

Microlink IT College

Sad Project Assignment

Project Title – Online Banking/Internet banking



Submmited to:-inst, Surafel Minalshowa

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GROUP MEMBERS

Name:-

ID

- **Birhan Tsegaye ----- 11,708/18**
- **Eldad Fikre ----- 12,059/18**
- **Elias Agidew ----- 12,122/18**
- **Kaleab Tadesse ----- 11,758/18**
- **Mikiyas Wasihun ----- 12,068/18**
- **Minilik Seyoum ----- 11,722/18**
- **Mubarek Getachew ----- 11,793/18**
- **Nabil Mohammed ----- 11,763/18**
- **Natnael Abebaw ----- 11,726/18**
- **Natnael Alemzewd ----- 11,796/18**
- **Sufyan Mohammed ----- 11,736/18**

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I ABSTRACT

Because of the speed, flexibility, and efficiency that it offers, the Internet has become the means for conducting growing numbers of transactions between suppliers and large international corporations. In this way, the Internet has opened new markets to the world and has accelerated the diffusion of knowledge.

The meaning of Internet markets or online business has been widely used in these days. The success of the business depends on its flexibility, availability and security. Since that the web-based systems should have a special way to design the system and implement it.

Nowadays, the Internet Banking System widely used and the banks looking to provide the best quality system with highly available, fast response, secure and safe to use. The Unified Modelling Language (UML) is the uniquely language which is used to analyze and design any system

More recently, it has been transformed by the Internet, a new delivery channel for banking services that benefits both customers and banks.

Internet banking system services can include: Open an account, Balance enquiry, Request for Cheque book, Beneficiary payments (EFT), Viewing monthly.

Furthermore, customer's application for electronic banking facilities is expanding as the cost savings on transactions over the Internet are significant.

II PLAGIARISM DECLARATION

We, Computer Science Students, Year 2, certify that this project is our own work. We do fully understand what plagiarism is and we have used quotations and references to fully acknowledge all the words and ideas of others, which we have used in our project. We have not copied anyone else's project. We have also not permitted anyone to copy our project.

Microlink Information Technology College, Computer Science Department, Year II

1. Introduction

1.1 Background

Online banking, also known as **internet banking**, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services.

Some banks operate as a "direct bank" (or "virtual bank"), where they rely completely on internet banking.

Internet banking software provides personal and corporate banking services offering features such as viewing account balances, obtaining statements, checking recent transaction and making payments. Access is usually through a secure web site using a username and password, but security is a key consideration in internet banking and many banks also offer two factor authentications using a (security token).

Look at figure 1.0 below.

What is electronic banking?

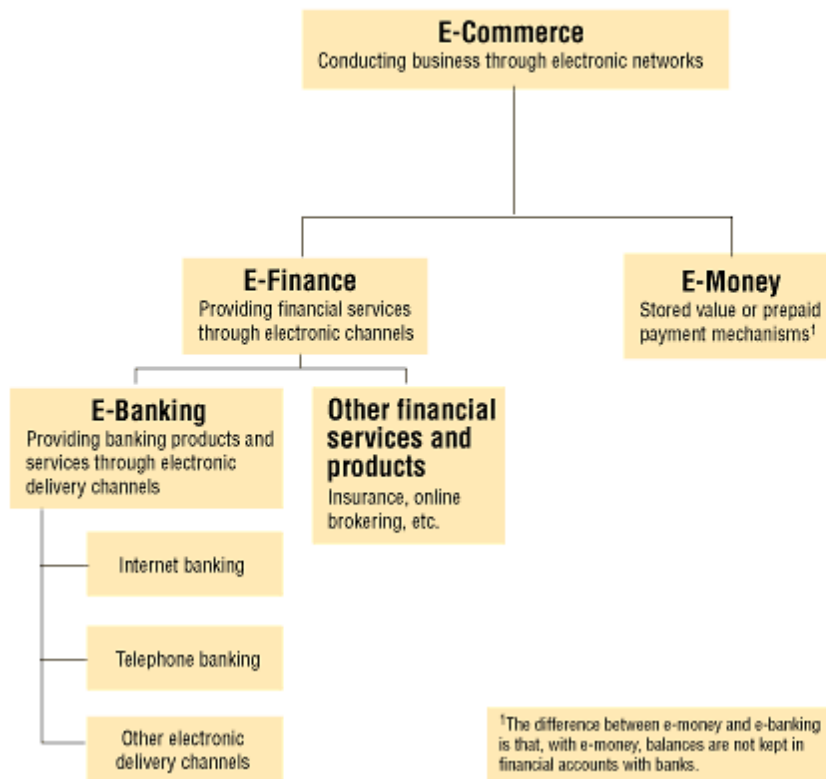


Figure 1.0 showing the Types and Definitions of E-commerce, the godfather of Online Banking

Online Banking is a broad sensed word, which is further decomposed to several parts. For instance:

- E-Payment
- E-Commerce
- Internet Banking
- Card Banking
- Mobile Banking etc.

Banking has come a long way since the days of regular visits to tellers. Now a customer can take a picture of a check with his phone to deposit it into a savings or checking account and receive SMS banking alerts in the form of texts. The evolution of online banking started in the 1980s when the definition and the practice of internet banking were far different than what exists today.

In Ethiopia, Commercial Bank of Ethiopia, (aka: **CBE**), is among several banks using Internet banking. The history of the Commercial Bank of Ethiopia (CBE) dates back to the establishment of the State Bank of Ethiopia in 1942. CBE was legally established as a share company in 1963. In 1974, CBE merged with the privately owned Addis Ababa Bank. Since then, it has been playing significant roles in the development of the country. Pioneer to introduce modern banking to the country. It has more than 1280 branches stretched across the country. The leading African bank with assets of 565.5 billion Birr as on June 30th 2018. Plays a catalytic role in the economic progress & development of the country. The first bank in Ethiopia to introduce ATM service for local users.

Currently CBE has more than 18.8 million account holders and the **number of Mobile and Internet Banking** users also reached more than 1,736,768 as of June 30th, 2018 . Active ATM card holders reached more than 4.4 million.

As of June 30, 2018, 1708 ATM machine and 11,796 POS machines were available.

It has strong correspondent relationship with more than 50 renowned foreign banks like Commerz Bank A.G., Royal Bank of Canada, City Bank, HSBC Bank,.

1.2 Purpose of The System

Many transactions can be carried out from the comfort of your home or office. The online services include:

- Viewing account balances and transactions.
- Making fund transfers between customers' own current accounts and savings accounts.
- Effecting payments to third parties, including bill payments
- Viewing and downloading current and Saving account statements.
- ...and more...

Online Banking was founded to solve the problem of the carried money, which might be stolen in an easy way.

Internet banking allows customers to manage their accounts online and conduct EFTs directly from that account. Many businesses--such as utilities and credit card companies--offer options for sending payments by both Internet and telephone (often for an extra fee). These features help consumers avoid late fees and the process and cost of mailing checks.

Direct Deposit

Another purpose for electronic banking is direct deposit. This is the process of having payments--such as paychecks, tax refunds or Social Security checks--deposited directly into an account, without the need for a paper check being printed. When using direct deposit, there's no need for the recipient to make a trip to the bank to deposit that check.

ECC

Internet banking methods can also expedite retail transactions and lessen the chances of a store receiving a bad check. With Electronic Check Conversion (ECC), the check is written by the customer, and the information (account number and amount) is instantly scanned and sent to the accounts of the customer and the business to complete the transfer of funds.

1.3 Scope of the Project

Despite the slow adoption rate in the early part of the history of internet banking, online banking has proved that it's here to stay. Online banking features and services have greatly evolved from the first days of internet banking history from the need to use a landline to pay bills in the 1980s to having the ability to transfer funds, pay bills and deposit checks with just the click of a mouse or on a mobile device today. As technology continues to advance, banking online will likely become even easier and more ingrained in the average consumer's lifestyle.

Additionally, one of the challenges can be is related to the problem how to increase the number of services of Internet banking and simultaneously guarantee the quality of service for individual customers. Also, another challenge is related to the problem how to understand customer's needs, translate them into targeted content and present them in a personalized way in usable user interface.

a) Traditional Banking Habits

Despite the benefits of online banking, some still go to traditional banking. This happens mainly because traditional banking is what many people are used to and it can take time for them to break habits. So, online banking marketers should focus on ways to convince traditional banking users to start using online banking services.

b) Security

Security is one of the most significant challenges for online banking marketers. This is because, in the past, if a robber was going to steal a person's bank savings, he or she would have to break into the bank vault, and make a daring escape with the money. This was an extremely difficult prospect and involved a lot of danger and risk.

c) Transaction Difficulty

It can be significantly more difficult and time consuming to deposit or withdraw money from an online bank. Not only do online banks often have fewer ATM's than their traditional counterparts, but it also can simply take longer amounts of time for deposits to be processed and put into a bank account.

For example, it takes roughly 3-5 days for deposits to show up in accounts for PayPal, one of the largest online banks. This is an issue that online banking marketers will most likely struggle with, until online banks speed up their transaction times.

d) Technical Issues

Because online banks rely so heavily on their online platforms, this means that they can generate substantial losses if their systems crash or if there are bugs in their code. A single technical issue that causes a bank to be down for a day could cost the bank millions in losses.

It can also wreak havoc for the bank customers who may not be able to make payments or conduct transactions during the time that the site is down. 54 percent of consumers now use a mobile banking app. So, it is a key component for banks to have their online platforms running smoothly.

In Ethiopia, Credit Cards, for example, are still not in use, and that is why we still cannot elaborate explicitly how branches of Online Banking are operating. Additionally, Internet connection in such a third world country is still slow.

Notwithstanding, people here are still not giving so much credit to such a technology.

A Google form submitted, targeted to a group of people aged between 18-40, who probably possess a bank account. It is attached in the Appendix.

We received precisely 32 responses.

1.4 Objective of the Project

1.4.1 General Objective

Since the world is moving and escalating in using new and updated technologies, particularly money transactions. That is why we decided to expose Ethiopia to a credible, trustworthy and easy means to use such a technology. Banks for the time being are not really exploiting Online Banking the way it is supposed to be, and we believe that by using Online Banking, a new horizon will be discovered.

1.4.2 Specific Objective

The inner procedure of a particular system using Online Banking is in question, which is demonstrated in the SURVEY. People want a credible, trustworthy and easy system when it comes to a sensitive subject matter like money, and how it is manipulated. What we want to discuss is a flawless, secure system that people in a third world country like Ethiopia can put trust on. For sure, some terminologies may be not self-explanatory for some, but the ultimate goal is to utilize the system to the fullest.

1.5 System Context

Online Banking System is a stand-alone system in which the system focuses on the system's interface to the external world. What this system would do is have an interface that asks the customer to login to and shows each person accounts and how much they have in each. It also lets you transfer money to different accounts.

We will be programming our system out in C++, HTML and CSS. Any merging programming language might be used for database or any other needed section. This project will be very customer driven. There would be lots of meeting between the coders and the customer (in this case fictitious), to find out the things that they really require.

2 System Planning Phase

2.2.1 Project Scope statement

Online Banking requires a set of processes , and we do need them for that to ensure the project's scope is accurately defined and well-mapped.

The needs of the project can be jotted down as follows:

a) Project Acceptance List:

This list is simply like a checklist, it is a set of processes that ensures that the project is just having the adequate, sufficient, and right tools and requirements to get things done. If the system selected has the following, we believe it will defiantly function in the way it is expected to.

Customer

The valid customer on internet banking has a set of requirements he/she does on internet banking. These requirements are offered on next pointes.

Login

A customer to be able to use this system, he/she has to enter username and password which he/she has created before and been saved in the database in the Login page.

This function might be a customer or an Admin also. The input in this function most be valid username and valid password and the output if the user is valid user then he/she will get into a page which can makes his/her transaction, but if the user made wrong in username or password then he/she will be invalid user and will see a message "Alert Invalid Username and Password" and to login again.

View Account

View Account allows to a customer to view today's up-to the minute balance information on deposit (saving/current), credit card, etc. The customer can also view transaction history with retention period up to a maximum of 90 days. Within this feature, the customer can request for account such as "view online, by e-mail or by post option. But the customer must be logged in the internet banking.

Transfer Funds

The customer must be logged into Banking System to be able to make his/her transaction for transfer funds.

Transfer Funds allows customer to transfer funds between authorized accounts – own personal accounts. Requested transfer take place immediately or at a selected future date specified by customer. The customer can save up to a maximum of 10 accounts and update or delete the account details. All the outstanding future transfers are recorded in a table. The customer can enquire whether there is any funds transfer pending and. when the customer selects the Transfer funds, the system will display Menu to select Transfer Funds function for transfer funds or Transfer History function for display the transaction he/she done.

Utility

The customer must be logged into Banking System. Utility allows customer to change password and the secure delivery contact information. Within this feature, the customer can also change the online profile personal information that is retained by the internet banking system only. And the customer can cancel the ATM facilities.

Logout

The customer must be logged into Banking System. This function is used when a logged in user finishes his/her job and wants to be logged out so that no one can abuse his username. The system will state the user has been logged out successfully.

Administrator

An administrator is that person who makes some editing for the internet banking system like add/cancel customer, check the transactions etc. but this administrator must be valid user. Therefore the administrator must have a username and password. In the project we will not go deep in an administrator because we will focus on the customer and his/her requirements more than the administrator.

Safety & Security Requirements

Backup, recovery & business continuity

We should ensure adequate back up of data as may be required by their operations. We should also have, well documented and tested business continuity plans that address all aspects of the bank's business.

1. Both data and software should be backed up periodically, the frequency of back up depending on the recovery needs of the application. The back-up may be incremental or complete. Automating the backup procedures is preferred to obviate operator errors and missed back-ups.
2. Recovery and business continuity measures, based on criticality of the systems, should be in place and a documented plan with the organization and assignment of responsibilities of the key decision making personnel should exist.
3. An off-site back up is necessary for recovery from major failures / disasters to ensure business continuity. Depending on criticality, different technologies based on back up, hot sites, warm sites or cold sites should be available for business continuity. The business continuity plan should be frequently tested. We understand that there is nothing more important than knowing that transactions are private and secure. Therefore, we have applied the very latest in technology when creating the Internet Banking security architecture. The best way to understand the security architecture within the Internet Banking is to take it one step at a time. These security features are described briefly below.

Account ID and Password (PIN) Protection

User Account ID and Password (PIN) protection occurs at the first level within the Internet Banking System. To access Internet Banking, users are required to enter an Account ID and password. Without these, access to the Internet Banking System is denied. Special password characters may be imposed by the Bank to provide a greater degree of security. The following characters may be used as required :!@#\$%^&*()_+=[\]{}|;:',<.> /?

To further increase the level of security, the bank may impose a periodic change of passwords. If the Password Change option is imposed, a warning message will be displayed when logging-onto Internet Banking.

Sign-off Button

When an end-user is finished with Internet Banking, they should click the Sign-off button before going anywhere else on the Web. This ends the Internet Banking session.

Failed Log-on Attempts

As an added security feature, the Internet Banking System is denied access after a pre-determined number of failed log-on attempts. If users have been locked out due to exceeding the pre-determined number of log-on attempts, the users must contact the Bank in order to be reinitialized.

