Prince Mohammad Bin Fahd University
College of Engineering
Department of Electrical Engineering

Smart Dropbox with OCR

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May 17, 2022

Outline

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Project Definition

Design a Smart Dropbox that can **save time** and reduce pressure of deadlines. Smart Dropbox with OCR will have the ability to recognize handwritten papers. Furthermore, it will **notify** the recipient and the sender when a paper has been received.

Project Objectives

- To design smart Dropbox with OCR, Dropbox, Ultasonic sensor, OCR and LCD Panel.
- To schedule instructors and students time.
- To reduce students pressure of submitting their assignments.
- To organize deadlines of submission for instructors.
- To arrange assignments/homework in order to be organized.
- Flexibility between students and faculty members in deadline submissions.

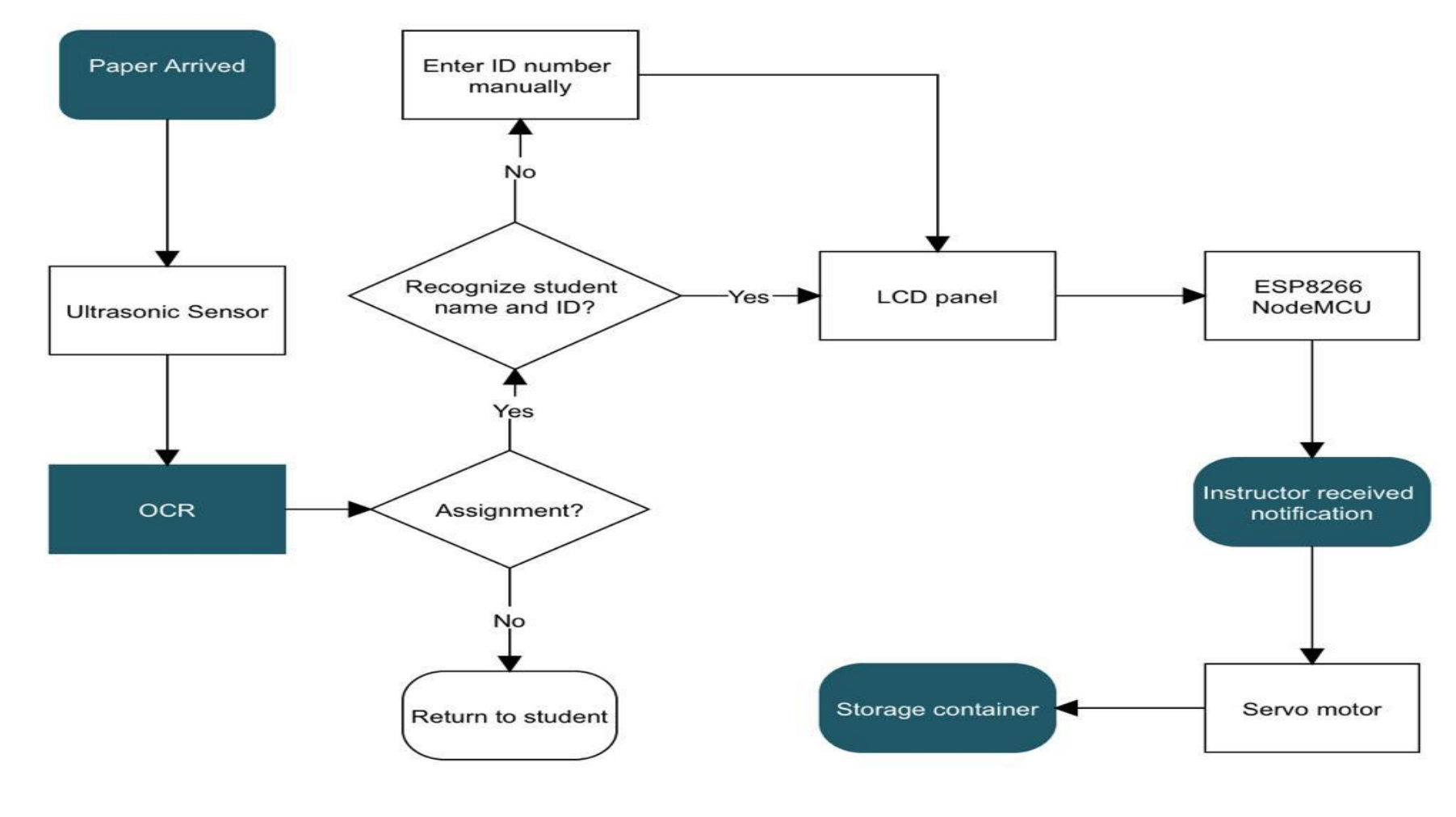
Project Specifications

- **Detect** the paper if it's submitted or not by Ultrasonic Sensor.
- **Recognize** handwritten papers by OCR (Optical Character Recognition).
- **Receive** notification by the Smart Dropbox to the student and faculty member when submission received.
- **Operates** the submission in few minutes.
- It has a microcontroller programmed to **control** all sensors inside the Smart Dropbox.
- It has the capacity to **store** up to 3000 papers.

