Kathmandu University

Department of Computer Science and Engineering

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A Project Proposal

on

'e-Ledger'

[Code No:. 102]

(For partial fulfillment of 1st Year / 2nd Semester in Computer Engineering)

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Abstract

A digitized version of a traditional ledger, ‘e-Ledger’ aims to ease the traders by providing a better method to keep track of transaction records. e-Ledger enables anyone involved in trade to efficiently use digital technology in an effective and organized manner, which would be difficult with traditional ledgers. We will be using C++ along with Object Oriented Programming concepts and will implement efficient sorting algorithms like merge sort to sort the transactions and provide a login system with password (encrypted with Caesar Algorithm) for the security and privacy of the user. We expect to get a program which is easy to use and low on system resources so that it can be used by everyone. To put it in a nutshell, it will be a program for local traders; a step towards digitization of Nepal. The idea that inspired us for this project was to find an alternative to regular tedious work of managing records and accounts. The project can further be improved by implementing GUI and also be developed into a cross-platform application.

Keywords: Object Oriented Programming with C++, record keeping, database storage with SQLite, Merge Sort algorithm, Caesar Algorithm.

Table of Contents

List of Figures i

Acronyms /Abbreviations ii

Chapter 1: Introduction 1

1.1 Introduction 1

1.2 Background 1

1.3 Objectives 2

1.4 Motivation and significance 2

1.5 Major features of the project 3

Chapter 2: Related Works / Existing Works 4

Chapter 3: Procedures and Methods 5

3.1 Methodology 5

3.1 Flowchart 6

Chapter 4: System Requirement Specification 7

4.1 Software Specification 7

4.1.1 Front End Tools 7

4.1.2 Back End Tools 7

4.2 Hardware Specification 7

Chapter 5: Project Planning and Scheduling 8

5.1 Project Planning and Scheduling 8

5.1.1 Planning and Preparation 8

5.1.2 Problem Identification and Requirement Analysis 8

5.1.3 Coding 9

5.1.4 Testing and Debugging 9

5.1.5 Documentation 9
5.2 Gantt chart 10
Appendix 12
QuickBooks 12
Khatabook 12
QNB eFinans e-Ledger 13
Waveapps 13
References 14

List of Figures

Figure 3. 1 Flowchart of e-Ledger 6

Figure 5. 1 Gantt chart for the project timeline (Span: July 10, 2020 – August 27, 2020) 10

Acronyms /Abbreviations

FMCG: Fast-Moving Consumer Goods

IDE: Integrated Development Environment

GCC: GNU Compiler Collection

BSD: Berkeley Software Distribution

CPU: Central Processing Unit

ARM: Advanced or Acorn RISC Machine

ERMS: Enterprise Record Management System

Chapter 1: Introduction

1.1 Introduction

Ledger is an account book or computer file for recording economic transactions measured in terms of a monetary unit of account. It includes debits and credits and provides total balance as an outcome.

e-Ledger is an electronic transaction management system that focuses on easy and secure alternatives to traditional record keeping. It is a digital version of traditional record books with enhanced features so that the tedious record keeping work gets more convenient and manageable.

1.2 Background

Many software similar to e-Ledger are specially designed to support users for record-keeping which is electronically accessible, reliable, easily usable, accurate and secure. They provide quick information about the records and keep the calculation easy. These kinds of projects also record the customer's information like name, contact number, address, etc. Digital record keeping provides a secure connection between people who are involved in particular transactions.

It is sure that digital record keeping systems are very useful to save time and resources. Many organizations and people now prefer digital record keeping and transaction management systems over traditional one. Transaction management and record keeping software similar to e-Ledger are leading in managing and keeping records easily and securely. One of the modern technologies that have revolutionized such systems and software, in general, is cloud computing. It has a profound impact on document management systems. This web-based document management system also allows for scalability, making it a solution for business both for small and large enterprises. Since it offers ease of access and reduces costs, cloud computing drives the best document management systems. Another similar example is Enterprise Record Management System (ERMS). These programs have advanced capabilities and can store, organize and

process a large amount of data. With an ERMS, it is easier to manage physical and digital records, track the status and location of each file and transfer data from legacy systems to the latest software.