Encryption

In addition to password protection, we ensures server authentication by using the latest techniques of data encryption. Data encryption is a way of translating data into a form that is unintelligible without a deciphering mechanism.(See below)

C:\Users\nabil\Desktop\C++\CyberSecurity\CesarCypherCryptography.exe

```
Please enter a string:
->This is a normal message please encrypt it
Please choose following options:
1 = Encrypt the string.
2 = Decrypt the string.
->1
      Encrypted string: Vjku"ku"c"pqtoen"oguucig"rngcug"gpel{rv"kv
Want to Enter Again, Press 1
Want to Decrypt || Encrypt , Press 2
Or Any NUMERIC Key EXIT
->_
```

b) Project Deliverables :

To get the demands of the aforementioned topic done, there are a collection of needed **Hardware**, **Software**, and **Operation Systems**. Such deep technical stuff gets the work done under the users' satisfaction and need.

PART I, the CODERS, in this case us: We will require at least 4 computers to create this piece of software. The personnel will have general knowledge about the topic. We will require a computer lab for most of the project. There might be some support software to verify and encrypt pin numbers (fictitious). Overall the project should take about 40 man-hours to complete, split into even parts that are 10 man-hours for each worker. As for hardware it won't be too resource

drawing so any plain old computer would probably run it. There would have to be some sort of support software for a scanning feature for credit cards

PART II, the environment or the users:

Client on Internet: *Web browser(any), operating system(any)*

Client on Intranet: *Client software, Web Browser, Operating System (any)*

Web server: *Apache Tomcat or Glassfish, Operating System(any)*

Database Server: *MS-access, Operating System(Microsoft Windows<any version>)*

Development End: *Net beans (J2EE, Java, Servlets, JSP), MSAccess (DB tool).*

- Users must have a valid e-mail address and telephone number on file.
- The **computer** you use to access online banking should meet the following minimum requirements:

- o *Computer Processor and Storage:* Standard PC or Mac with at least 1GHz processor and 1GB of RAM

- o *Browser:* Latest internet browser version for improved security and greater anti-virus and spyware protections. Supported browsers are Microsoft Internet Explorer®, Google Chrome™, Safari® and Mozilla Firefox®. See below for more information.

- o *Internet Connection:* Cable, DSL or ISDN internet connection needed

- The **mobile device(s)** used to access online or mobile banking should meet the following minimum requirements:

- o *Operating System:* iOS version 5.0 or later or Android version 2.3 or later

- o *Camera:* To utilize mobile deposit functionality, your mobile device must have a camera with more than 1.9 megapixels.

Online Banking Browser Requirements

Having a current browser installed is a key component to keeping online banking experience and financial information safe and secure. No matter what browser is used, latest version installed is recommended.

Browsers for Microsoft operating systems:

Microsoft Internet Explorer

Mozilla Firefox

Google Chrome™

Browsers for Mac operating systems:

Mozilla Firefox

Safari

Google Chrome™

c) Project Exclusion :

They are any limitations, hinders, or obstacles – or in other words- boundaries of a given system, which is in our case the Online Banking System. Exclusions can be a constraint a system cannot perform, for the time being, currently, or also cannot do due to bank policies. Below are some:

- **Customer Service**

Banks don't just enable customers to deposit checks, withdraw money and transfer funds -- they also make it easy for you to get answers to any questions that you might have. That's one area that online banking trails in. Although some banks have implemented instant message chatting features on their websites and offer customer service lines, these communications means don't compare to the convenience of speaking with a teller or other banking professional in person.

- **Deposit Limitations**

Many employers have implemented direct deposit, meaning that paychecks are electronically deposited into an employee's bank account. But there are other instances when consumers need to deposit checks or cash they've received. This can't be done online, unless you have a smartphone and belong to one of the banks that offer smartphone apps to make deposits. If you don't own a smartphone or belong to a bank that offers such technology, the only way to deposit funds is to make a visit to your bank, or, in the case of an online-only bank, use snail mail to send the deposit in.

- **ATM Limitations**

Using online banking, customers have 24-hour access to their accounts and are able to transfer funds, make payments and view bank statements. However, if you need to withdraw cash for something, that must be done at either your bank location or at an ATM machine. If you're withdrawing cash at an ATM not affiliated with your bank, you'll most likely be subject to service fees. Internet-only banks don't have a network of ATMs, so such customers can expect to pay ATM fees with every withdrawal.

- **Security Risks**

According to a report in IT News, 86 percent of online banking users deem security as a concern, with four out of five people identifying desiring better security measures than just a password. According to a story in Computerworld, hackers have been responsible for robbing small- to medium-sized businesses of millions. While banks maintain that their websites are safe, factors such as accessing accounts on smartphones and from unprotected Internet connections -- as well as cyber-attacks -- have the potential to put banks, and user accounts, at risk

d) Project Assumptions :

For any project, incidents, accidents or any scope minimization procedure may occur, and that is why it is crucial to be prepared for anything that potentially shall happen.

During the project we assume the customer has an action to perform. We assume that they have an account with the bank already if they are trying to withdraw money or deposit money. Depending on if they have money, how much money they can withdraw. The customer must put in the proper pin number. The type of accounts the user has may change what they can and can't do. (For instance, interest on saving accounts versus no interest on a checking account.) This will have constraints to access the system. The customer must have an account to do any action.

e) Risk Management:

One big risk that we've taken precautions against is the "this person didn't do enough", we've split it up so everyone has a part in everything. An issue that's already popped up is the snow issue and school closing down. We've already missed a couple of meetings and finding times to make it up is difficult. Some of us don't come to the school every day and some of us have class when the others don't, Others have to leave here and immediately go to work. We have to keep in contact with each other and figure out each other's schedules and maybe find a better meeting time.

f) Monitoring and Controlling Mechanisms:

We will file reports at the end of all phases. There will be constant contact between the 10 of us over who's doing what and how it's getting done. Monitoring will have to be done through periodic progress checks by the group leader or the team assigned to.

2.2.2 Project Feasibility Study

When conducting a project, a range must be set so that the potential project can function the way it is supposed to. Six criteria (factors) can vividly explain a project feasibility range.

A. Economical Feasibility:

*In terms of **benefit**:*

Tangible (Measured In MONEY)	Intangible(not measured)
<ul style="list-style-type: none">• The money we get from having more transactions through Online Banking• Offering what International banks provides• Being up to date with the recent technologies used in banks• *ROI is for sure a priority, and we are looking forward to maximize it	<ul style="list-style-type: none">• If the program had additional, extra and beneficial features• If the program had suburb, International Standard quality• If the program can execute what the user wants with convenience, speed and efficiency• The program will pay us in means of less transaction and also being paperless

**ROI is an acronym for (Revenue On Income)*

In terms of **cost**:

Tangible	Intangible	One-Time	Recurring Cost
<ul style="list-style-type: none">• For programmers who will finish their tasks before the deadline• Also, if they worked more than the given work-per-time, which is 10 hours• Maintaining the software whenever a problem pops up	<ul style="list-style-type: none">• Incentives can motivate workers accomplish more in a timed-frame schedule• Maintaining a good relationship with some VIP costumers• Bringing more customers through credible transactions	<ul style="list-style-type: none">• Paying money for some software, such as payment for antiviruses• OTHERS	<ul style="list-style-type: none">• A one-time payment for Hardware like HARDISKS to store• Payment for servers to store info about costumers

B. Operational Feasibility:

Such study goes in align with the Organization's rules, regulations, objectives , goals, and strategies that will promote and foster it to grow more and more and escalate its profitability.

The foremost part is that our proposed system is to be found to fix the problems that Ethiopians face when using Online Banking processes. Whether they complain or feel eventually dissatisfied. The system will solve several problems, such as security issues and easy usability. It enables prompt and speedy operation to clients. And lastly it saves a lot of time to the customer and convenient access for them.

C. Technical Feasibility:

To properly construct the Online Banking system, and since we are a group of 10 people, we can comfortably split positions to hold and tasks to perform. Additionally, we, for sure, need some professional engineers who can play the role of the 'Third Party Tester' and tell us what to add, change, or completely change. We might get the help of designers and/or other programmers with experience in other programming languages to make the system a crossed-platform. We will require at least 4 computers to create this piece of software. The personnel will have general knowledge about the topic. We will require a computer lab for most of the project. There might be some support software to verify and encrypt pin numbers (fictitious). Overall the project should take about 40 man-hours to complete, split into even parts that are 10 man-hours for each worker. As for hardware it won't be too resource drawing so any plain old computer would probably run it. There would have to be some sort of support software for a scanning feature for credit cards.

D. Political Feasibility:

Some people who are using the system might be '*computer illiterates*'; and on the other way around, employers, or administrators, might also not be able to run and make use of the system fully. We suggested making an additional page, calls '**HELP**', which helps those who do not know what to do which steps they must take to make sure that the system is fully exploited.

E. Legal Feasibility:

It might be questionable if the proposed system is stolen, copied, or not licensed. We will finalize all the processes regarding copyright issues and license acquisition. Also, we will be contacting other banks, whether domestically or internationally located, to get further information about the contractual and legal stuff regarding building an Online Banking System.

F. Schedule Feasibility:

For this part, we did utmost effort to make sure that the project is well prepared, is meeting the deadlines and has no time constraints. Anything might occur, and we did take out precautions in how to confront such time challenges. So below is what we think is the right, on point schedule time framework.

We were assigned to develop the project theoretically 3 months ago, and henceforth, we decided that **2 months** duration is our designated time schedule.

More details are further elaborated in the Project Scheduling phase, where we took the most likely time in consideration.

2.2.3 Project Management Activity

This sub point consists of 10 parameters, each parameter will be either further explained within its context or in later parts.

1) Project Initiation Phase

Online Banking system building is thoroughly started, and we as a team gathered requirements from customers, as explained in page '6'.

Also, we gathered information from other stakeholders, such as CBE Birr, to construct and prepare the project scope.

For the project charter:

- Goals: improving on an existing E-payment system
- Objectives: delivering the system on time and flawless
- Priorities: fixing the bugs, problems and issues related to that existing system
- Nature of the work: as previously stated, 40 hours is what is needed, each developer of the team, total 10, will work 10 hours
- Budget: approximately \$1500, including all the stuff denoted in page 20
- Other Considerations: will be reported as soon as vividly stated

2) Project Planning Phase

For the planning phase, we specifically elaborated how each task is meeting the project goals. Resources, labor materials and other infrastructure are done in later sections.

3) Project Execution Phase

In alignment with the project scope, the deliverables of the system besides its implementations are done in the testing phase, where a prototype product, trial product, is released for testing as a final draft. No further elaborations about this phase for the current time.

4) Project Documentation Phase

To make sure that the project is maintained after its execution, we will do it in several ways, each as needed, with more not mentioned:

- i) making comments in the original program
- ii) jot down any changes through the program building
- iii) taking feedbacks from the users constantly
- iv) keep adding features without creating other problems

Ultimately, we might be involving writing Application Program Interface(API)

5) Project Monitoring and Controlling Phase

This phase deals with how the project is monitored and well manipulated, and is elaborated below:

Monitoring	Controlling
Supervision over project execution phase	Is fully dependent on the Monitoring phase
Time schedule is meeting the parameters of the project	Agreed standards must be fulfilled during the execution phase
Any issues or contingencies that may disrupt are dealt with through this phase	Codes are working properly alongside validation and also meeting the accepted standards

6) Project Quality Controlling Phase

As stated in the Project Monitoring and Controlling Phase, the project must be meeting the standards set by the organization. Additionally in this phase, we get to catch emerging errors and bringing early solutions to such errors. Otherwise, such errors may escalate and turn into major obstacles. An example can be any small error like *transaction latency*.

Our project development team will be using several approaches, such as Six Sigma, 5S, Total Quality Management (TQM) or any other up-to-date methodologies.

7) Project Risk Management Phase

This phase takes place in the early phases of the project. Handling uncertainties that are closely related to the Monitoring and Controlling Phase. For example, if a risk was identified, taking actions and the appropriate approaches are listed down, such as user literacy of the system and wrong implementation (installation).

Risks are inevitable, and our development team will evaluate the risks in each phase, particularly Monitoring and Controlling Phase. The team will look into the best strategies and approaches to limit or eliminate such issues.

Further examples can be:

- Shortage in supply,
- Shortage in resources
- Demand for experienced developers etc.

Last but not least, the team will prepare a risk log that details the risks encountered and its responses.

8) Project Feedback and Approval Phase

Taking feedbacks from a client (or Third-Party Testers) at the end of each deliverable is a must. Changes may be requested, and since we are putting ourselves at the client's side, we must be setting up the project to what the user feels comfortable and satisfied with the most. For instance, if the user couldn't interact with the system very well due to technical problems, it is therefore pointed out and reported, and hence changed.

User may face:

- Interface dissatisfaction
- Navigation obstacles
- Time of loading pages (in websites).
- Unexplained Fields

The purpose behind the feedback and approval phase is to ensure that the clients remain satisfied with the progress of the system. Suggestions are always taken into serious and high considerations and also incorporated.

However, we might not be cooperative when a change is requested out of the original project charter and the project scope originally; and that is what is called '*Scope Creep*'.

Suggestively, when designing the project, programmatically speaking, two architectures were proposed:

- Extreme Programming Architecture: caters to constant involvement of the client
- Traditional Programming Architecture: taking the clients' feedback at the end of the execution phase, which is the prototyped, trial system.

Satisfactory feedback leads to client approval, which denotes the end of the execution phase.

9) Project Closing Phase

At the end of the project, we integrate the various modules of the system, tie up the loose ends, specifically improve on the user-friendly features, and add to the overall appearance to make the project appear attractive not only to the client but also to customers.

10) Project Deployment and Maintenance Phase

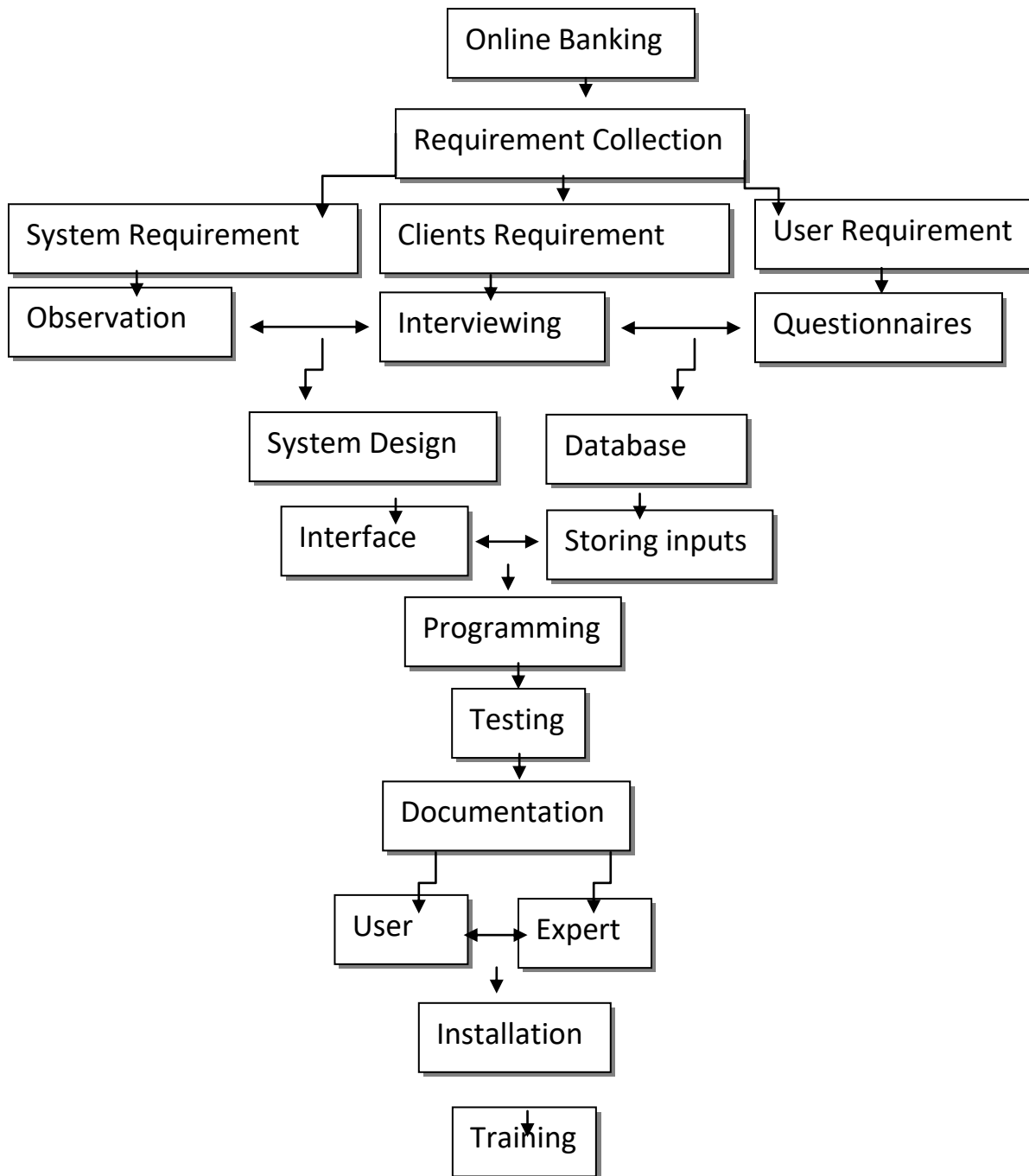
This phase is dealing with how the project is delivered to the customer. Also, how the project is maintained if a problem popped up.