Design Constraints & Standards

- Economic (budget).
- Safety.
- Social, culture.

Project Architecture



Planning

- Have verified the efficiency of the topic.
- Choosing the topic, fundamental points, assigned tasks.
- Search for component availability in local stores and online website.
- Examining the selected subsystems.

Background: Problem

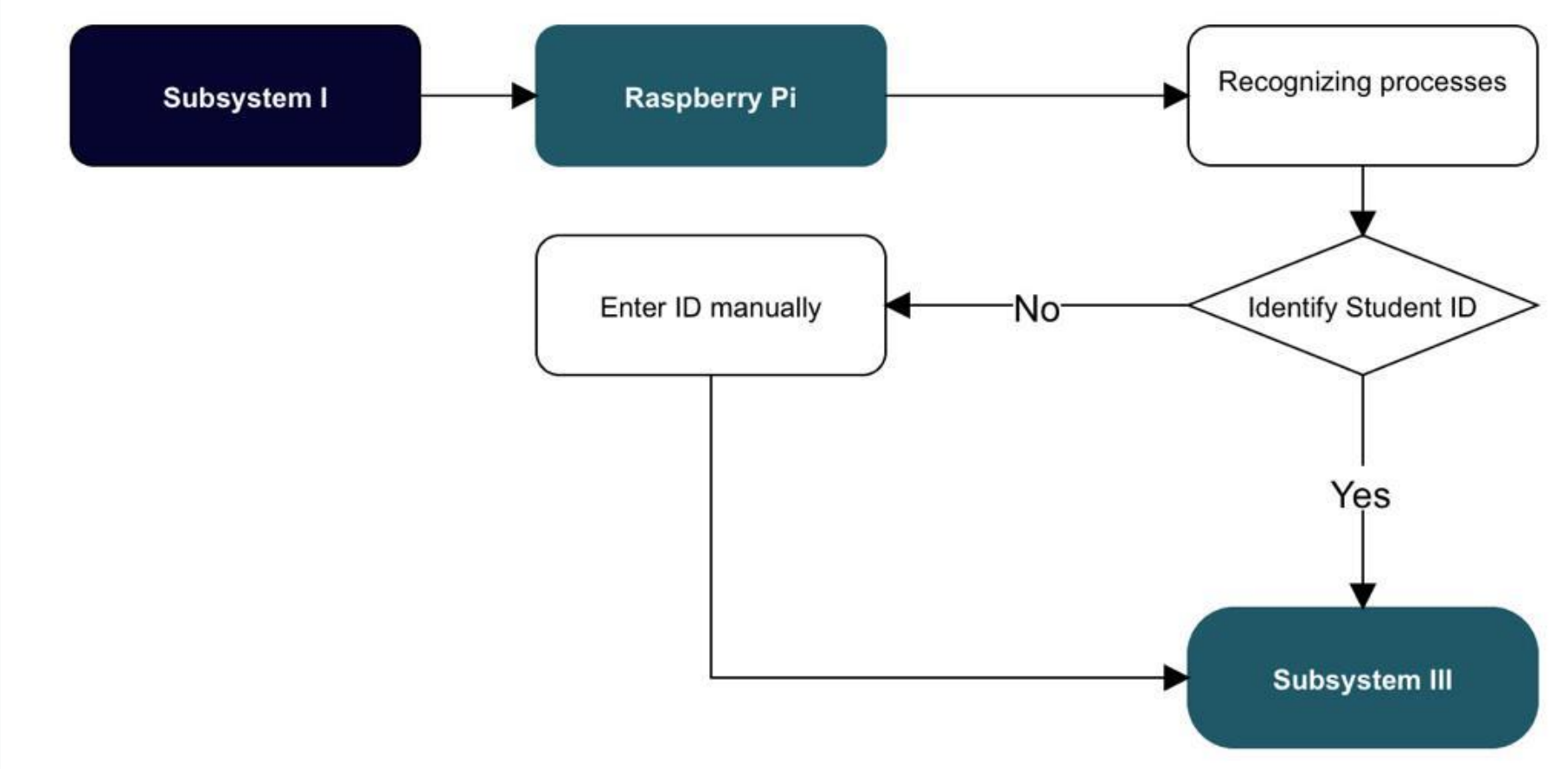
- Availability of the instructors.
- Submitting assignments before due date.