Systems with vulnerabilities and bugs are always bound to security issues. So, adequate testing and debugging is necessary to create a secure and reliable program to meet all the requirements of a ledger. It is an economical and the easiest way to keep records.

1.3 Objectives

The basic purpose of our project is to provide easy, economical, and secure digital record management systems. i.e., e-Ledger.

List of objectives of our project

1. To make record keeping and information retrieval easier
2. To simplify accounting
3. Cost-saving from materials and space used by traditional record keeping
4. To allow for easier collaboration

1.4 Motivation and significance

We are inspired to work on this project due to monotonous, tedious and unmanageable statements of incomes, expenditures and other records of various trades, for example as in a FMCG shop. ‘e-Ledger’ will address such drawbacks of traditional record keeping. The user can view transactions based on date, name or phone number of customers, amount, etc. that will be stored in their computer. Traditional ledger is convenient for small transactions. However, transactions with hundreds of customers make it quite difficult to handle and tedious. Use of e-Ledger will enable us to store the customer's name, phone number, etc. and most importantly transaction made with them. We will be able update the transactions and keep records easily without any hassles as we face in

case of traditional ledger. No need to overwrite anything, no need to find someone in a particular paper in the ledger of hundreds of pages.

1.5 Major features of the project

1. Easy and quick audit
2. Easy retrieval of data
3. Economical

Chapter 2: Related Works / Existing Works

QuickBooks (intuit, 2018) can track income & expenses, prepare custom invoices and receipts and even connect to the bank.

KhataBook (KhataBook, 2020) claims that it is a free and secure digital ledger cash book that provides reminders in the form of SMS on every transaction, allowing to view all details of credit-debit for any number of customers across multiple businesses on our phone.

e-Ledger (QNB eFinans, n.d.) has features like managing and accessing files like trial balance and balance sheet information from anywhere with the internet.

Waveapps (Wave Financial Inc., n.d.) is a free accounting software for small businesses and aims to provide organized and stress-free accounting.

Our project is only a simple accounting program with few features. It does not include many features such as cloud storage, cross-platform applications and preparing custom reports as required.

Chapter 3: Procedures and Methods

3.1 Methodology

Various procedures and methods will be followed which are described below:

i. **Research on the similar topic**

   We will go through related articles, videos, journals, etc. Features of similar transaction management systems will be studied. Various samples will be taken for better design.

ii. **Brainstorming and designing**

   This portion is crucial to set up an idea on what resources and tools we need and should be using for our project. Frequent mind mapping and sketches will be made to get a clear working path.

iii. **Gathering resources and tools**

   Required resources and tools including algorithms will be gathered. They may include resources like blogposts, articles, documentations, etc. on certain topics and tools like code editors, IDEs, databases, etc.

iv. **Experimentation**

   Once required resources and tools will get gathered, they will be experimented to learn how stuffs work. We are sure it will help to avoid problems enabling in easier implementation in the project. We may modify them from the actual one.

v. **Coding, testing and debugging**

   This is where everything will begin to shine. Every single resources, tools and that are mentioned above and ideas that will come ahead will be extensively used. We will need to invest a lot of time and energy for coding. Testing and debugging will also be performed for better result.

3.1 Flowchart

Figure 3.1 shows the working of our program.