Deployment	Maintenance
Handing the project to the customer	Giving free maintenance for the project given to the client for <u>one full year</u>
Providing training to ensure the customer can use the project seamlessly	Maintenance incorporates removing bugs

2.2.4 WBS of the Project

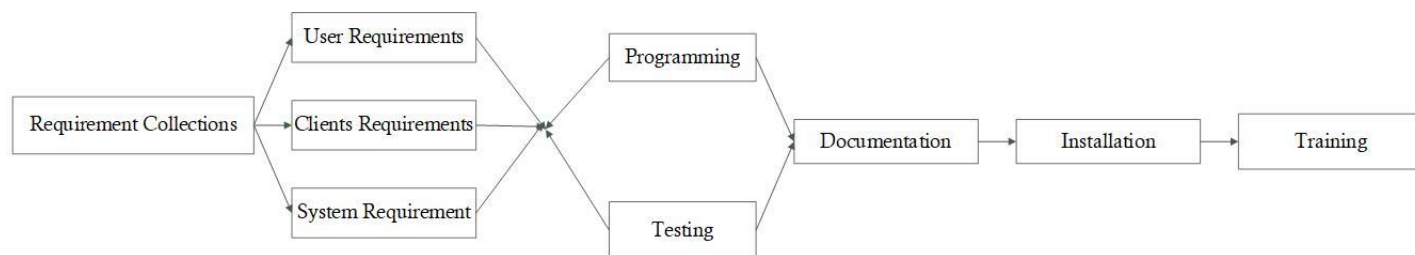
Here, the entire project is divided into manageable tasks and hence logically ordered to ensure smooth evolution between the tasks. Moving on, we may see how detailed and structured the data is set out to, in which the data is graphically designed. Each task has a single and identifiable deliverable.

- ❖ Online Banking: The Project
 - ❖ Requirement Collection: the process in which requirements are gathered
 - User requirement: what the users want
 - Done through questionnaires
 - Clients requirement: what the customers want
 - Done through interviewing
 - System requirement: what the system needs
 - Done through observation
 - ❖ System Design
 - Building the interface
 - ❖ Database Design
 - Constructing where the input will be stored
 - ❖ Programming: actually building the system using programming languages (preferred 3rd generation languages)
 - ❖ Testing: ensuring that the system is functional
 - ❖ Documentation: showing how the system functions in written or graphical representations
 - User documentation: how the user will use the system
 - Expert documentation: how the expert will be able to manipulate the system
 - ❖ Installation: configuring the system to the operating system
 - ❖ Training: giving the users the right skills to work on the system
-
- ❖ “Main Point”
 - “Sub-Main Point”
 - “Follow up of Sub-Main Point”



2.2.5 Project Scheduling

To perfectly and appropriately schedule the project, we had a variety of techniques available for depicting and documenting project plans. We decided to use PERT chart because it shows the ordering of activities the way we wanted it. So, the aforementioned WBS has been graphically reported below.



**Microsoft Visio 2013 has been used to develop the PERT chart for the project*

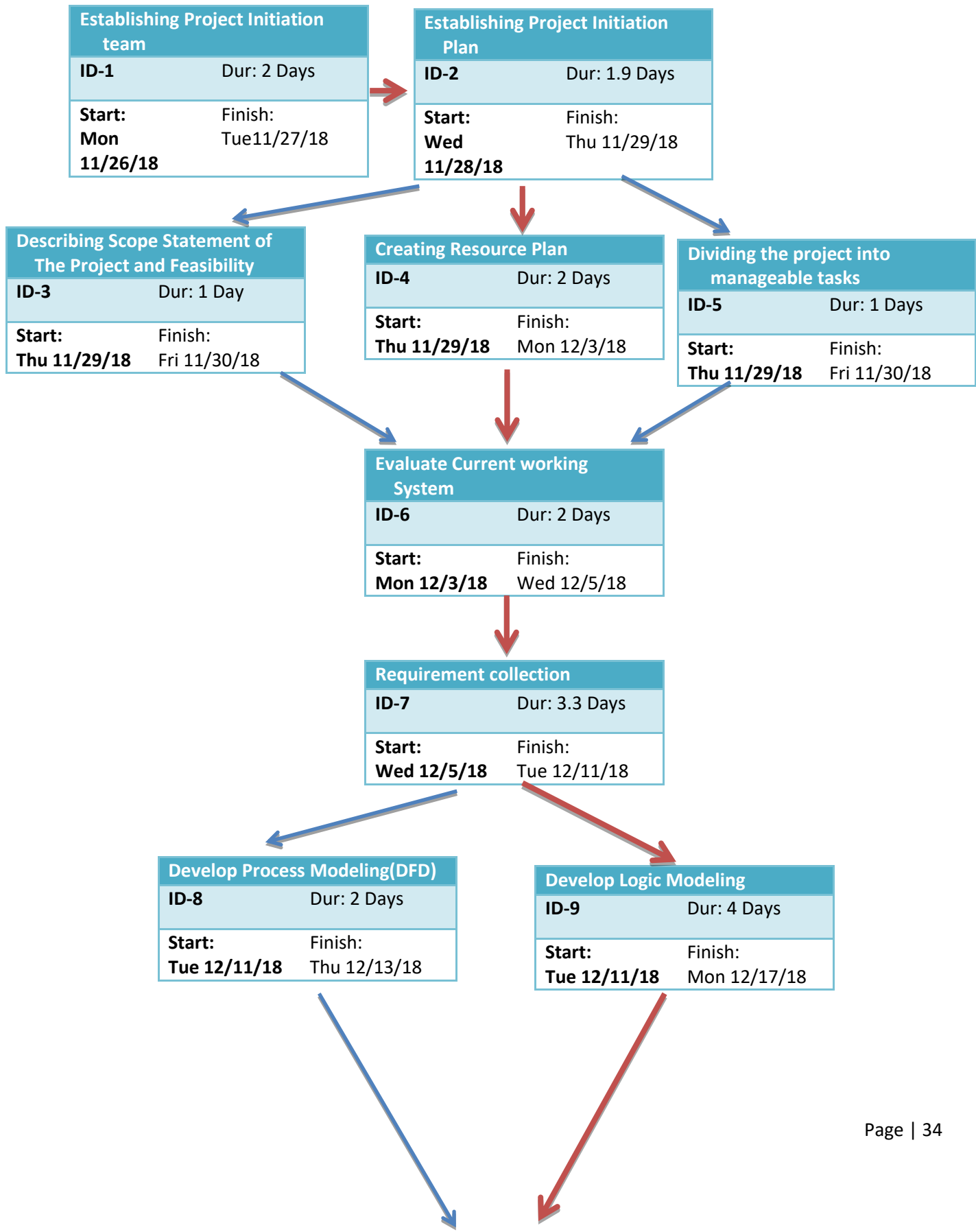
Since each and every task has six major characteristics which are:

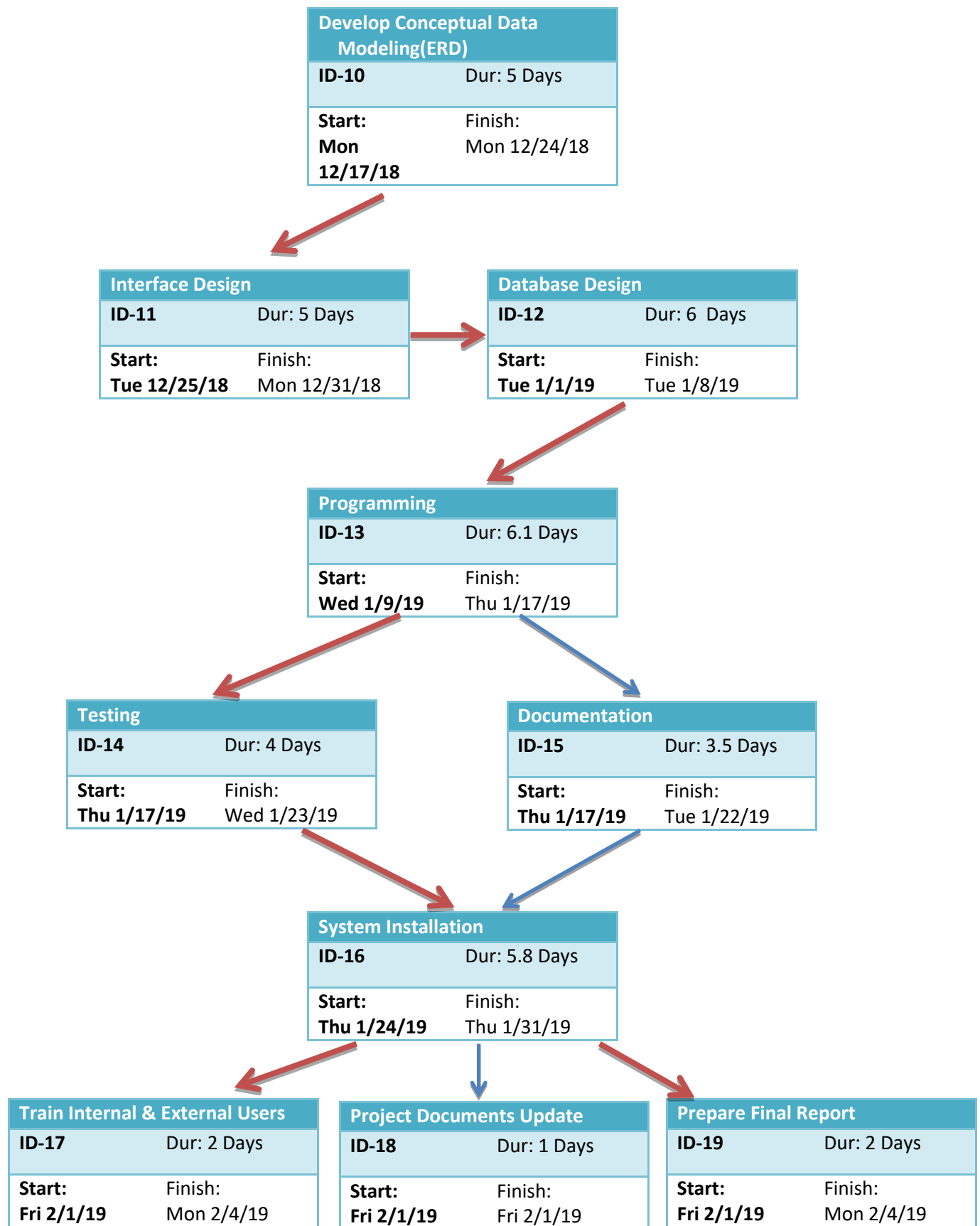
Preparation, Planning, Analyzing, Designing, Implementation, Closure

We did the project scheduling in the following way

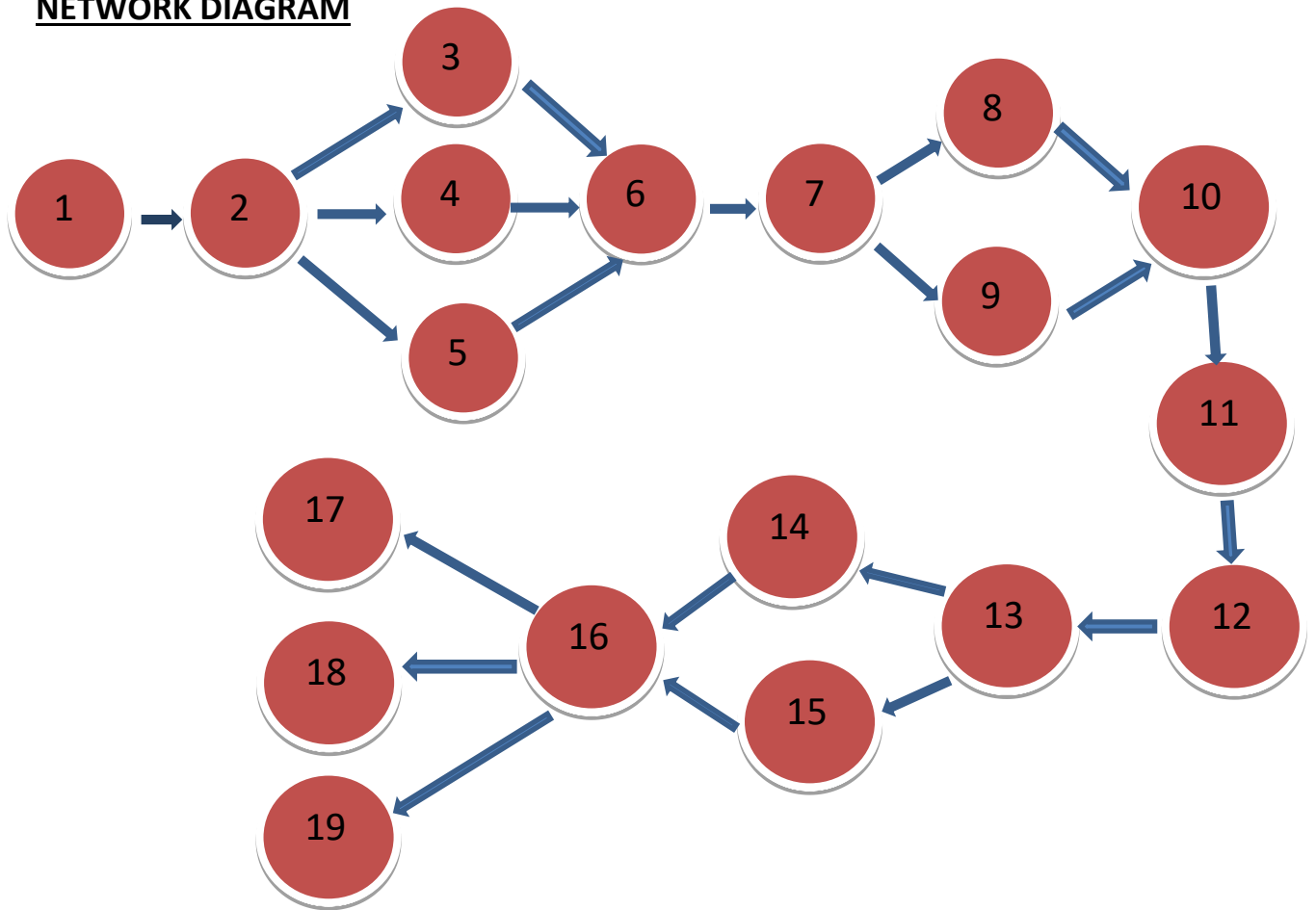
			Optimistic Estimation	Most likely Estimation	Pessimistic Estimation	Expected Duration
ID	Description	Predecessor	Days A	Days B	Days C	
	A, PREPARATION					
1	Establishing Project Initiation team	-	1	2	3	2
2	Establishing Project Initiation Plan	1	1	2	2.5	1.9
	B, PLANNING					
3	Describing Scope Statement of The Project and Feasibility	2	0.5	1	1.5	1
4	Creating Resource Plan	2	1	2	2.5	2
5	Dividing the project into manageable tasks	2	0.5	1	1.5	1
	C, ANALYZING					
6	Evaluate Current working System	3,4,5	1	2	3	2
7	Requirement collection	6	2	3.5	4	3.3
8	Develop Process Modeling(DFD)	7	1	2	3	2
9	Develop Logic Modeling	7	3	4	5	4
10	Develop Conceptual Data Modeling(ERD)	8,9	3	5	7	5
	D, DESIGNING					
11	Interface Design	10	4	5	6	5
12	Database Design	11	5	6	7	6
	E, IMPLIMENTATION					
13	Programming	12	5	6	8	6.1
14	Testing	13	3.5	4	5	4
15	Documentation	13	3	3.5	4	3.5
16	System Installation	14,15	4	6	7	5.8
17	Train Internal & External Users	16	1.5	2	3	2
	F, CLOSURE					
18	Project Documents Update	16	0.5	1	1.5	1
19	Prepare Final Report	16	1	2	3	2