Background: Solutions

- Instructors will receive a notification with time, date of the submission.
- Smart Dropbox will offer flexibility between instructors and students.

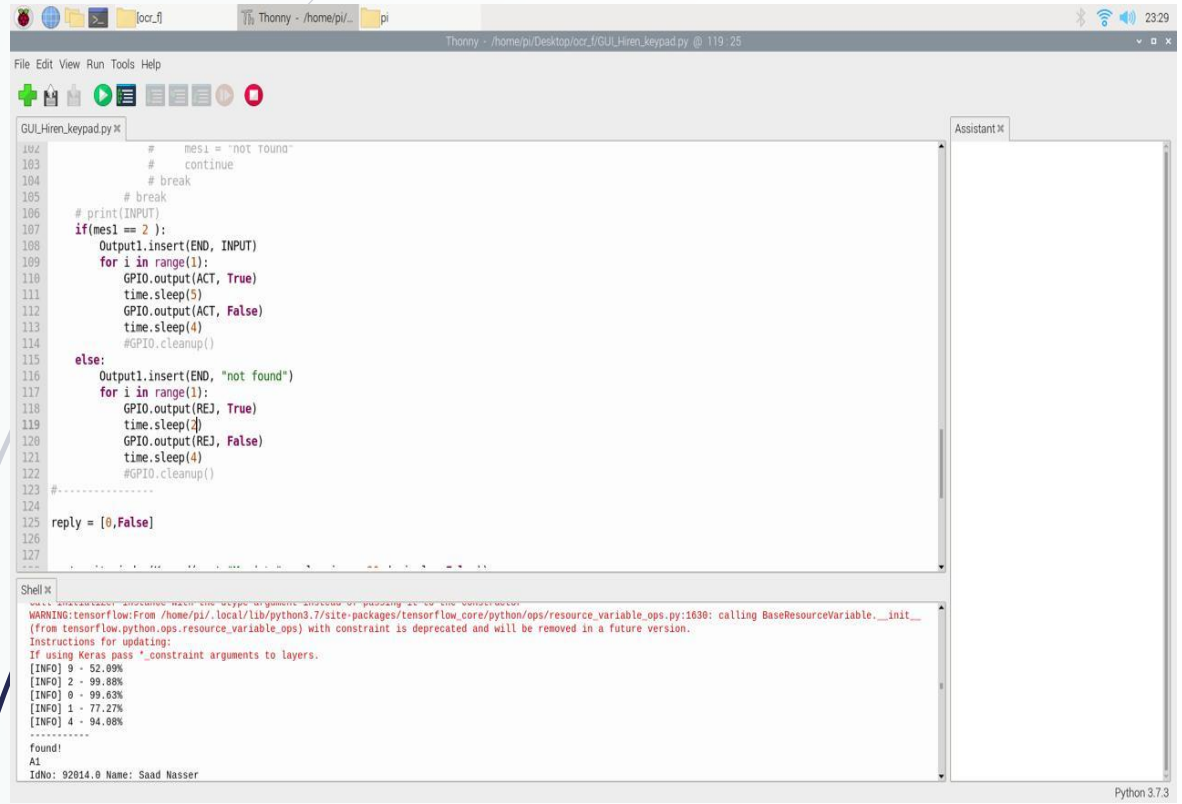
Design Subsystem I: Dropbox Design

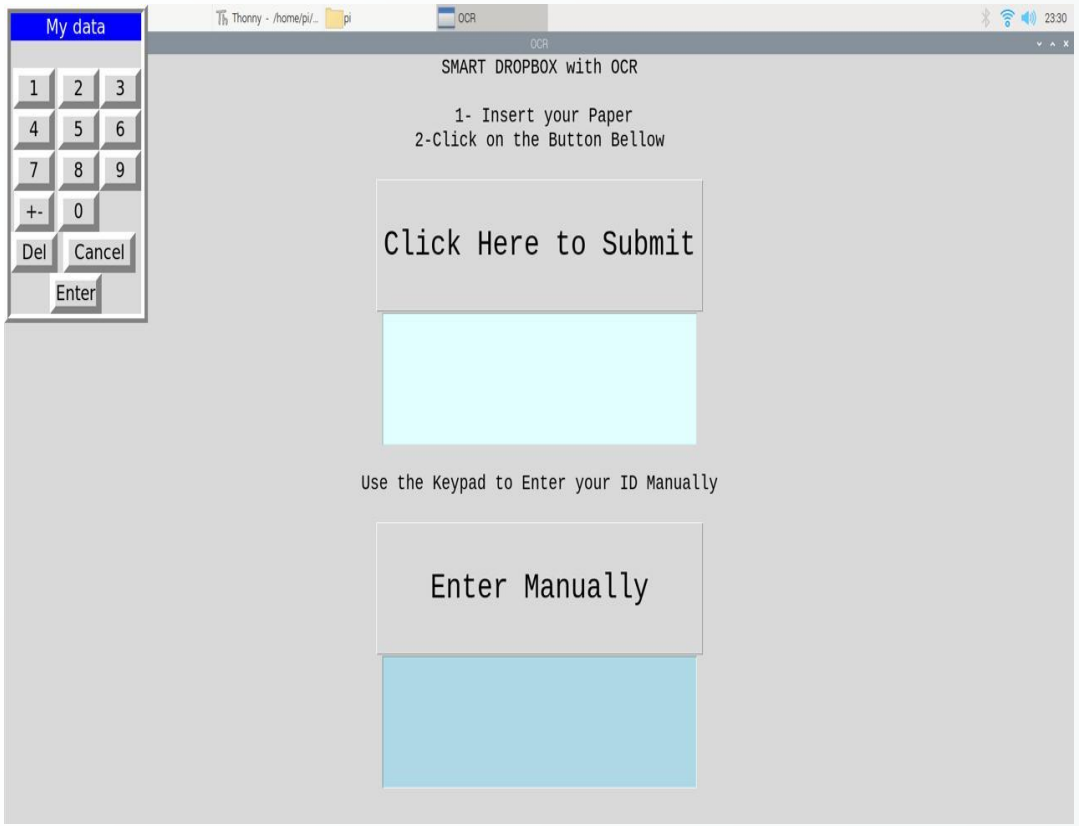
Design Subsystem II: OCR



