

Module 5 – Assignment 2 (RAD)

Module 5- Computer Systems (2023-24) Project

UNIVERSITY OF TWENTE.

Requirement Analysis Phase 1

Basic Information:

Project Name: SAFety	Team Members: Dany Shalhoub (s3005550), Sam Mulder (s3013022), Khanh Nguyen (s2950944), Robert Grgac (s2710099), Shun Nishijima(s2977923), Nynke Luijten (s2563363)
Team ID: 6	Mentor(s): David Galati

Introduction

Hi, we are a team of 6 students, we are making a safe using a membrane button pad, an (LCD) display, a servo motor, an LED, a photoresistor and a raspberry Pi.

The membrane button pad is the input for the device. A user will be recognized by the password that they enter. There will be multiple user roles to comply with the security requirements of authorization. There will be a normal user who can only access the content of the safe.

1. Product purpose

The purpose of our product is first and foremost to store objects safely. We will be adding extra features that will increase the functionality for our intended audience and originality of the safe.

2. Limitations

Current systems do not have the combination of features that we are planning to implement. This combination will increase the functionality for the intended audience of the safe.

- Our safe will sound an alarm when it is moved.
- The safe will make a sound when the user calls for it.
- The LCD display with keypad

3. Intended audience

The safe will be specifically, but not exclusively, designed for people with repaired vision. The sound features will be helpful in this compartment. The safe can also be used by non-blind people with a need to store objects safely. This can be individuals, hotels, Airbnb's etc.

4. Define smart goals

Specific (What)	Measurable (Up to)	Attainable (How)	Relevant (Why)	Time-bound (when)
1. Making the product accessible for blind people by having responsive sounds	To evaluate success of use by blind people	To test the system with special responsiveness for blind people	Blind people cannot see what is being said on the display	Last 3 weeks of the project
2. Securing the safe against theft	To evaluate the success of the system when the safe is moved	Sending a (live) location /notification when connected to the internet	In case of theft, the safe can be relocated	Last 3 weeks
3. Providing security by authorization	Testing with random password to try to login and making sure only defined password are recognized as account.	Screen will be locked after 3 wrong attempts	A random password generator cannot be used to hack the safe	Week 5 - 6
4. Ensuring the system is connected to the internet.	Check if the system is connected to the internet.	The system will use the internet connection to share its live location and provide information to the user in a	To make sure the system functions as intended.	Ensuring the system can connect to the internet is crucial for its performance, so it should be done in weeks 4 – 5.

		reasonable amount of time.		
5.Ensuring the operating speed is acceptable	Checking the response time of the system	The system will have to do the asked task within 2 seconds.	A user does not want to wait too long for their safe to respond	Throughout the whole project, it is necessary to maintain the speed of the system for every feature
6.Being able to change some features as admin	Checking by logging as admin and changing settings likely color of light.	Making two accounts by making different passwords and giving the admin account privilege for changing setting.	Changing display based on admin's preference to attain a safe feeling for them	Week 5 – 6 (in same time with authorization)

5. Scope

System boundaries (Software and hardware):

- *Software: C, Python*
- *Hardware: Raspberry Pi 4, Wood cover, Speaker, Power supply, Keypad, Sound Sensor, LED display, wires, resistors, capacitors, GPS module, battery, servomotor.*

Interfaces:

- *Internet via Wi-Fi*

Limitations:

- *This project can only work for opening safe and prohibit strangers from opening the safe.*
- *This project can only send emails with home Wi-Fi. So, when it gets stolen it has a limited GPS range.*
- *This project can only stand so much physical damage because of the limited materials.*
- *This project will have limited space to store object*
- *The safe should be plugged in to a power supply*

Product Features (total of 9 requirements, two of which are security and 7 functional and non-functional combined)

A. Functional Requirements

The functional requirements of a Smart Safe are:

Username should be able to interact with the safe through a keypad (H)

Speaker for informing disabled people (i.e., blind people) by making a sound when a user claps so it is easier to locate and when the door opens and closes. (H)

The safe will have a wooden exterior. (H)

The safe will have a GPS, letting the owner know the location of the location in case of theft. (L)

Dual power supply (battery and outlet) so that when power is lost the safe still works. (M)

A sound sensor that will send a signal if a user claps to make a sound. (L)

Photo resistor to turn on the LEDs in case the room gets dark. (L)

B. Non-functional requirements

The non-functional requirements of a Smart Safe are:

All software details will be hidden from the user (on the lcd screen) (H)

The time between entering the code and being able to open the safe is within 2 seconds. (M)

The safe must be always available, if it is plugged in. (H)

C. Security requirements

The security requirements of a Smart Safe are:

The passwords will be checked on correctness (H)

The passwords will be hashed (H)

There will be two passwords: one for the admin and one for guests. The admin can change certain features of the safe after logging in, such as the color of the light. (L)

Conclusion

To conclude, in this project we will create a safe that is accessible for blind people. It is accessible for blind people in the sense that it will make sounds when giving the person gives a command (clapping/some other noise). It will have an LCD screen and a button pad on the front of the safe. The password can be entered here. The GPS sensor will send its location or a notification when the safe is moved to protect against theft.