PERT CHART FOR SCHEDULING





NETWORK DIAGRAM

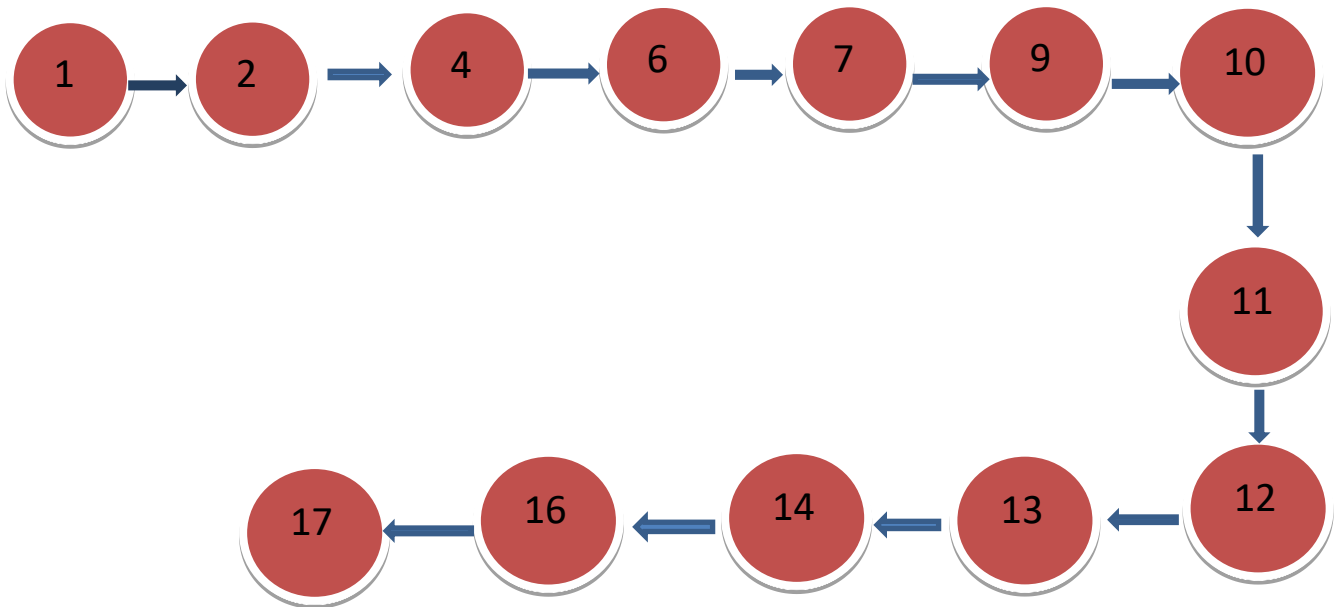


POSSIBILITY PATH

Possible Paths	paths	Totals
Path 1	ID(1+2+3+6+7+8+10+11+12+13+14+16+17)	46.1
	Dur(2+1.9+1+2+3.3+2+5+5+6+6.1+4+5.8+2)	
Path 2	ID(1+2+4+6+7+8+10+11+12+13+14+16+17)	47.1
	Dur(2+1.9+2+2+3.3+2+5+5+6+6.1+4+5.8+2)	
Path 3	ID(1+2+3+6+7+9+10+11+12+13+14+16+17)	48.1
	Dur(2+1.9+1+2+3.3+4+5+5+6+6.1+4+5.8+2)	
Path 4	ID(1+2+4+6+7+9+10+11+12+13+14+16+17)	49.1
	Dur(2+1.9+2+2+3.3+4+5+5+6+6.1+4+5.8+2)	
Path 5	ID(1+2+3+6+7+8+10+11+12+13+15+16+17)	45.6
	Dur(2+1.9+1+2+3.3+2+5+5+6+6.1+3.5+5.8+2)	
Path 6	ID(1+2+4+6+7+8+10+11+12+13+15+16+17)	46.6
	Dur(2+1.9+2+2+3.3+2+5+5+6+6.1+3.5+5.8+2)	
Path 7	ID(1+2+3+6+7+9+10+11+12+13+15+16+17)	47.6
	Dur(2+1.9+1+2+3.3+4+5+5+6+6.1+3.5+5.8+2)	
Path 8	ID(1+2+4+6+7+9+10+11+12+13+15+16+17)	48.6
	Dur(2+1.9+2+2+3.3+4+5+5+6+6.1+3.5+5.8+2)	
Path 9	ID(1+2+3+6+7+8+10+11+12+13+14+16+18)	45.1
	Dur(2+1.9+1+2+3.3+2+5+5+6+6.1+4+5.8+1)	
Path 10	ID(1+2+4+6+7+8+10+11+12+13+14+16+18)	46.1
	Dur(2+1.9+2+2+3.3+2+5+5+6+6.1+4+5.8+1)	
Path 11	ID(1+2+3+6+7+9+10+11+12+13+14+16+18)	47.1
	Dur(2+1.9+1+2+3.3+4+5+5+6+6.1+4+5.8+1)	
Path 12	ID(1+2+4+6+7+9+10+11+12+13+14+16+18)	48.1
	Dur(2+1.9+2+2+3.3+4+5+5+6+6.1+4+5.8+1)	
Path 13	ID(1+2+3+6+7+8+10+11+12+13+15+16+18)	44.6
	Dur(2+1.9+1+2+3.3+2+5+5+6+6.1+3.5+5.8+1)	
Path 14	ID(1+2+4+6+7+8+10+11+12+13+15+16+18)	45.6
	Dur(2+1.9+2+2+3.3+2+5+5+6+6.1+3.5+5.8+1)	
Path 15	ID(1+2+3+6+7+9+10+11+12+13+15+16+18)	46.6
	Dur(2+1.9+1+2+3.3+4+5+5+6+6.1+3.5+5.8+1)	
Path 16	ID(1+2+4+6+7+9+10+11+12+13+15+16+18)	47.6
	Dur(2+1.9+2+2+3.3+4+5+5+6+6.1+3.5+5.8+1)	

CRITICAL PATH

ID(1+2+4+6+7+9+10+11+12+13+14+16+17)



3. System Analysis Phase

3.3.1 Requirement Determination Tools and Techniques

Three tools were used. For instance:

- Interviewing
- Questionnaires (Surveys)
- Document Analysis

We were divided into two teams (of four each) to collect data from targeted, experienced figures, like CBE & Awash banks.

Although most of the branches of the aforementioned banks were totally cooperative with us, we did our best to extract as much information potential as possible.

I. Interviewing:

We designed 8 open-ended questions so we can make the interviewee feel free to answer what he/she finds appropriate. We even particularly asked to interview the one in charge of Online banking section in the targeted branch to be more in depth.

We asked for allowance to record the interview for the project purpose, but awash bank were very tackling. So unfortunately, we did not got the chance to record.

For the most part, the questions were quite unambiguous, right to the issue, and short on length so it takes less time.

Only one bank was cooperative, including its branches whose staff were very helpful, was **CBE bank**. Questions asked were attached in the Appendix.

II. Questionnaires (Surveys)

At the beginning of our system building process, we wanted first to see if the environment really needs such a system or an improved one. We conducted a survey using *Google Forms*. The designed form was released up to many places through the cyber net, using one social media application: Telegram. Many people, around 32, were surveyed, since we decided accepting responses.

The questions were a mixture of both open and close ended questions. And, as shown in page 6, the questions were quite short, with some long paragraphs required to be written.

III. Document Analysis

This means using the system, and put it under serious, tough testing methods to examine and list out the problems.

Since we do not have bank accounts in both CBE and Awash, we are not allowed to use their Online Banking Service, and therefore cannot list down how the data is processed, special information is set to go etc.

But, here are some screenshots of the platforms used in Online Banking in CBE and Awash banks.

Look at figures 2.0 & 2.1.

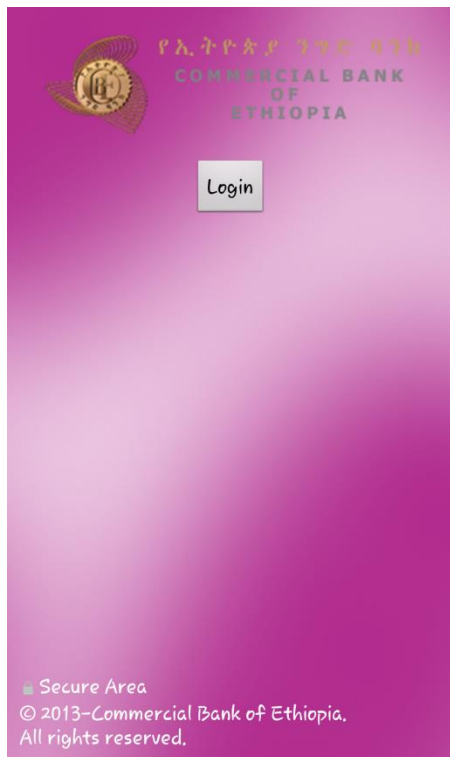


Figure 2.0 CBE interface in the application

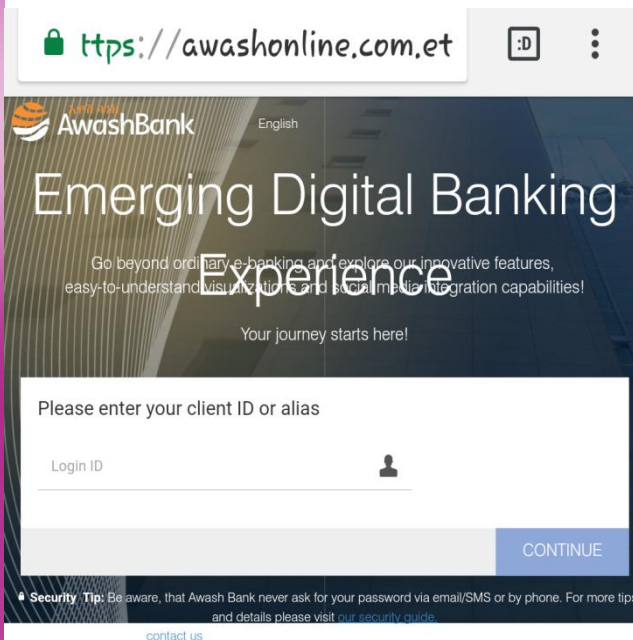


Figure 2.1 Awash bank interface online of the web

3.3.2 System Requirement Specification

3.3.2.1 Functional Requirements

The Functional Requirements Specification describes what the system must do; how the system does it is described in the Design Specification.

Interface requirements

- Field 1 accepts numeric data entry.
- Field 2 only accepts dates before the current date.
- Screen 1 can print on-screen data to the printer.

Business Requirements

- Data must be entered before a request can be approved.
- Clicking the Approve button moves the request to the Approval Workflow.

Regulatory/Compliance Requirements

- The database will have a functional audit trail.
- The system will limit access to authorized users.
- The spreadsheet can secure data with electronic signatures.

Security Requirements

- Members of the Data Entry group can enter requests but cannot approve or delete requests.
- Members of the Managers group can enter or approve a request but cannot delete requests.
- Members of the Administrators group cannot enter or approve requests but can delete requests.

Such examples may be encountered frequently. In our case, we got around 9 functional requirements, listed below:

Functional Requirements of the Online Banking system

- 1) Customer must have a valid user id and password to login to the system
- 2) If a wrong password is given three times in succession, that account will be locked for a set time depending on how many time they kept entering in the wrong password. When an invalid password is entered a warning is given to the user that his account is going to be locked.
- 3) After the valid user logs in he is shown the list of accounts he/she has with the bank.
- 4) On selecting the desired account he is taken to a page which shows the present balance in the particular account number.
- 5) Customer can request details of the last 'n' number of transactions he has performed. A report can also be taken of this.
- 6) Customer can make a funds transfer to another account in the same bank. User is provided with a transaction password which is different from the login password.
- 7) Customer can transfer funds from his account to any other account with this bank. If the transaction is successful a notification should appear to the customer, in case it is unsuccessful, a proper message should be given to the customer as to why it failed.
- 8) Customer can request for check book/change if address/stop payment of checks
- 9) Customer can view his monthly as well as annual statements. He can take print out of the same.
- 10) The system is providing balance enquiry facility.

3.3.2.2 Non-Functional Requirements

Functional requirements exhibit the behavior of the system that fulfills client's objectives or tasks whereas non- functional requirements consolidate constraints and qualities. Qualities are properties of the system that are examined by its and in this manner will affect their level of satisfaction with the system.

As online banking is carried by various types of clients i.e. whether they have knowledge of computers or not so the application designed for online banking must be easy to use and enable the client to manage their accounts or transactions with simplicity.

Non-Functional Requirements

- 1) Those not registered with the system shall not be able to enter it. Only users authorized to enter the system will have the ability to view the system. In other words, secure access of confidential data
- 2) The system shall be designed so it can be easily be modified, and Better component design to get better performance at peak time
- 3) The system shall be simple to configure and use. The system will not require its users to adhere to specific organizations of information, and will not be technically difficult to use. Also, Flexible service based architecture will be highly desirable for future extensions.
- 4) If access to the system is invalid more than three times then the user will be locked out for security purposes for a set time depending on how many times the user tried to get access.