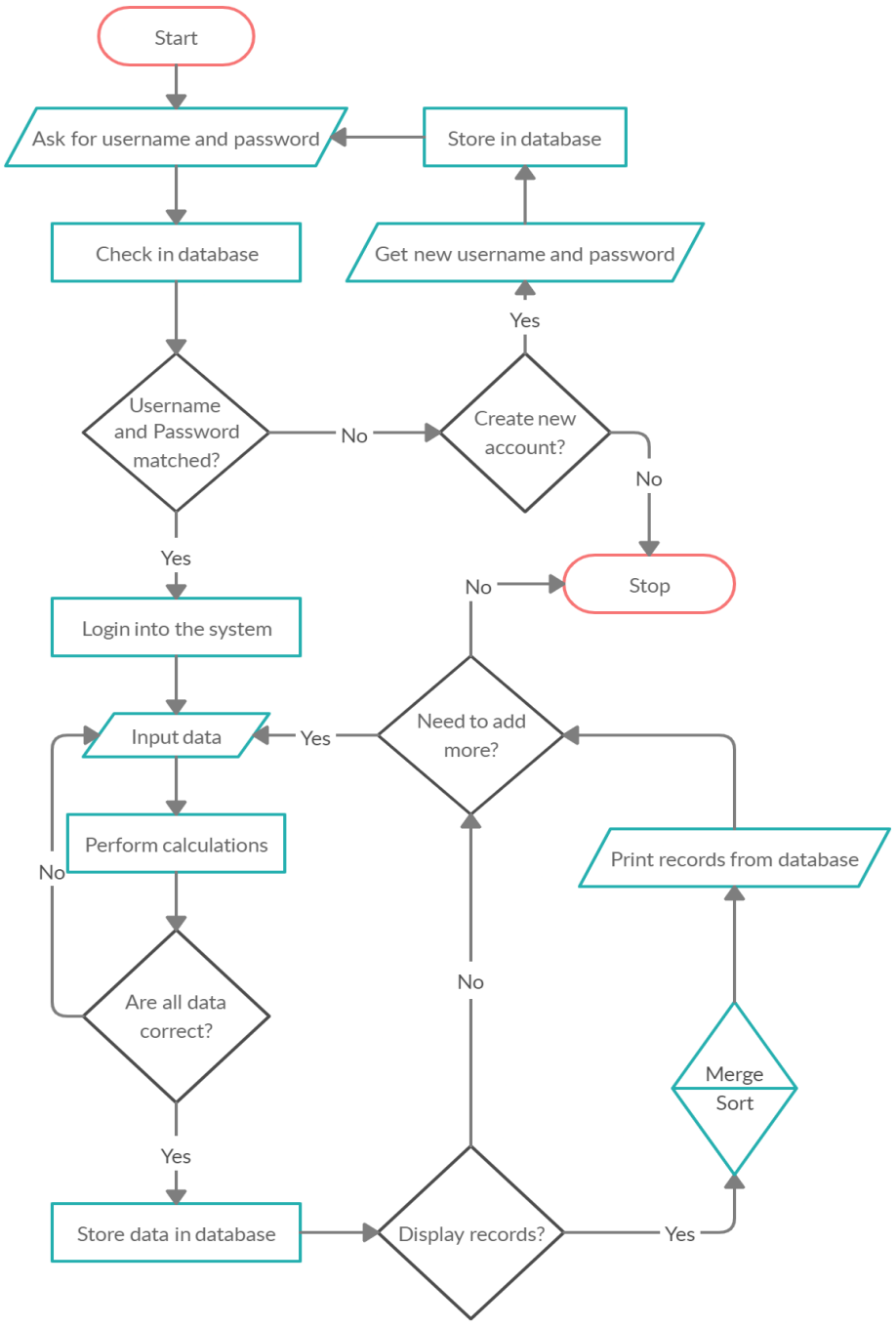


Figure 3. 1 Flowchart of e-Ledger

Chapter 4: System Requirement Specification

4.1 Software Specification

4.1.1 Front End Tools

e-Ledger supports Linux, Windows, Mac and BSD but the program will have to be recompiled for each operating system. Various compilers like GCC, Clang, etc. with support for C++11 standard can be used for the compilation purpose.

4.1.2 Back End Tools

As it is a transaction management system, we need to store data for which we will use SQLite database. The sorting will be done with Merge Sort and password will be encrypted with Caesar Algorithm.

