**CSC445 Software Engineering**

**Software Requirements Specification (SRS) Template**

Items that are intended to stay in as part of your document are in **bold**; explanatory comments are in *italic* text. Plain text is used where you might insert wording about your project.

The document in this file is an annotated outline for specifying software requirements, adapted from the IEEE Guide to Software Requirements Specifications (Std 830-1998).

Tailor this to your needs, removing explanatory comments as you go along. Where you decide to omit a section, keep the header, but insert a comment saying why you omit the data.

Kubera E-Banking System

Independent Study

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**Software Requirements Specification**

**Document**

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# 1. Introduction

## 1.1 Purpose

The purpose of this document is to lay out the functions and behaviors of a new online banking system for an exclusively online bank. The target audience of this document is comprised of the stakeholders and development team. This document will describe what the system should do and what constraints apply.

## 1.2 Scope

The online bank is Kubera Financial Services, and the system being developed is their Kubera E-Banking System platform.

This will be a national bank, not international, where account holders can before the same basic transactions through this web-based application as could be accommodated at a physical bank. Account holders would benefit from having a secure system from which to deposit, withdraw, and transfer funds at any hour of the day from the comfort of their own homes. They will even be able to pay their bills through the application. There will be no waiting in lines or waiting for the bank to open, providing maximum convenience to customers.

## 1.3 Definitions, Acronyms, and Abbreviations.

* KES. Kubera E-Banking System
* user. The person, or persons, who operate or interact directly with the product, but who may not have established an account on the KES
* account holder. The person, or persons, who operate or interact directly with the product and already has an account on the KES
* DBMS. Database Management System
* HTTPS. Hypertext Transfer Protocol Secure
* FTP. File Transfer Protocol
* SMTP. Simple Mail Transfer Protocol
* TCP/IP (port 443). Transmission Control Protocol/Internet Protocol
* SRS. Software Requirements Specifications

## 1.4 References

[1] “IEEE Guide for Software Requirements Specifications,” *IEEE Std 830-1984*, pp. 1–26, Feb. 1984, doi: https://doi.org/10.1109/IEEESTD.1984.119205.

[2] V. machine backup expert, “Financial Data Protection: How Do Banks Backup Data? - Vinchin Backup,” *@Vinchin*. https://www.vinchin.com/en/blog/how-do-banks-backup-data.html (accessed Oct. 08, 2023).

[3] “How to run a local Django development server over HTTPS with a trusted self-signed SSL certificate,” *timonweb.com*. https://timonweb.com/django/https-django-development-server-ssl-certificate/ (accessed Oct. 08, 2023).

[4] “Installation¶,” Installation - Flask Documentation (2.3.x), https://flask.palletsprojects.com/en/2.3.x/installation/ (accessed Dec. 3, 2023).

## 1.5 Overview

1.5.1 This SRS details the functions and behaviors of the proposed system for both Account Holders and Admministrative users.

1.5.2 Sectional breakdown

1.5.2.1 Section 2 gives a general description of what the system should do for both Account Holders and Administrative users. It is written to be understood by both developers and the client.

1.5.2.2 Section 3 is a detailed breakdown of each function the system should perform for both Account Holders and Administrative users in a language to be understood by developers. It is intended that the design and testing of the product can be developed from these requirements.

# 2. The Overall Description

## 2.1 Product Perspective

2.1.1 Physical banks have limited hours

* Banking hours often fall within traditional working hours, meaning those who work traditional hours have to either use their lunch breaks or take time off to visit the bank to perform transactions

2.1.2 Physical banks charge account fees

* Physical banks have much higher overhead, and thus recoup some of those costs through fees charged to their customers. The absence of those particular overhead costs allows for online only banks to provide savings and checking accounts with no account fees

### 2.1.1 System Interfaces

2.1.1.1 Database containing user profile and contact information, username and password, and all associated account data

2.1.1.2 Web browsers: Google Chrome, Safari, Firefox, Microsoft Edge, and Windows Internet Explorer 11

2.1.1.3 Integration tool: Flask

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### 2.1.2 Interfaces

2.1.2.1 Database development through SQLite

2.1.2.2 Application development through Flask in Python language.

### 2.1.3 Hardware Interfaces

2.1.3.1 Application is web-based and available to anyone with an internet connection, so there are no special hardware interface requirements

