. | Successful 🗸 |
|  | Click View archived auctions. | Archived auctions should be shown. | Archived auctions are shown. | Successful 🗸 |
|  | Click unarchive icon. | Auction should be unarchived. | Auction is unarchived. | Successful 🗸 |
|  | Click View unarchived auctions. | Unarchived Auctions should be shown. | Unarchived Auctions are shown. | Successful 🗸 |
|  | Click attach catalogue. | Available Catalogues should be shown. | Available Catalogues are shown. | Successful 🗸 |
|  | Click attach this. | Catalogue should be attached. | Catalogue is attached | Successful 🗸 |
|  | Click view | Item for that catalogue should be shown. | Item for that catalogue is shown. | Successful 🗸 |
|  | Click details icon. | Item details should be shown. | Item details is shown. | Successful 🗸 |
|  | Click view | Auction details should be shown. | Auction Details is shown. | Successful 🗸 |
| 8 | Logout | | | |
|  | Click the Logout. | Should be Directed to home page. | Directed to home page. | Successful 🗸 |

* + 1. Buyer Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.N. | Test Cases | Expected Output | Actual Output | Result |
| 1 | LOGIN | | | |
|  | Login with correct credentials. | Directed to auction catalogues page. | Directed auction catalogues page. | Successful 🗸 |
|  | Login with incorrect credentials. | “Password do not match” should be shown. | “Password do not match” is  shown. | Successful 🗸 |
| 2 | Put bid and advance bid. | | | |
|  | Click View Items Catalogue on ongoing auction. | Directed to list of items for that auction. | Directed to list of items for that auction. | Successful 🗸 |
|  | Click details icon. | Item details should be shown. | Item detail is shown. | Successful 🗸 |
|  | Click on Put Bid. | Should be directed to bid amount page. | Directed to bid amount page. | Successful 🗸 |
|  | Enter the amount and click on bid. | Selected item should be bid by you. | Selected item is bid by you. | Successful 🗸 |
|  | Click View Items Catalogue on tomorrow auction. | Directed to list of items for that auction. | Directed to list of items for that auction. | Successful 🗸 |
|  | Click on Put Advance Bid. | Should be directed to bid amount page. | Directed to bid amount page. | Successful 🗸 |
|  | Enter the amount and click on bid. | Selected item should be bid by you. | Selected item is bid by you. | Successful 🗸 |
| 3. | Search Items criteria. | | | |
|  | Click on All Items. | Directed to list of pending-sales items page. | Directed to list of pending-sales items page. | Successful 🗸 |
|  | Search for specific item. | Searched item should be shown. | Searched items are shown. | Successful 🗸 |
| 4 | View Profile | | | |
|  | Click the profile. | Should be Directed to profile page. | Directed to profile page. | Successful 🗸 |
| 5 | View Bought Items | | | |
|  | Click on Your Items. | Should be Directed to page where there are your bought items with sales and commission details. | Directed to page where there are your bought items with sales and commission details. | Successful 🗸 |
| 9 | Logout | | | |
|  | Click the Logout. | Should be Directed to home page. | Directed to home page. | Successful 🗸 |

* 1. Evaluation Strategy

System Evaluation is the process of examining usability and functionality of the system. For this, I prepared series of **questionnaire** to ask a few people associated to Fotheby’s who would be asked to use the system and evaluate it and answer the questions based on their experience in-order to get the overview of a system regarding its **usability** and functionalities. It is basically free trial of the product.

The questions prepared are:

* 1. Is the system user-interface friendly?
  2. How was the system complexity?
  3. Did you see all the functionalities you expected?
  4. How was the bidding mechanism?
  5. How do you find the search mechanism?
  6. Were there any errors?
  7. How was your overall experience with the system?
  8. Did the system meet company’s requirements?
  9. Is the system usable?

Product Trials

User 1

* + 1. Is the system user-interface friendly?

|  |  |
| --- | --- |
| Yes | 🗸 |
| No |  |

* + 1. How was the system complexity?

|  |  |
| --- | --- |
| Bad |  |
| Moderate | 🗸 |
| Good |  |
| Excellent |  |

* + 1. Did you see all the functionalities you expected?

|  |  |
| --- | --- |
| No |  |
| Yes |  |
| Yes, except few | 🗸 |

* + 1. How was the bidding mechanism?

|  |  |
| --- | --- |
| Good |  |
| Satisfactory | 🗸 |
| Could be worse |  |

* + 1. How do you find the search mechanism?

|  |  |
| --- | --- |
| Good |  |
| Satisfactory | 🗸 |
| Could be worse |  |

* + 1. Were there any errors?