4.2 Hardware Specification

Any computer in working condition can be used, though preferred CPU architecture is x86 or x64 or ARM.

Chapter 5: Project Planning and Scheduling

5.1 Project Planning and Scheduling

We have planned to complete our entire engineering project in 7 weeks, in order to achieve the best result of our effort and passion. The entire task has been divided into following tasks:

1. Planning and preparation
2. Problem Identification and Requirement Analysis
3. Coding
4. Testing and Debugging
5. Documentation

First of all, we will be discussing briefly about each task, in order to clarify the entire scheduling.

5.1.1 Planning and Preparation

This was the earliest stage of our project where our newly formed group had just begun to discuss topics. After a long discussion, we agreed on a topic that was quite unique and strenuous. The project was to make a program to manage the records of traders, so that this program to completely replace the traditional ledger. We discussed features that the program would have and aspects that we could develop in order to provide the users an enhanced digital version of the account book. The feasibility and limitations of the program were determined to implement the plans in future.

This task spanned for about a week, where the entire group devised a rough sketch of the whole project, i.e. generated an idea to carry out the project within the given time.

5.1.2 Problem Identification and Requirement Analysis

The essence as well as disadvantages of the current method of record keeping were learnt to aim for further improvement and enhancement. The entire project was properly

analyzed and the problems that were present were identified so that it could be solved. “e-Ledger” required a complex program to be capable of switching over the actual ledger. So we properly studied the problems and discussed the possible solutions for the problem. This phase of project work took 2 weeks of time to be completed.

5.1.3 Coding

This is a vital stage of project work where the actual program development begins. This also takes a lot of time to be completed, so we will be dividing the entire program within the members so that each one can complete an aspect of the program, and finally complete the main part of the project. Each line of the program is equally important so this has to be the most important part of the project work. The entire program is to be written in C++ using the concepts of Object Oriented Programming, whereas the SQLite database is used for the relational database management system to be implemented in the program. We have planned to use Caesar Algorithm to secure the records with a password that is planned to be encrypted using this method. The coding part will be divided which will be later compiled together. This is the most important part of the project which is planned to be completed in 3 weeks.

5.1.4 Testing and Debugging

The entire program is tested to check if it runs properly. We also need to look for defects and debug them so that the project runs smoothly and effectively. The deficiencies are identified and fixed so that the program can meet its requirements properly. We have decided to give enough time to test and debug the program so that each aspect of the program is taken care of. So this task would be completed in a duration of one week.

5.1.5 Documentation

The entire codes of the program are arranged so that it is easy to understand and convenient for further development. Then the documentation of the output is improved so

that it can be easily understood by the targeted users, and also look good and well-managed in appearance, which would be completed in a week.

5.2 Gantt chart

Gantt chart has been used in this project as a project management tool used in the planning and scheduling of projects, and is particularly useful for scheduling the future tasks in advance. Figure 5.1 shows how we will approach our goal.