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### 2.1.4 Software Interfaces

2.1.4.1 Flask will be the tool used for backend development. <https://flask.palletsprojects.com/en/2.3.x/installation/>

2.1.4.2 SQLite 3.43.1 will be the tool used for the database component. It is supported by Django. <https://www.sqlite.org/download.html>

2.1.4.3 Python 3.11.5 will be the development language. It is supported by Flask. <https://www.python.org/downloads/>

2.1.4.4 System will interface with web browsers: Google Chrome (all versions), Safari (all versions), Firefox (all versions), Microsoft Edge (all versions), Windows Internet Explorer 11.

### 2.1.5 Communications Interfaces

2.1.5.1 HTTPS for web browser communication

2.1.5.2 TCP port 443 for network communication

### 2.1.6 Memory Constraints

2.1.6.1 There are no memory constraints at this time.

### 2.1.7 Operations

2.1.7.1 Account Holders will have a GUI for searching their account transaction history.

2.1.7.2 Administrative users will have a GUI for searching database records.

2.1.7.3 Administrative users will have a GUI for running fraud analysis reports.

2.1.7.4 System backup will occur at midnight EST time daily, during which time neither Administrative nor Account Holder users will have access to the site.

2.1.7.5 System maintenance will occur immediately following system backup until 3 a.m. daily, after which the system will be restarted.

### 2.1.8 Site Adaptation Requirements

2.1.8.1 There are no Site Adaptation Requirements

## 2.2 Product Functions

2.2.1 User Access

2.2.1.1 Users will be able to establish a checking and/or savings account on the KES, where they will create a unique username, establish a password, and provide contact information and basic profile information. While the username cannot be changed, the user can change the password through KES. Account holders will be able to perform the following:

2.2.1.1.1 Check their savings and checking account balances

2.2.1.1.2 Get a debit card linked to their checking account that can also be run as credit

2.2.1.1.3 View their checking and savings transaction history

2.2.1.1.4 Pay their bills through the Online Bill Pay feature

2.2.1.1.5 Make deposits and transfers

2.2.1.1.5.1 Deposits can be made via uploaded photo of checks or checks/cash submitted through an ATM

2.2.1.1.5.2 Transfers can be made between their personal accounts

2.2.1.1.6 Make transfers, either in real-time or scheduled

2.2.1.2 Account holders will be able to close their accounts online without a phone call to customer service:

2.2.1.2.1 When selecting the option to close their account, account holders will receive a prompt to provide a reason for closing their account, accompanied by the following predetermined selections:

2.2.1.2.1.1 Poor customer service

2.2.1.2.1.2 I am switching to another bank

2.2.1.2.1.3 I prefer a bank with a physical location

2.2.1.2.1.4 I am moving out of the country

2.2.1.2.1.5 Other

2.2.1.2.1.51 Account holders will be given a text window with which to further explain a selection of “Other”

## 2.3 User Characteristics

2.3.1 Intended users are U.S. residents age 18 years or older with two forms of identification and access to the internet. Because the system is for an exclusively online bank, it is expected that the KES will appeal most to users under the age of 50, as they are more likely than those in older demographics to trust in an exclusively online bank.

2.3.2 E-Banking employees are expected to be U.S. residents age 18 years or older who have a minimum of a high school diploman or GED and who pass a thorough background check to ensure identiy and no felony convictions.

## 2.4 Constraints

2.4.1 This system will comply with all U.S. banking regulations and because each account will be FDIC insured, it will comply with all requirements to maintain that insurance.

2.4.2 Web browsers that are Internet Explorer versions prior to 11 are not supported, and account holders using unsupported browsers will not have access to their accounts.