|  |  |
| --- | --- |
| Yes |  |
| No | 🗸 |

* + 1. How was your overall experience with the system?

|  |  |
| --- | --- |
| Bad |  |
| Could be worse |  |
| Moderate |  |
| Satisfactory | 🗸 |
| Excellent |  |

* + 1. How well could you perform the desired functionalities?

|  |  |
| --- | --- |
| Bad |  |
| Could be worse |  |
| Moderate |  |
| Satisfactory |  |
| Excellent | 🗸 |

* + 1. Is the system usable?

|  |  |
| --- | --- |
| Yes | 🗸 |
| No |  |

User 2

* + 1. Is the system user-interface friendly?

|  |  |
| --- | --- |
| Yes | 🗸 |
| No |  |

* + 1. How was the system complexity?

|  |  |
| --- | --- |
| Bad |  |
| Moderate |  |
| Good | 🗸 |
| Excellent |  |

* + 1. Did you see all the functionalities you expected?

|  |  |
| --- | --- |
| No |  |
| Yes |  |
| Yes, except few | 🗸 |

* + 1. How was the bidding mechanism?

|  |  |
| --- | --- |
| Good |  |
| Satisfactory | 🗸 |
| Could be worse |  |

* + 1. How do you find the search mechanism?

|  |  |
| --- | --- |
| Good |  |
| Satisfactory | 🗸 |
| Could be worse |  |

* + 1. Were there any errors?

|  |  |
| --- | --- |
| Yes |  |
| No | 🗸 |

* + 1. How was your overall experience with the system?

|  |  |
| --- | --- |
| Bad |  |
| Could be worse |  |
| Moderate | 🗸 |
| Satisfactory |  |
| Excellent |  |

* + 1. How well could you perform the desired functionalities?

|  |  |
| --- | --- |
| Bad |  |
| Could be worse |  |
| Moderate |  |
| Satisfactory | 🗸 |
| Excellent |  |

* + 1. Is the system usable?

|  |  |
| --- | --- |
| Yes | 🗸 |
| No |  |

Product Trials Results

From the above product trails, following conclusions are drawn:

|  |  |  |
| --- | --- | --- |
| S.N. | System Evaluation | Evaluation Results |
| 1 | System Usability | Usable |
| 2 | System Complexity | Moderate |
| 3 | Errors | None |
| 4 | System Functionalities | Few were not found. Regardless, work as expected. |
| 5 | Overall Experience | Satisfactory |
| 6 | Bidding Mechanism | Satisfactory |
| 7 | Search Mechanism | Satisfactory |

1. CHECKLIST

|  |  |  |  |
| --- | --- | --- | --- |
| Functionalities | Status | | Comments |
| Yes | No |
| Adding auction and auction lot details to the database. | ✓ |  | Auction lot details are catalogues with items. |
| Modifying existing auctions and lot details present in the database. | ✓ |  | Auction could not be edited. |
| Deleting/archiving auctions and auction lot details in the database. | ✓ |  |  |
| Displaying auctions and individual lot details for items within the database. | ✓ |  |  |
| Allowing simple search criteria to be used to interrogate the database to yield approximately matching results. | ✓ |  | Both the admin and buyers can search for items |
| Allowing complex search criteria to be used to interrogate the database including; finding items by, Artist, Category, Price, Auction Date, Subject Classification or any combination of these, to find appropriate pieces for specific clients. | ✓ |  |  |
| Expanding the system to include client record details.  (Details of both buyers and sellers) | ✓ |  | Details can be viewed with the number of sales for sellers and number of items bought for buyers. |
| Allowing clients to place advance bids before the day of the auction.) | ✓ |  |  |
| Include a graphical representation of lot items within the database. | ✓ |  |  |
| Incorporate appropriate financial elements into the system to allow Fotheby’s to record the sale price of each item and calculate commission. | ✓ |  | Commissions should be 10% of the sold items from both the buyers and sellers. And 5% of the deleted items from the sellers. |
| Extend the client records system to show all sales and pending sales (as a buyer or seller) for a given customer. |  | × |  |
| Incorporate suitable security/access control features into the prototype software solution. | ✓ |  | Clients could only enter the system by logging in with correct credentials and necessary information are encrypted. |
| Generate automated and ad-hoc reports of critical business events. | ✓ |  | Result report of each auction can be generated. |
| Potentially having online client areas to display essential information for existing clients (both buyers and sellers). |  | × |  |

1. CONCLUSIONS

Hereby, I conclude this project (design and development of application software for Fotheby’s following agile methodology). All the necessary requirements were collected from the workshops. System was designed using use case and class diagrams, build using Laravel 8 technology, tested using black box testing and evaluated asking questions to the company users (project trials).