3.3.2.3 Analysis (Scenarios) of the Previously Mentioned Requirements

Analysis of the Requirements
1. Customer must have a valid user id and password to login to the system—if the customer does not an account with the bank then they cannot log on.
2. If a wrong password is given three times in succession, that account will be locked for a set time depending on how many time they kept entering in the wrong password. When an invalid password is entered a warning is given to the user that his account is going to be locked. —if the user enters the wrong password three times they will be denied access for 30 minutes, and if the enter in the worn password for another three times after the 30 minutes they will be denied access for 1 hour, each time it doubles.
3. After the valid user logs in he is shown the list of accounts he/she has with the bank. They will be given their accounts in a list which they can choose from.
4. On selecting the desired account he is taken to a page which shows the present balance in the particular account number. — the user is shown more about their account that they have chosen
5. User can request details of the last ‘n’ number of transactions he has performed. A report can also be taken of this. —the user can see and select any transaction that has happened in the past that regards the account.
6. User can make a funds transfer to another account in the same bank. User is provided with a transaction password which is different from the login password. The user can transfer money for the system without having to go to the bank to transfer the funds. But you can only make so many transfers online. And will be given a transaction password to log on with to make sure the transaction went through.
7. User can transfer funds from his account to any other account with this bank. If the transaction is successful a notification should appear to the customer, in case it is unsuccessful, a proper message should be given to the customer as to why it failed. The user will get a notification as to when the transaction has went through or was denied.
8. User can request for check book/change if address/stop payment of checks — the user can order a check book or change their checks. They can also change their address for the billing statements. And they can cancel their account if they wish too.
9. User can view his monthly as well as annual statements. He can take print out of the same. The user will be able to view all transactions in all accounts on one page and will be prompted if they want to print it or not.

3.3.3 System Requirement Structuring

First, we do a requirement gathering process to determine whether the system, that we are examining or putting under testing, is automated or manual. In our case, the system used for online banking in the most places we looked at is automated; because everything is done through electronics, so no need to the interference of manual system by any means.

Then to execute system requirement structuring, we start to develop DFDs (Data Flow Diagrams) and ERDs (Entity Relationship Diagrams) using Entities, Attributes and Relationships, further discussed in the successor section.

The outcome of the above is SRS (System Requirement Specifications), which we already discussed above in page 45, which also listed down functional and non-functional requirements.

3.3.4 Process Modeling of Data Flow Diagram (DFD)

This tool will show us how the Online Banking internal and external components are really working. We will start with **Context Diagram**, which show simple, basic graphical interpretation of the system. It merely lists down the **major inputs and outputs.**

Every phase is then decomposed into several concepts, which are noted respectively.

Look at figure 3.0

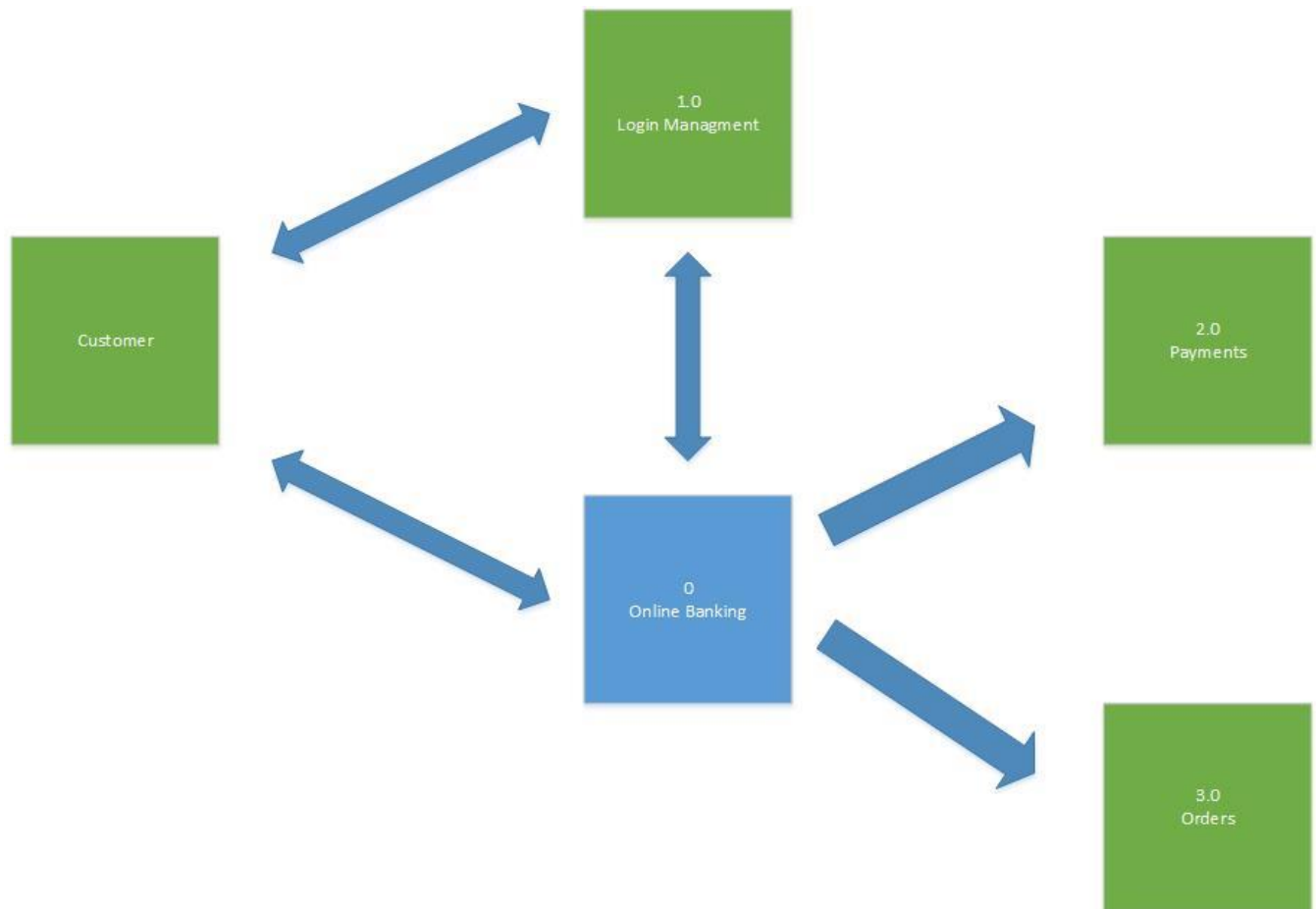


Figure 3.0 showing the context diagram

Customer is the one and only matter of the subject down here, since all the information is going to be taken from him/her. The Login Management authenticates if the user is actually a real user of the system. After that, the user has the opportunity to choose between operations, such as Payments and/or orders. These operations are just initially, as we grow, we will be adding up.

Level 0:

System's major processes are elaborated here graphically using diagrams.
Figure 3.1 below