The challenges of this project are to make all components connect and communicate. Therefore, this will be a focus point from the very start.

Reference

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- Inspirations:

[1]: <https://www.youtube.com/watch?v=EBEzOQV4kYM>

[2]: <https://www.youtube.com/watch?v=GOO84CGBPz8>

Prepared by: D

Version

Security By Design

Policy	Confidentiality, Integrity, and Availability					
Security Requirements	Security mechanisms	Remarks on why you considered these Requirements?	Supplement requirements for your application	Risk identification/Threat Assessment	Appropriate Security Controls	Tick ✓ if you have applied

Authenticatio n	Checking password	For granting access to multiple users (at least manager and normal user), each user has password for opening the safe.	Goal: The system verifies that there are no default passwords used by the application or any of its components. Requirement: To open the safe, one should require authentication. User story: As a user, I can enter passwords to open the safe.	Risk identification: i)The length of the passwords are less than 4 characters., ii) The password is not very strong., iii) You enter the wrong password more than 3 times.	JavaScript for checking password quality. Showing a lock interface on display in case entering wrong password 3 times and notifies the admin.	✓
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Authorizati on	Role-based	We want to enable the option of the different kinds of users.	Goal: The system is able to recognize different users and treat them accordingly. Requirement: Different users should have different roles and different rights based on these roles. User story: As the manager of the safe, I want more control over the safe than the regular users.	Risk identification: More users/roles means more passwords and thus easier to intrude.	To secure by hashing password database and concealing it at interface by capsulation.	✓
Audit	Protection of Log files	We want to make sure that the passwords cannot be accessible for outsiders	Goal: The log files are protected Requirement: It is not possible to access from outside and if a hacker accesses the database, files are impossible to view contents in it. Abuse story: As a hacker, I can see the passwords by hacking databases and investigate the Log	Risk identification: The files in the database are stored in a local folder which is vulnerable to invasion from outside.	Use a cloud online back-up with authentication.	✓

			files.			
	Backup files	In case of a crash, we will still have a lot of files.	Goal: Backing up important files Requirement: Backup files are placed differently from local. It is safe to delete local files by recovering from backup. User story: As the manager of the safe, I will still have all the files in case of a crash.	Risk identification: The local device is affected by virus or physical accident and all data at local are deleted.	Use a cloud online back-up.	✓
	Temporary files, software and database licenses	We want our creative invention to be protected.	Goal: The invention is legally protected. Requirement: The safe needs legal protection. User story: As the manager of the safe, I make sure that everything I do is legal and protects my invention.	Risk identification: We choose a week license, so outsider can easily pick our idea/invention.	We find a suitable license	✓
	aspect/GDP R policies), etc.	For adapting the law, we need to manipulate personal data properly.	Goal: Protect possible personal data Requirement: The data developed by the GPS sensor needs to be protected. User story: As a user, I expect that the service follows GDPR, and my personal information is protected, and few information has been taken.	Risk identification: The GPS data could be hacked, which could potentially be a problem if the safe is located at someone's home.	Store the data in cloud database with strict authentication. Ask users to have an agreement about GDPR in case we need to get personal information.	✓
Team members reviewed:	(Dany Shalhoub, yes), (Sam Mulder,	(Dany Shalhoub, yes), (Sam Mulder,	(Dany Shalhoub, yes), (Sam Mulder, yes), (Khanh Nguyen, yes),	(Dany Shalhoub, yes), (Sam Mulder, yes), (Khanh	(Dany Shalhoub, yes), (Sam Mulder, yes),	(Dany Shalhoub, yes), (Sam Mulder, yes), (Khanh Nguyen, yes),

	yes), (Khanh Nguyen, yes), (Robert Grgac, yes), (Shun Nishijima,y es), (Nynke Luijten, yes)	yes), (Khanh Nguyen, yes), (Robert Grgac, yes), (Shun Nishijima,y es), (Nynke Luijten, yes)	(Robert Grgac, yes), (Shun Nishijima,yes), (Nynke Luijten, yes)	Nguyen, yes), (Robert Grgac, yes), (Shun Nishijima,yes), (Nynke Luijten, yes)	(Khanh Nguyen, yes), (Robert Grgac, yes), (Shun Nishijima,yes) , (Nynke Luijten, yes)	(Robert Grgac, yes), (Shun Nishijima,yes), (Nynke Luijten, yes)
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