## 2.5 Assumptions and Dependencies

2.5.1 Operating systems Windows, Mac, and Linux are supported.

## 2.6 Apportioning of Requirements.

2.6.1 No requirements at this time.

# 3. Specific Requirements

## 3.1 External Interfaces

3.1.1 The system shall present all users with a login screen requiring correct entry of their username and password.

3.1.1.1 The login screen shall have the following options:

3.1.1.1.1 Username field

3.1.1.1.2 Password field

3.1.1.1.3 “Login” button

3.1.1.1.4 “Create Account” link that presents the user with a new screen to create a username and password

3.1.1.1.5 “Forgot Username” and “Forgot Password” links that presents user with Security Questions screen to complete in order to trigger email with username or password reset link, respectively

3.1.1.2 The system shall authenticate the username and password entered against those in the supporting database.

3.1.1.2.1 If there is a matching account, the system shall open the “Account Summary” of the matching account.

3.1.1.2.2 If there is not a match, the message: “Username and/or password do not match. Please try again” displays to the user.

3.1.1.2.3 Three consecutive authentication failures result in the login screen locking and the user being present with the following message: “Account is now locked. Please contact support for login assistance,” followed by the customer support telephone number in format 1-###-###-#### format.

## 3.2 Functions

3.2.1 The home page provides a link to either Login or Register if a new user.

3.2.2 The login page shall contain the fields and links outlined in 3.1.1. To create a new account, the user will click the “Create Account’ link to display the Create Account page:

3.2.2.1 This page shall display the following REQUIRED fields:

3.2.2.1.1 Last Name and First Name

3.2.2.1.1.1 Last Name is alphabetic with a character limit of 40 characters

3.2.2.1.1.2 First Name is alphabetic with a character limit of 30 characters

3.2.2.1.2 Date of Birth, in MM / DD / YYYY format

3.2.2.1.3 Social Security Number, in ###-##-####

3.2.2.1.4 Username, with a character limit of 15 alphanumeric characters

3.2.2.1.5 Password, with a character limit of 12 characters that consists of at least one lower-case letter, at least one upper-case letter, at least one numeric, and at least one special character.

3.2.2.1.6 Re-Enter Password, with a requirement that it match the entry in the Password field.

3.2.2.1.7 User will automatically have a zero-balance savings and checking account generated.

3.2.2.2 This page shall display the following CONDITIONALLY REQUIRED fields, where the condition is that only 1 of the 2 is required and the other is optional, and either can be the sole entry:

3.2.2.2.1 Telephone Number in ### - ### - #### format

3.2.2.2.2 E-Mail with a character limit of 30 characters and allowing all characters

3.2.2.3 This page shall display an OPTIONAL field for Middle Name that is alphabeth with character limit of 30 characters.

3.2.3 The system will cross-check the entered username against the existing database and display a prompt to the user: “User name not available. Please enter another user name” until a unique username is entered that consists of valid characters.

3.2.4 The system will validate all fields to determine if they meet character validation and limit requirements.

3.2.4.1 If any of the fields do not meet validation requirements, the system shall present a message to the user: “Please match the requested format” followed by a the format pattern needed.

3.2.5 Once the registration page is correctly completed, the system will return the user to the login page, where the user will be required to enter the correct username and password to proceed, after which the system shall route them to their Account Summary page.

3.2.6 The Account Summary page will display the account holder’s and total balances for both their checking and savings accounts.

3.2.7 Users can access all webpages from every other page, except:

3.2.7.1 Checking Account Transaction History can only be accessed from the

Transaction History page

3.2.7.2 Savings Account Transaction History can only be accessed from the

Transaction History page

3.2.8 On the Deposit page, users can enter a deposit amount and select either their checking or savings account from a drop-down.