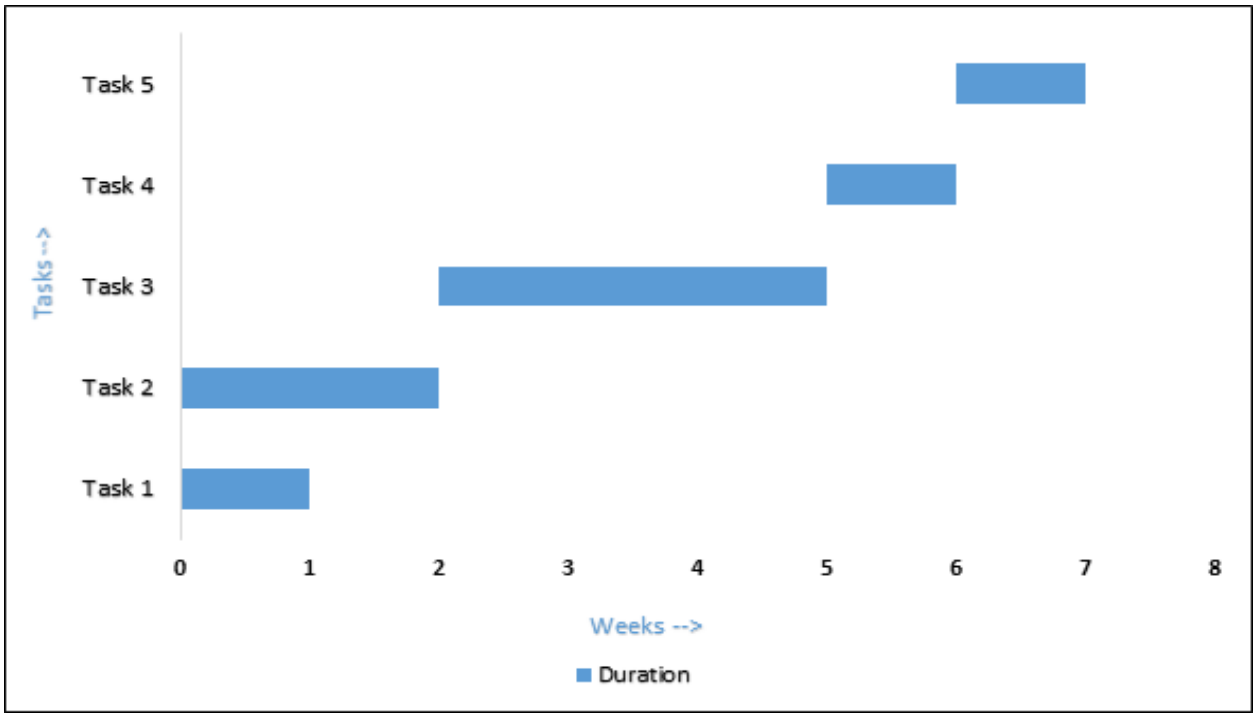


Figure 5. 1 Gantt chart for the project timeline (Span: July 10, 2020 – August 27, 2020)

Weeks:

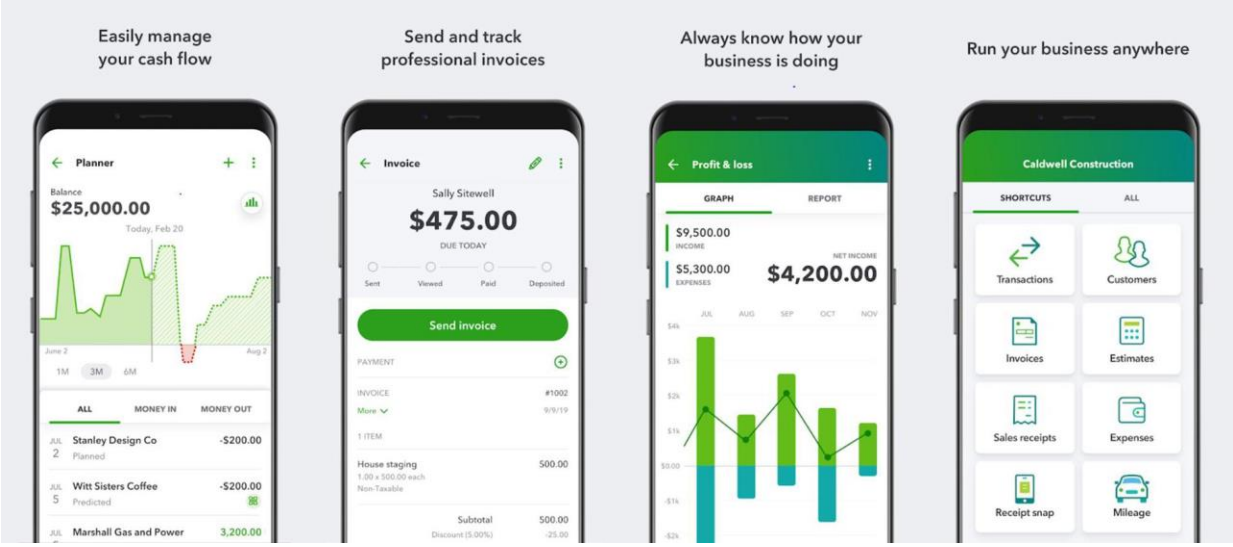
1. Week 1: July 10, 2020 – July 16, 2020
2. Week 2: July 17, 2020 – July 23, 2020
3. Week 3: July 24, 2020 – July 30, 2020
4. Week 4: July 31, 2020 – August 6, 2020
5. Week 5: August 7, 2020 – August 13, 2020
6. Week 6: August 14, 2020 – August 20, 2020
7. Week 7: August 21, 2020 – August 27, 2020