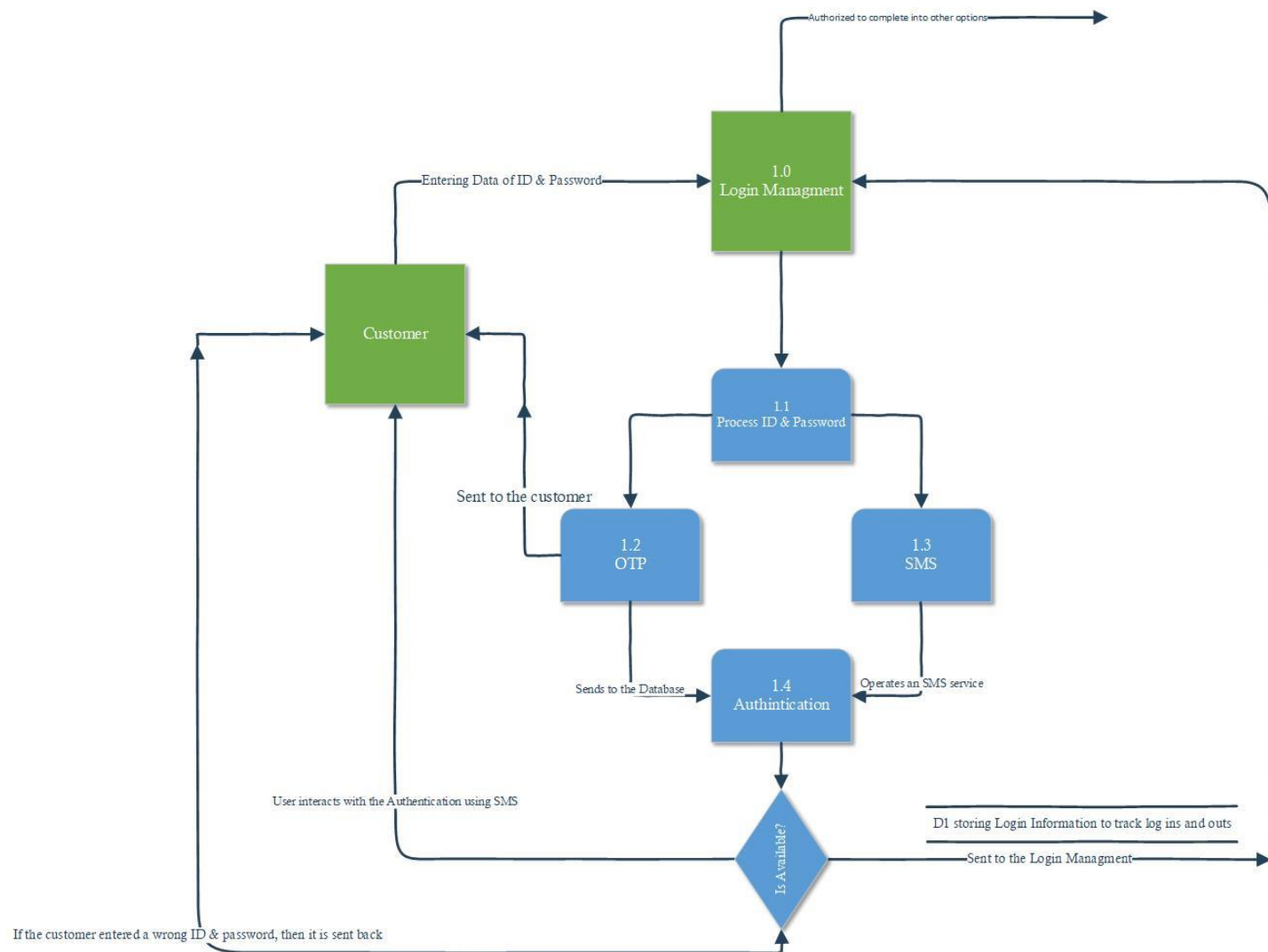


Figure 3.1 shows the level 0 of Login Management

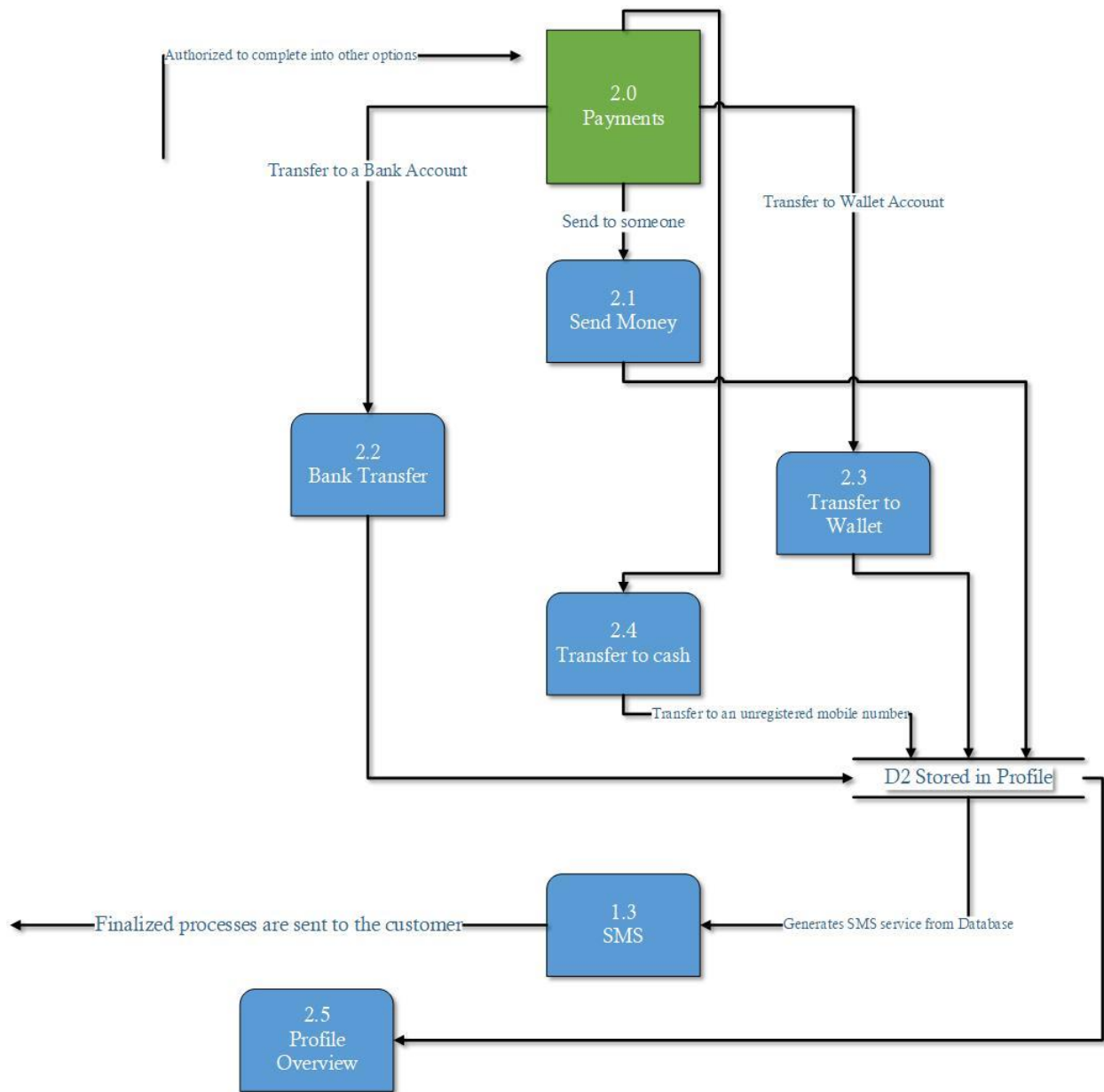


Figure 3.2 shows the level 0 of Payments

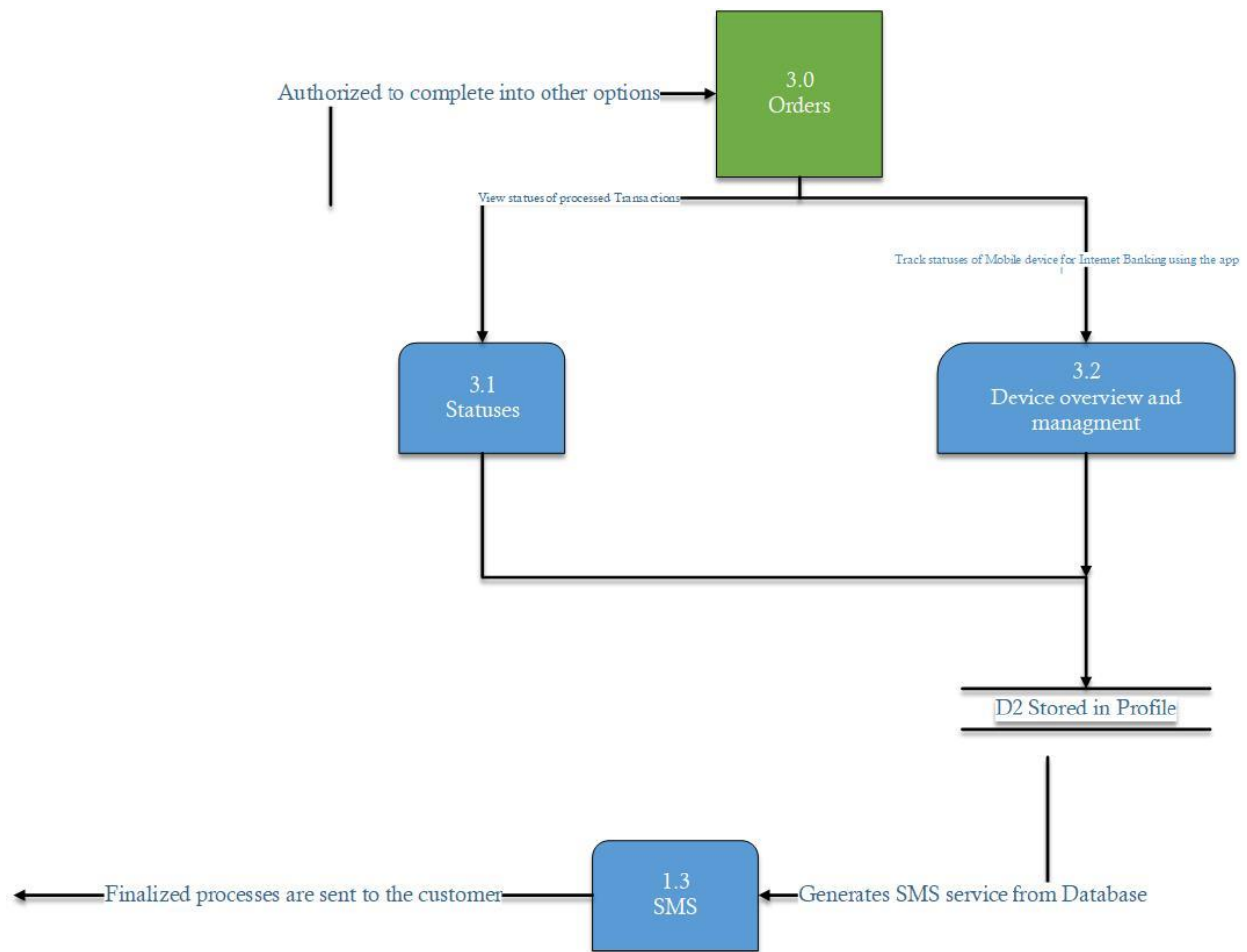


Figure 3.3 shows the level 0 of Orders

Level 1:

Just same like level 0, it shows all the data with its characteristics, such as Data flow, data store, and process alongside its sink.

Figure 3.4 shows Profile Overview.

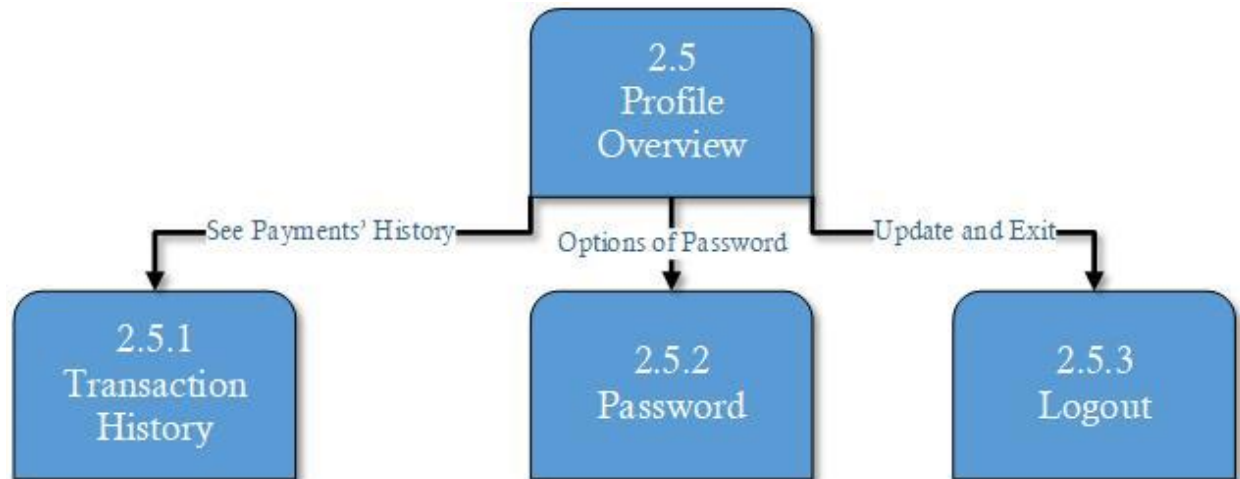


Figure 3.4 shows how profile overview is down

Level 2:

This level shows further breakdowns.

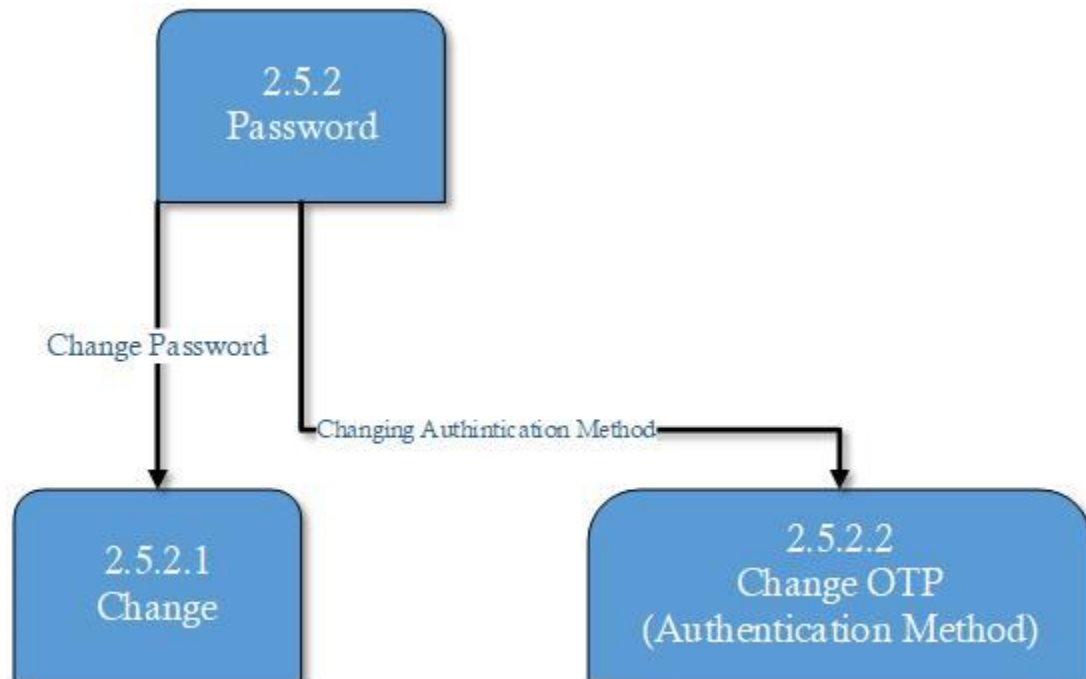


Figure 3.5 shows Passwords being broken down

Level 3:

Since there are no more additional procedures, decompositions concludes in this level, which is therefore is called the **Primitive DFD**

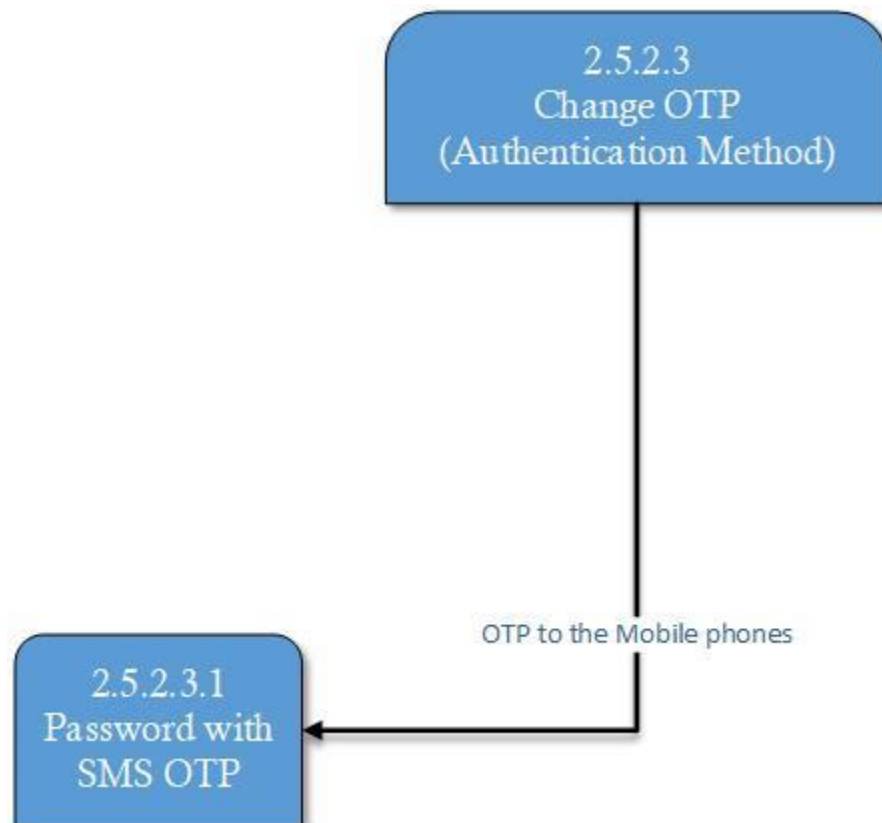


Figure 3.6 shows Passwords being broken down

3.3.4.1 Data Dictionary

A data dictionary is a collection of descriptions of the data objects or items in a data model for the benefit of programmers and others who would like to refer to them. Data modeling is done through identifying each object and its relationship, and the result is a picture of objects relationship. Conclusively, a brief textual description is provided. Figure 4,0 shows how Data Dictionary life cycle, while for this project, figure 4.1 shows its own Data Dictionary.

Column	Data Type	Description
ID	int[7]	Primary key of the table
initial_pin	char[10]	Primary key of the table
password	Char[6]	User password
send_money	Int	Process op1
Bank-transfer	Int	Process op2
Wallet-transfer	Int	Process op3
Cash-transfer	Int	Process op4

Figure 4.1 shows a simple Data Dictionary
OP refers to 'option'

3.3.5 Logic Modeling

Logic models typically depict the inputs, processes, outputs, and outcomes associated within this project. The purpose of logic modeling is to present a clear plan for the use of assets to meet the desired goals. There are three types in logical modeling: **Decision Tables**, **Decision Trees**, and **Structural English**. We decided to use the latter for its relevance to our major, which is Computer Science. Moreover, Structural English uses a modified form of English used to specify logic of information processes. Ironically, each and every analyst has his/her own way in making standards regarding logic modeling.

The problem of the other types of Data Flow Diagram is that they do not show logic inside the processes and what really occurs within a single process

And that is what Logic Modeling brought, which is representing internal structure and functionality of processes depicted on a DFD

Process 1.0 Logic Management

DO

ACCEPT ID and password

GENERATE One Time Password (OTP)

SENDS an SMS Authentication Code

// If someone is trying to hack into the customer's account, we have put the evaluation process after ACCEPTING, GENERATING, and SENDING, for customer priority

BEGIN IF

IF ID and Password are equal to what is in the database

THEN proceed to process 2.0

STORE time and date the user utilized the system for tracking purposes (Cookies)

ELSE show an error message

IF GET ID and password exceeds 3 times

SENDS SMS message to the customer of the ID targeted

END OF IF

END OF IF

UNTIL GET ID and password exceeds 3 times OR READ ID and password are not in the database

Process 2.0 Payments

SELECT

CASE 1: Send Money

ACCEPT amount of money

ACCEPT information about the other person, including BANK ID

GOTO evaluation

break

CASE 2: Bank Transfer

ACCEPT Bank Account ID

ACCEPT amount of money

GOTO evaluation

break

CASE 3: Transfer to Wallet Account

ACCEPT Wallet Account ID

ACCEPT amount of money

GOTO evaluation

break

CASE 4: Transfer to Cash

ACCEPT other person's Phone Number

ACCEPT his/her Bank Account ID

ACCEPT amount of money

GOTO evaluation

break

END OF SELECT

BEGIN evaluation

READ balance in database

IF amount of money is greater than existing balance

THEN SHOW error message

GO back to **SELECT**

END OF IF

GENERATE SMS service

SHOW what the customer chose with adequate details

CASE 5: Profile Overview

BEGIN SLECET

CASE 1: Transaction History

READ data from database

DISPLAY history

CASE 2: Password

IF user pressed '**C**hange'

ACCEPT old password

ACCEPT new password

ELSE IF user pressed '**C**hange **OTP**'

READ phone number from database

SENDS SMS message

END OF IF

END OF SELECT

END OF SELECT

STORE any changes in the database

// the storing process is the last considering several transactions occurring at the same time, this might damage the servers and /or slow them

Process 3.0 Orders

SELECT

CASE 1: *Statuses*

READ processed transactions from the database

DISPLAY transactions

break

CASE 2: Device Management

BEGIN IF

IF user pressed 'Track Statuses'

GOTO *Statuses* and do the processes mentioned

ELSE IF user pressed 'Link Device'

GET device information

ELSE IF user pressed 'Delink Device'

GET device information

END OF IF

break

STORE changes in the database

SEND finalized processes to the customer via SMS service

3.3.6 Conceptual Data Modeling (ERD)

A detailed model that shows the overall structure of organizational data, while being independent of any database management system or other implementation considerations. Its purpose is to show as many rules about meaning and interrelationships among data as possible.

3.3.6.1 Entities with their descriptions

An entity is what is in the user environment about which the organization wishes to maintain data. An entity also has its own identity, which distinguishes it from every other entity.

Entity	Description
USER	Frequent customer
ADMIN	Manages the system
ACCOUNT	Information about the customer's transactions
LOGIN_MANGMENT	Processes to login and use the system
PAYMENT	Processes of payments
ORDER	Tracking transactions
TRANSACTION	Withholds processes

3.3.6.2 Relationship with entities

Relationships are like the glue that holds up the various entities together in an ER-diagram. An association of relationships is an event or some natural linkage exists between the entities.

Relationships	Description
One to One	A <u>USER</u> can have one <u>ACCOUNT</u>
One to Many	An <u>ADMIN</u> can manage many <u>USERS</u> A <u>USER</u> can process multiple <u>PAYMENTS</u> , <u>ORDERS</u> , and <u>TRANSACTIONS</u>
Many to Many	Several <u>LOGINS</u> by several <u>USERS</u> at a time

3.3.6.3 Attributes with their descriptions

For each entity, it has a set of attributes associated with it. Additionally, an attribute is a property of an entity. Below is the list of attributes, listing down all the entities mentioned with its attributes.