3.2.9 On the Transfer Funds page, users can enter an amount and select via drop-down both the “from” account and the “to” account

3.2.10 On the Transaction History page, the user is presented with the following options:

3.2.10.1 Link to checking account transaction history, which opens the Checking

Account Transaction History Page:

3.2.10.1.1 Date: Displays the date and time of the transaction

3.2.10.1.2 Type: Displays whether it was a WITHDRAWAL, DEPOSIT, or

OPEN if established when account added but no money deposited

3.2.10.1.3 Payee: Who the money went to if it was a WITHDRAWAL; will

show None if was a transfer between client accounts

3.2.10.1.4 Amount: Dollar amount of transaction

3.2.10.1.5 Balance: Updated balance at the time of the transaction

3.2.10.2 Link to savings account transaction history, which opens the Savings

Account Transaction History Page:

3.2.10.2.1 Date: Displays the date and time of the transaction

3.2.10.2.2 Type: Displays whether it was a WITHDRAWAL, DEPOSIT, or

OPEN if established when account added but no money deposited

3.2.10.2.3 Amount: Dollar amount of transaction

3.2.10.2.4 Balance: Updated balance at the time of the transaction

3.2.10.3 Once the selected sub-page opens, the entire transaction history for that

account is displayed in descending order by transaction date/time

3.2.11 On the Online Bill Pay page, the user is can enter a payment amount and a vendor, and their checking will be debited that amount and the amounted routed to the vendor account

3.2.12 On the Logout page, the user is asked if they’re sure they want to logout and are presented with the option to proceed with Logout via button or click the link to Cancel

## 3.3 Performance Requirements

3.3.1 A Create Account request shall be processed in less than 30 seconds

3.3.2 All “View” transactions shall be process in less than 2 seconds

3.3.3 All other transactions shall be processed in less than 15 seconds

## 3.4 Logical Database Requirements

3.4.1 Administrative Users can view the supporting database and generate reports

3.4.2 There will be 3 SQLite databases through Flask for client records, and they shall contain the following information:

3.4.2.1 The primary key for the userdatabase is an autoincremented integer; the primary keys for the savings and checking transaction databases are the composites of the username and the date/time of the transaction.

3.4.2.2 The user database shall contain account holder full name, date of birth, and social security number

3.4.2.3 The user database shall contain account holder contact information

3.4.2.4 Each of transaction databases shall contain that account’s balance

3.4.2.5 Each of the transaction databases shall contain transaction history

3.4.3 There will be a vendor database containing each vendor’s name and

routing ID for payment

3.4.4 User databases can be queried by username or by first and last name with either date of birth, or social security number. Transaction databases can be queried by username. Vendor database can be queried by vendor ID.

## 3.5 Design Constraints

No Design Constraints at this time.

### 3.5.1 Standards Compliance

3.5.1.1 System will comply with all federal banking regulations

3.5.1.2 System will comply with all standards required to maintain FDIC

insurability

3.5.1.3 All transaction records will be retained for seven years, which is 2 years

over the required minimum of 5 years

## 3.6 Software System Attributes

### 3.6.1 Reliability

3.6.1.1 The E-Banking database and transaction log shall be backed up through Cloud Storage services.

3.6.1.2 The E-Banking website shall be secured using HTTPS.

### 3.6.2 Availability

3.6.2.1 Account holders will have full access to their accounts 21 hours a day, 7 days a week, 365 days a year, with daily system maintenance and backup occurring between midnight and 3 a.m. EST. The backup shall occur before the maintenance.

3.6.2.2 The maintenance schedule shall be displayed at the top of the home page and be disclosed to each user at the time of account creation.

3.6.2.3 Should the E-Banking system suffer an unexpected outage, the outage will be communicated immediately to all account holders via text message and/or email, with hourly updates on the status of the fix until the outage is resolved.

### 3.6.3 Security

3.6.3.1 System shall use HTTPS for e-Banking website to ensure greater security

3.6.3.2 System shall use secured database provided through Flask.

3.6.3.3 System shall prohibit any user from accessing any account for which they do not have the username and password.

3.6.3.4 System shall not provide the username or password reset link to any user who cannot correctly answer all three security questions.

3.6.3.5 System shall generate a detailed log of all activity on each account that is accessible only to Administrative users.

3.6.3.5.1 Items on the log are deleted after seven years

### 3.6.4 Maintainability

3.6.4.1 Use Flask with the supported SQLite database for the entirety of the system to minimize code complexity and make the ability to maintain and evolve the code simplere.

### 3.6.5 Portability

3.6.5.1 No Portability requirements.