Tasks:

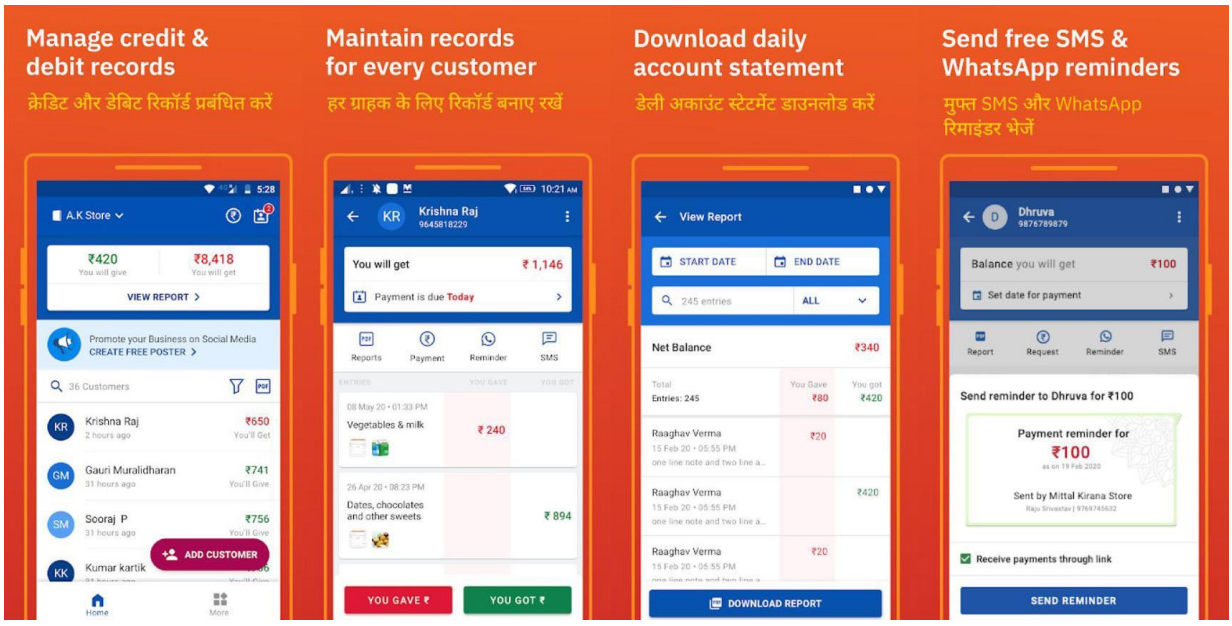
1. Planning and preparation
2. Problem Identification and Requirement Analysis
3. Coding
4. Testing and Debugging
5. Documentation