USER	Cus_ID
USER	Cus_Name
USER	Cus_Mobile_No
USER	Cus_Email
USER	Cus_ID

ADMIN	Admin_ID
ADMIN	Admin_Name
ADMIN	Admin_Mobile_No

ACCOUNT	Username
ACCOUNT	Account_ID
ACCOUNT	Password
ACCOUNT	Balance
ACCOUNT	Amount_transacted

LOGIN_MANG	Password
LOGIN_MANG	Cus_ID
LOGIN_MANG	Cus_Mobile_No

PAYMENT	Payment_ID
PAYMENT	Payment_Type
PAYMENT	Payment_Amount
PAYMENT	Cus_Name
PAYMENT	Cus_ID

TRANSACTION	Transaction_ID
TRANSACTION	Transaction_Type
TRANSACTION	Amount
TRANSACTION	Date
TRANSACTION	Reciever_Account
TRANSACTION	Reciever_Name
TRANSACTION	Reciever_ID

ORDER	Transaction_ID
ORDER	Cus_Mobile_No
ORDER	Amount_Transacted

3.3.6.4 Candidate Keys and Identifiers

A candidate key is a combination of attributes that can be uniquely used to identify a database record. The best thing is that all candidate keys have some common properties, so we can easily pick them up, since the primary key is going to be a unique one.

On the other hand, an identifier is a candidate key that has been selected to be used as the unique characteristic for an entity.

To uniquely identify a customer, we will be using his/ her:

- Account ID
- Cus ID

Why only these? Because if we used, for example, Phone Numbers, it is common that most carriers recycle phone numbers, and individual subscribers can have several phone numbers simultaneously.

So the **BEST** option was to choose what can be unique and totally different from a person to another.

3.3.6.5 Degree of Relationship

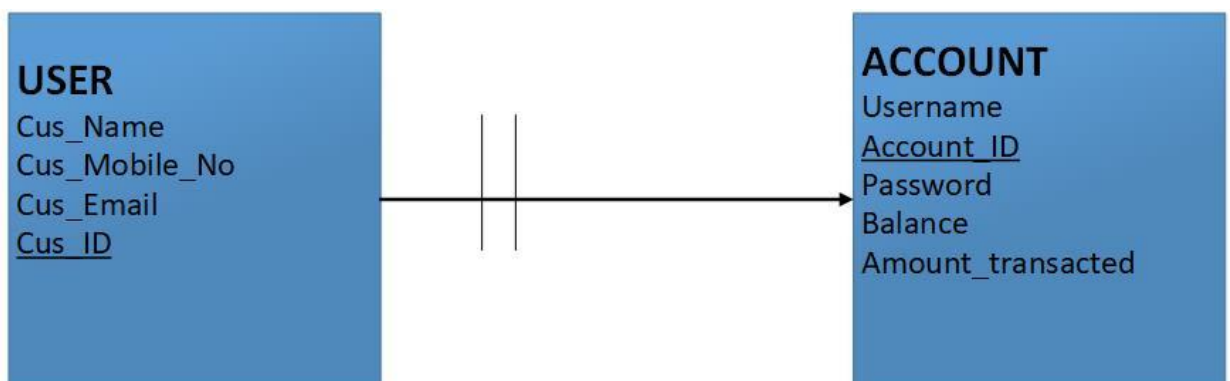
A relationship degree indicates the number of entities or participants associated with a relationship. There are FOUR degrees of a relationship or in other words 'Cardinalities':

- Unary
- Binary
- Ternary & Higher-Degree
- Recursive

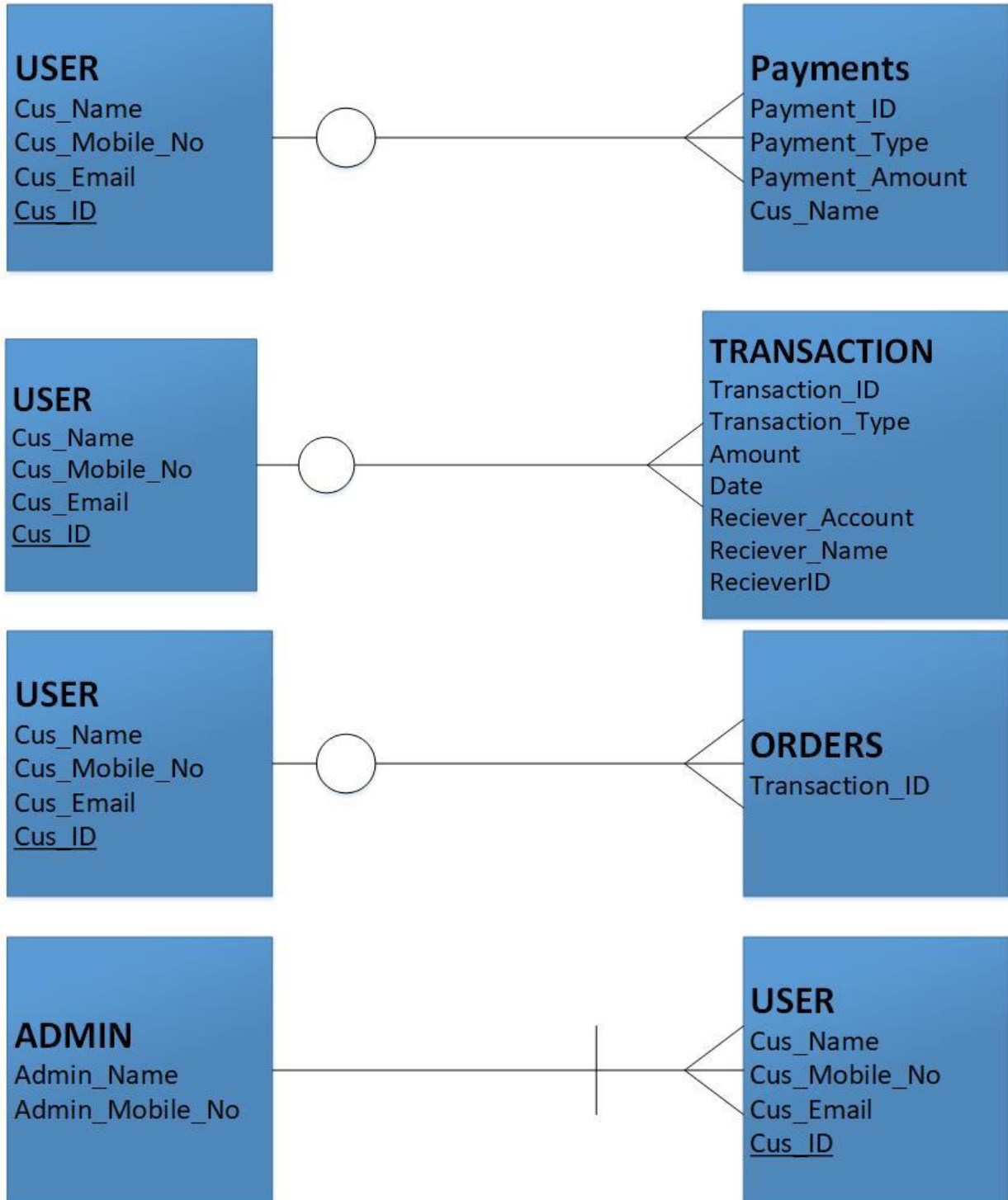
What properly fits this project, or any potential project, is determined by its entities.

The above is what will be detailed graphically in the coming sector, 3.3.7.6 Cardinalities. For now, we will be discussing three degrees of relationships. Also, the drawings below are shown with respect to cardinality

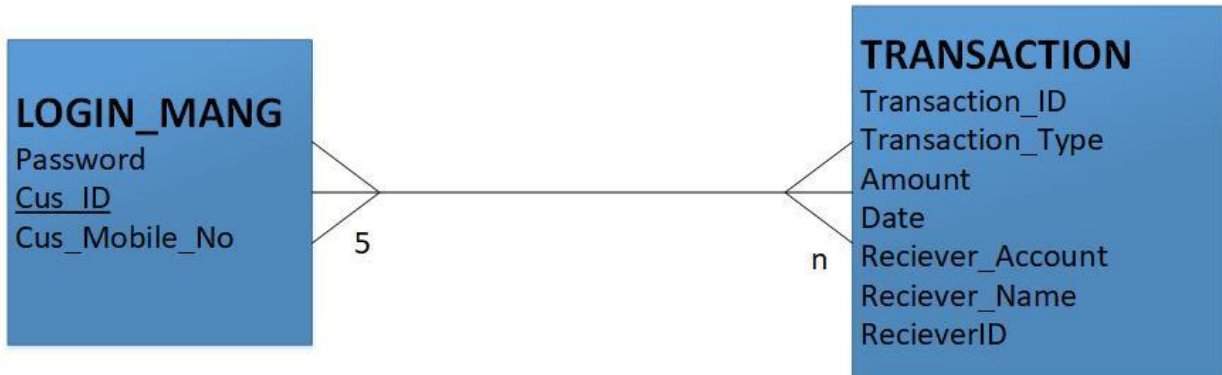
- One-to-One (1:1) this is where one occurrence of an entity relates to only one occurrence in another entity.



- One-to-Many (1:M) this is where one occurrence of an entity relates to many occurrences in another entity.



- Many-to-Many (M:N) this is where many occurrences of an entity relates to many occurrences in another entity.

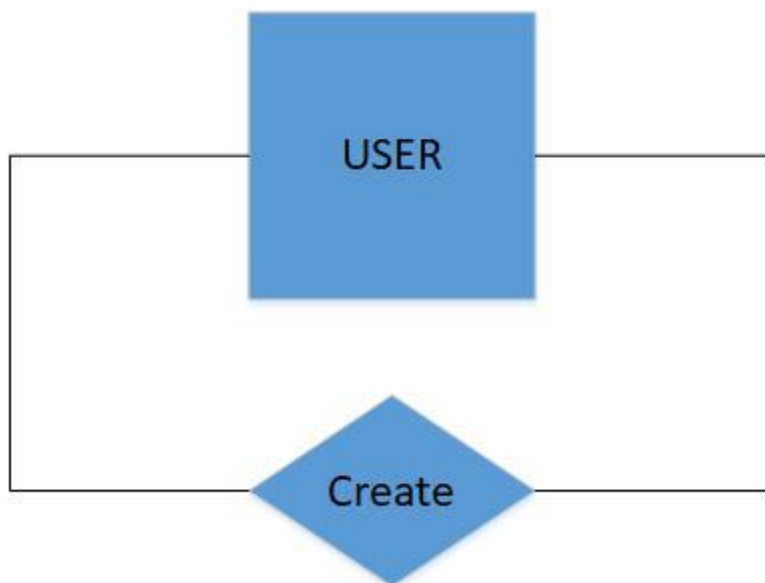


3.3.6.6 Cardinalities in Relationship

As previously mentioned, Cardinalities refers to the maximum number of times an instance in one entity can relate to other instances of another entity.

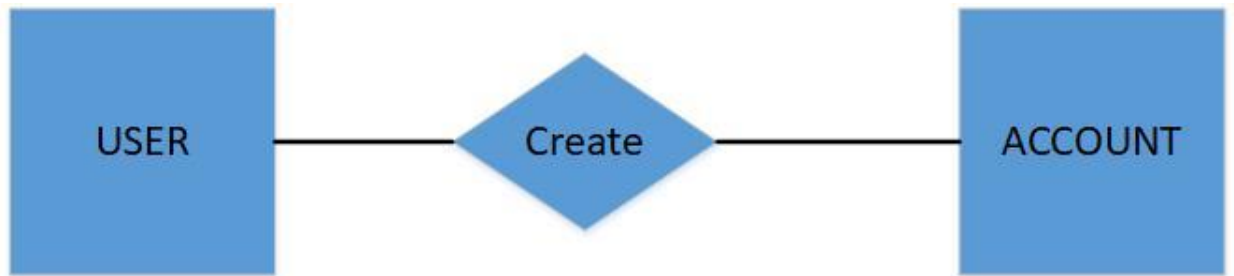
In other words, it is the same as Degree of relationship, except with some slight changes, which will be elaborated through a detailed graph.