Appendix

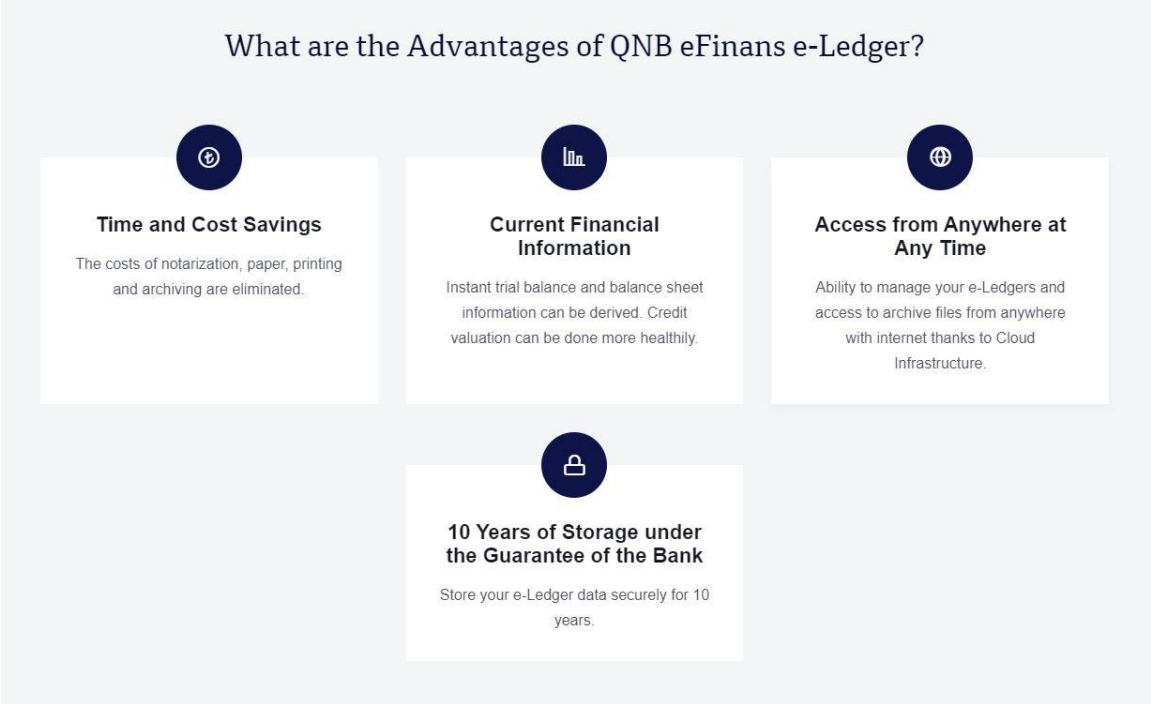
QuickBooks



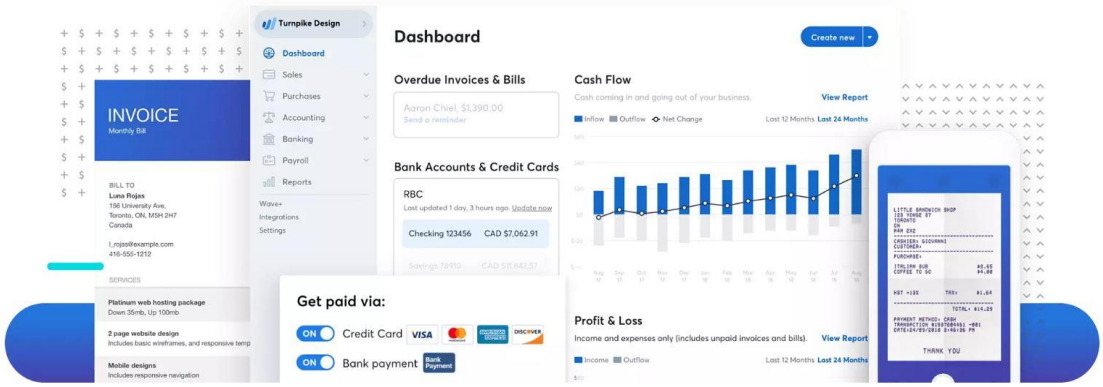
Khatabook



QNB eFinans e-Ledger



Waveapps



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