- Unary: is when both participants in the relationship is of the same entity

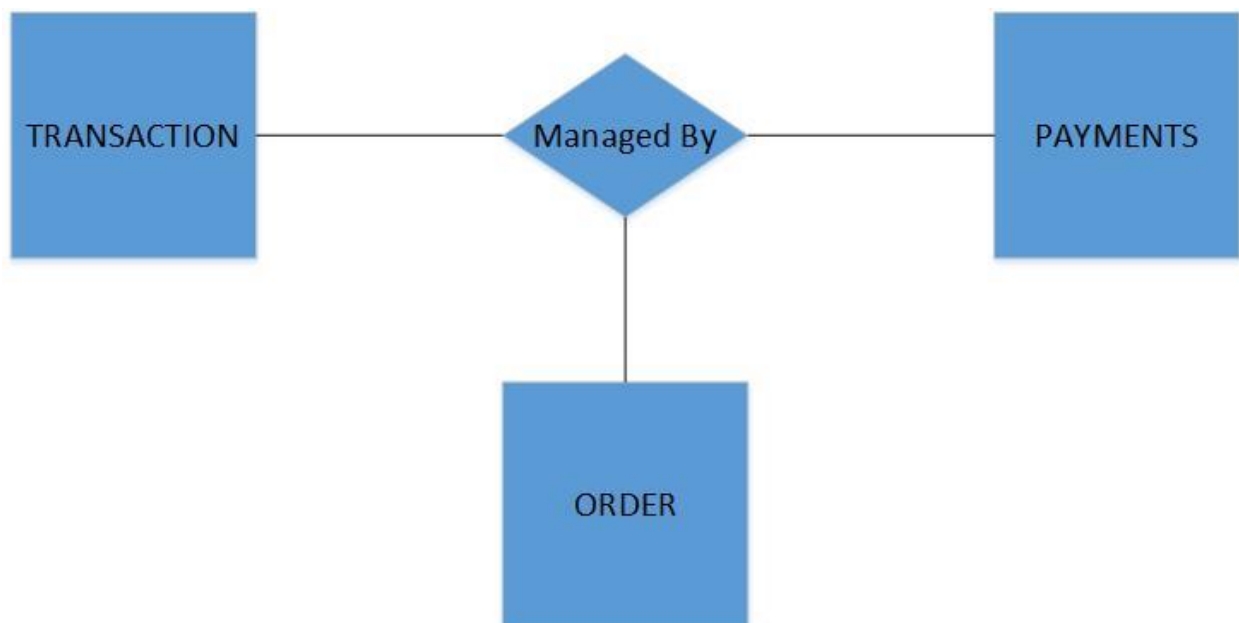


//Here, a USER can manage, modify, and add details to his/her Profile

- Binary: is when two entities participate

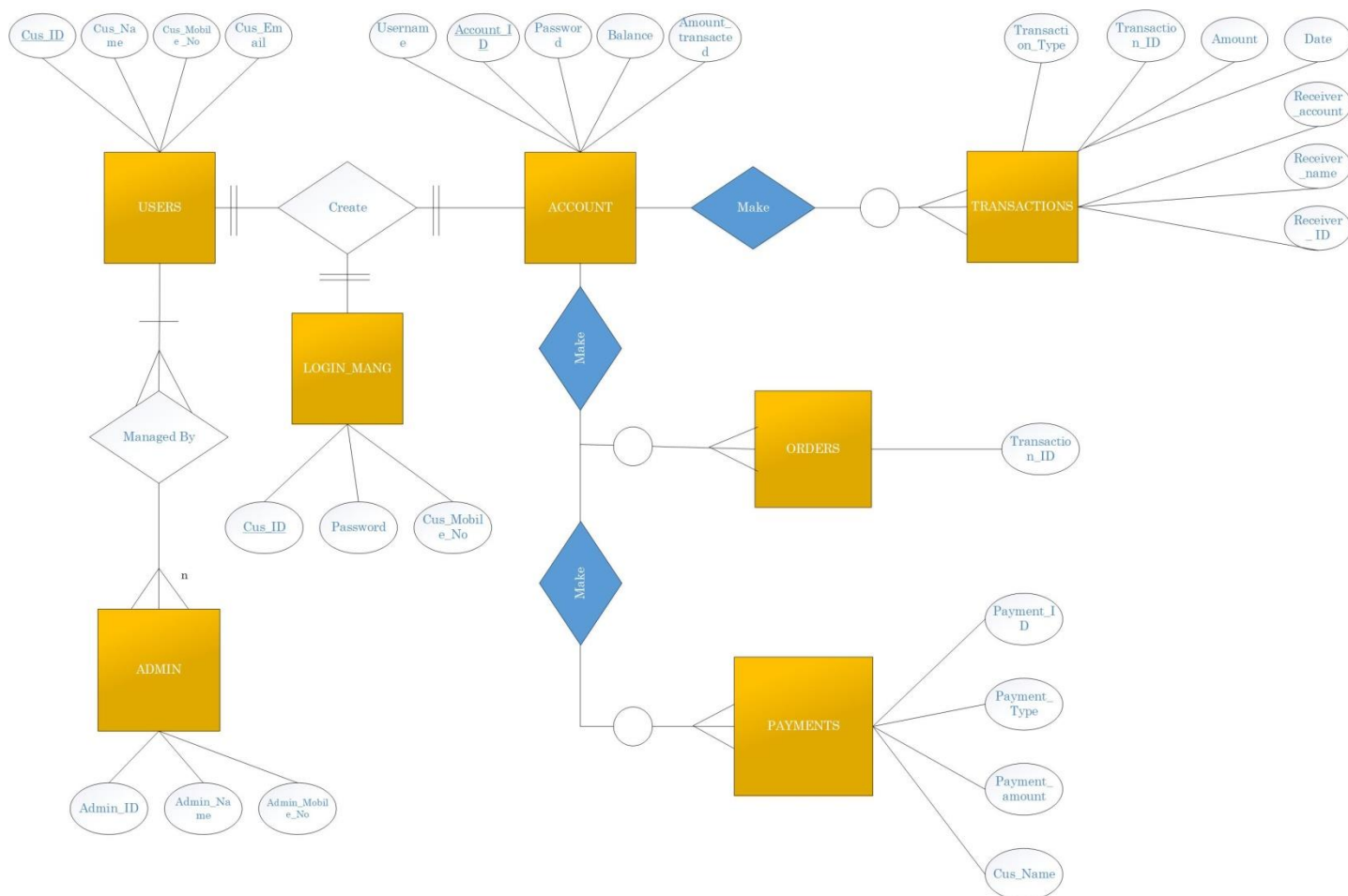


- Ternary: is when three entities participate in the relationship



3.3.6.7 Full-fledged ERD

The ERD shows all the process being broken down in all of the aforementioned processes. It shows a detailed, graphical interpretation of how Entity-Relationship Diagram is interpreted, and also displays how the system functions.



II REFERENCES

Websites

- https://en.wikipedia.org/wiki/Online_banking
- <https://www.combanketh.et/EPayment/InternetBanking>
- <https://www.gobankingrates.com/banking/banks/history-online-banking/>
- <https://bizfluent.com/facts-6077080-purpose-electronic-banking>
- <https://www.capitalbankopen.com>
- [https:// yourbusiness.azcentral.com](https://yourbusiness.azcentral.com)
- <https://awashonline.com.et>
- <https://sqa.org.uk>
- <https://slideshare.com>
- <https://creatly.com>
- <https://it.toolbox.com>
- <https://ctb.ku.edu>
- <https://datado.com>
- <https://perzi.com>
- <https://coursehero.com>
- <https://conceptdraw.com>

Books

- System Engineering Analysis, Design, and Development (Wiley Series) by Charles S. Wasson
- Systems Analysis and Design by Goyal A
- Essentials of System Analysis & Design by Valacich, George and Hoffen

III APPENDIX

All the photos, and any additional gathering and collection processes, were stated at its declaration, using the name “***Figure**”. Additionally, how such mechanism was achieved by also stating everything at its declaration

Pictures, not all are listed, used are listed as follows:

Figure 1.0

Figure 1.1

Figure 2.0

Figure 2.1

Figure 3.0

Figure 3.1

Figure 3.2

Figure 3.3

Figure 3.4

Figure 3.5

Figure 3.6

Figure 4.0

Figure 5.0

Figure 5.1

Figure 5.2

Figure 5.3

Figure 5.4

Figure 5.5

Figure 6.1

Figure 6.2

Figure 7.0

Questions asked were:

- What is Online banking in terms of your bank's service?
 - Actually, our service is a browser based application provided to bank's customers. We also do have a Mobile channel, or in other words, a smartphone application similar to the web based application in functions.
- What are its benefits? From the customer side and the bank side as well?
 - For customers, they no longer need to go to banks physically. They can do the same procedures on the application or the website. For us, we promoted our bank's services and also kept up to date with the new technologies emerging. Additionally, we are constantly looking for our customers' comfortability, so we always keep an eye on new technologies to present to our esteemed customers.
- What are the precautions that the beneficiary of the system must watch out of?
 - We paid full attention to possible vulnerabilities using such a system that is why we took extra carefulness on Security measurement. We listed out 10 measurement in which we believe that if the user took care of, he/she will not be facing severe damages.
(*see the figure below)
- What are the platforms or devices used to access such technology?
 - We are for the current time using only two platforms that most of customers are using: Mobile and Web. Devices used by the users must have, at least, an access to the Internet.
- What are the features you think is missing in the Online Banking system or the API you are using?
 - We are trying to solve some technological and security issues. Some complex transactions may not occur easily. And the main problem is making deposits.

Other Security Measures to be Taken

- Keep personal information private
- Check for the right and secure website-Before doing any online transactions or sending personal information, make sure that correct website has been accessed.
- Protect personal computer from hackers, viruses and malicious programs-Install a personal firewall and a reputable anti-virus program to protect personal computer from virus attacks or malicious programs.
- Do not leave computer unattended when logged in, Log-off from the internet banking site when computer is unattended, even if it is for a short while.
- Clear the memory cache and transaction history after logging out from the website to remove account information. This would avoid incidents of the stored information being retrieved by unwanted parties.
- Do not send any personal information particularly password or PIN via ordinary e-mail.
- Do not open other browser windows while banking online.
- Avoid using shared or public personal computers in conducting Internet banking transactions.
- Disable the "file and printer sharing" feature on the operating system if conducting banking transactions online.
- Contact the bank to discuss security concerns and remedies to any online e-banking account issues.

- What might cause the system to fail?
 - Hackers or anyone illiterate can have a temporary effect on the system's processes, such as entering passwords wrongly several times, or the ID. Hackers also can hack the first layer of the system which will then cause confusion in the system itself. But eventually we can still catch such warnings.
- How were the feedbacks from your customers?
 - They really felt happy that we started using such a technology since it will diminish time consuming processes. Though some complain, we still try to keep them in their comfort zone for as soon as everything is going the way it is planned to

All the notes were reviewed and approved by our team, so there is no need to go back to ask for more clarifications. We tried to seek diverse views, but as previously noted, some operators were not cooperative.

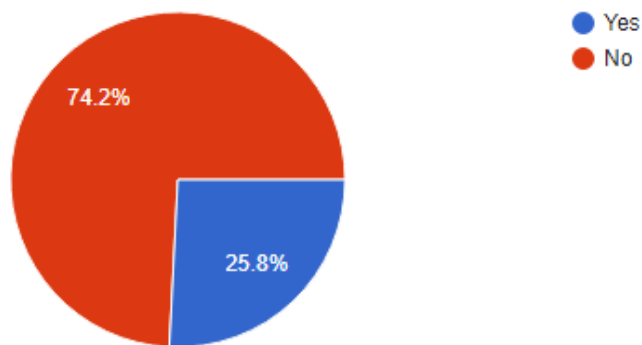
Survey

Link to the survey:-

https://docs.google.com/forms/d/e/1FAIpQLSfPHduX9ESdkM0NOvXTgYCW3-nQtT4EkCnUPkTspWa3YoN7-Q/viewform?usp=sf_link

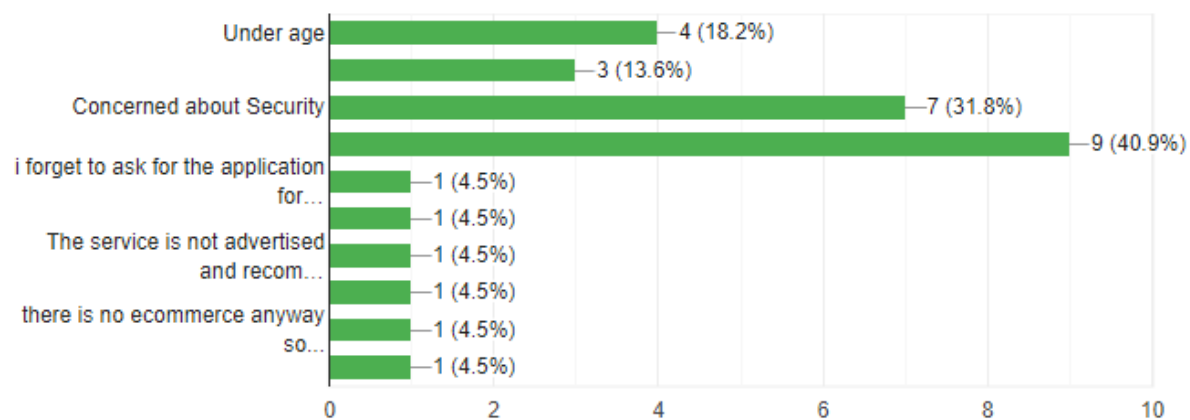
Do you have an Internet bank account? (If your answer is 'no' please answer only question number 2 and if your answer 'yes' then please skip the question number 2)

31 responses



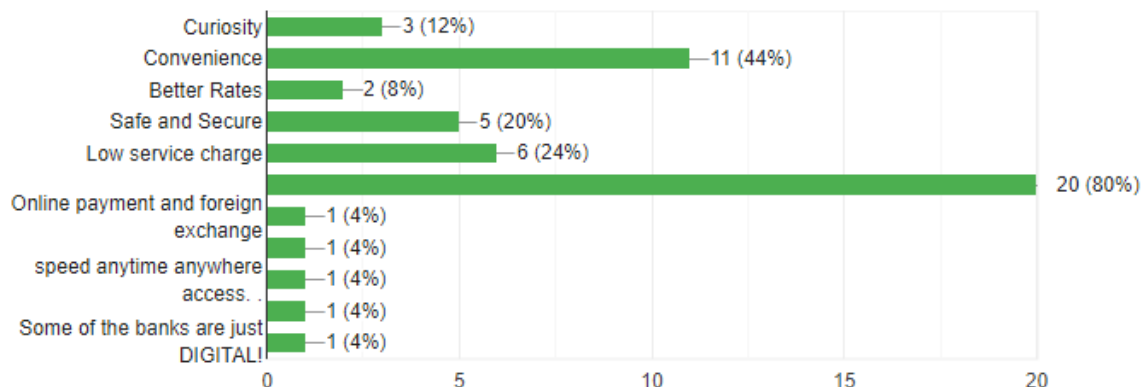
These questions were asked if the respondent answered 'no' to having an Internet bank account: What are the main reasons that you have not opened an INTERNET bank account yet? (you may choose more than one option)

22 responses



What are the most important reasons for you to have an INTERNET bank account opened?(You may choose more than one option)

25 responses



How do you think banks can improve their relationship with customers through the use of the INTERNET?(Feel free to write!)

14 responses

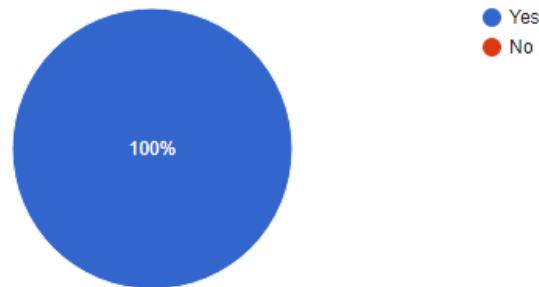
not have to go to the bank for every little thing and do things online
Having lower data usage Giving privileges to the internet banking user
It would be more convenient.
NOthing
Social media, making it easier to pay for goods online
they can improve their relation by announcing their progress and any new activities for their customer.....
Join the rest of the world and allow payment for online services and products
Just by letting things go smooth and easily transacted
Yes because INTERNET is making things very linked and it is mandatory now a day
Invest more on devs afterall they r the backbones who make the pace
IDK

Social media, making it easier to pay for goods online
they can improve their relation by announcing their progress and any new activities for their customer.....
Join the rest of the world and allow payment for online services and products
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Yes because INTERNET is making things very linked and it is mandatory now a day
Invest more on devs afterall they r the backbones who make the pace
IDK
they can make their system authometed and easy to control and their relation with their customer will be very tough they can rsach their customers easily
As I think,firstly banks should make an awareness creation for the people.You know that many of our community haven't aware of technology.
By updating new systems that are easy yo use and minimize their cost

Would you prefer an Online System to be established in Ethiopia?



25 responses



If 'Yes', why?

20 responses

it would make sooo many things easier
Because I want to access it at anytime and anywhere
E-commerce, convenient.....
Its good thing
Digitalization is needed for more efficiency
however the internet users are little in number, it is better to reduce client flow to their workplace
Get (purchase) a lot of products and services online
We need such a system to help people move less
Because as internet is a day to day nedd there must be online banking to easy access and convinency.
Sooner cus its ein win game for the bank & customer. Bank got his cash customer got his money
I WANT TO BE AN ONLINE MERCHANT
ease of access and since more and more people are becoming active internet users it would be an easy shift i think

Sooner cus its ein win game for the bank & customer. Bank got his cash customer got his money
I WANT TO BE AN ONLINE MERCHANT
ease of access and since more and more people are becoming active internet users it would be an easy shift i think
it wil save my time
makes life easier
To become the country modernist
Easy to access
it's simple and useful
Because Ethiopia is a developing country and there is less transportation system so the peoples can't easily access to the bank and also to save time
It is easy to have transactions
Ethio gotta wake up! And keep up!

In your opinion, why up till now there has not been a credible Online Banking system in Ethiopia?

18 responses

wrong timing for users
Because of our poor telecommunication infrastructure
Weak connection with the banks.
GWUiehr sjejdghose dudjsgsu
Knowledge of developers... they want an easy made project that they can show off and get paid. We need more people who are really intrested in making it happen
low internet users, illiteracy ,
No, there haven't, because the previous systems have limited support for online products and services
Some are using the wrong APIs
Don't know
Mis directions by the gov officials (of all things thy r connected)
NI ONE IS GENIUS ENOUGH

not many active internet users..... and and for those who arethe security issue reliable sites that are secure are hard to come by in our country's products. Most don't really make security their main priority when building a website or any other software as a matter of fact security is an after thought in most cases.....
i dont know
May be a shortage of thinking
Because the banking system is not well developed
May be they haven't get the chance and the money it may also be they didn't think that its that much nussasery
Ther is no faster internet access and less knowledge
Absence of intl banks due to restricted policy of the gov! How come Ethio doesn't have internationally accept visa/debit card?