Design Subsystem II: Rasberry Pi 4 with Camera

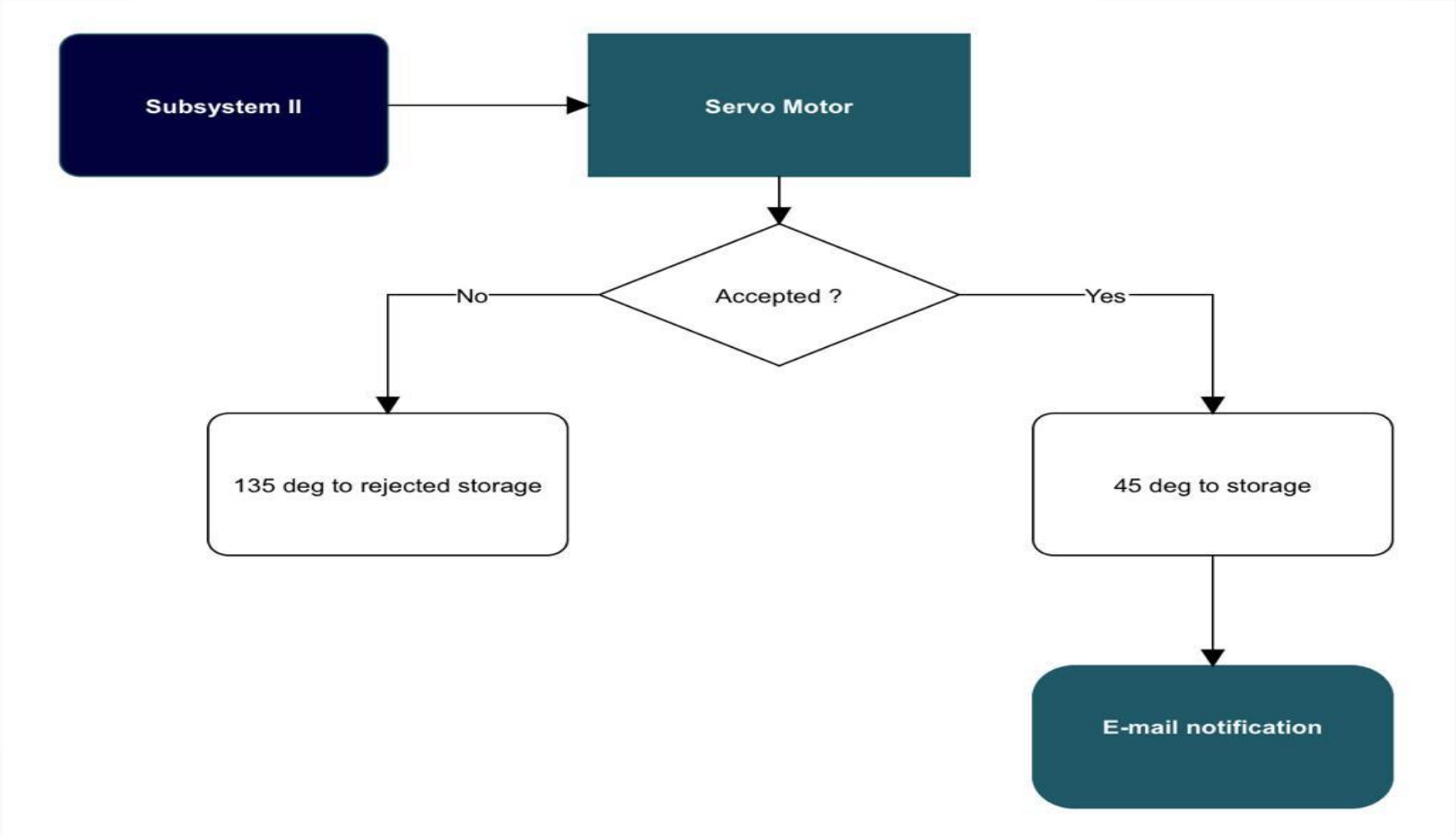
Design Subsystem II: Testing



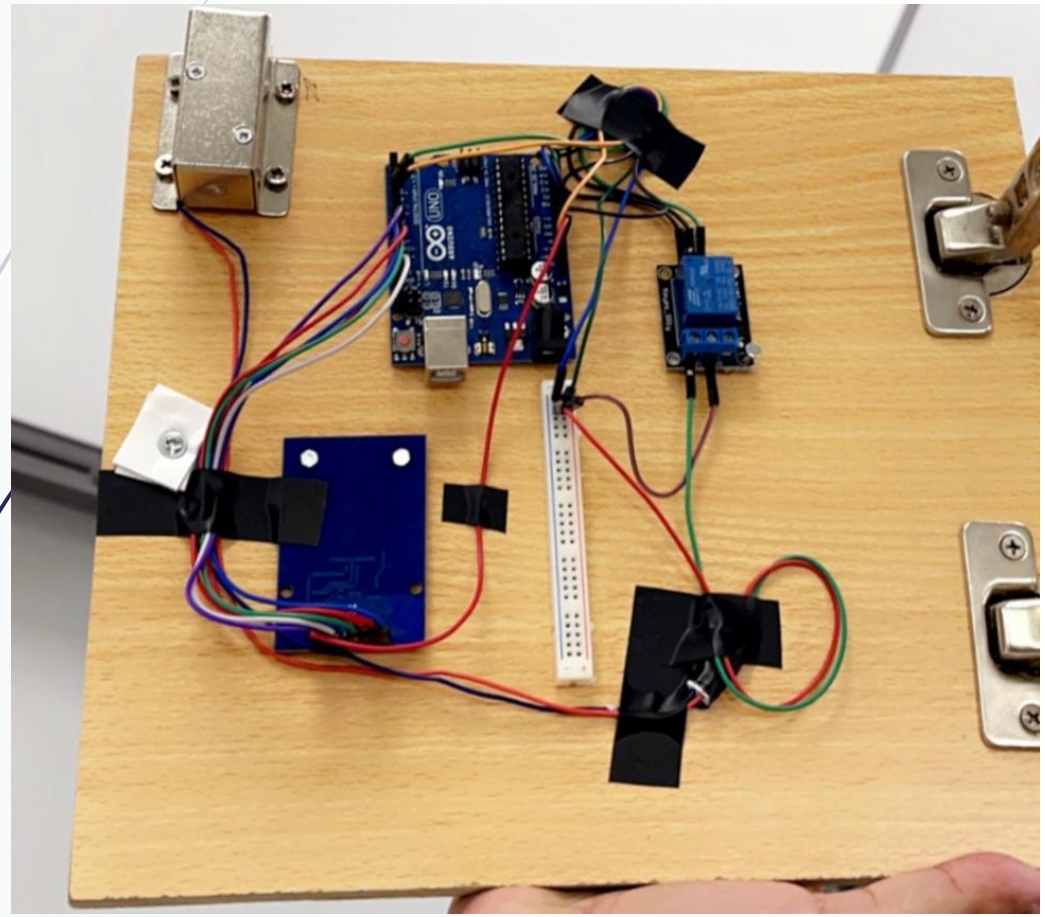


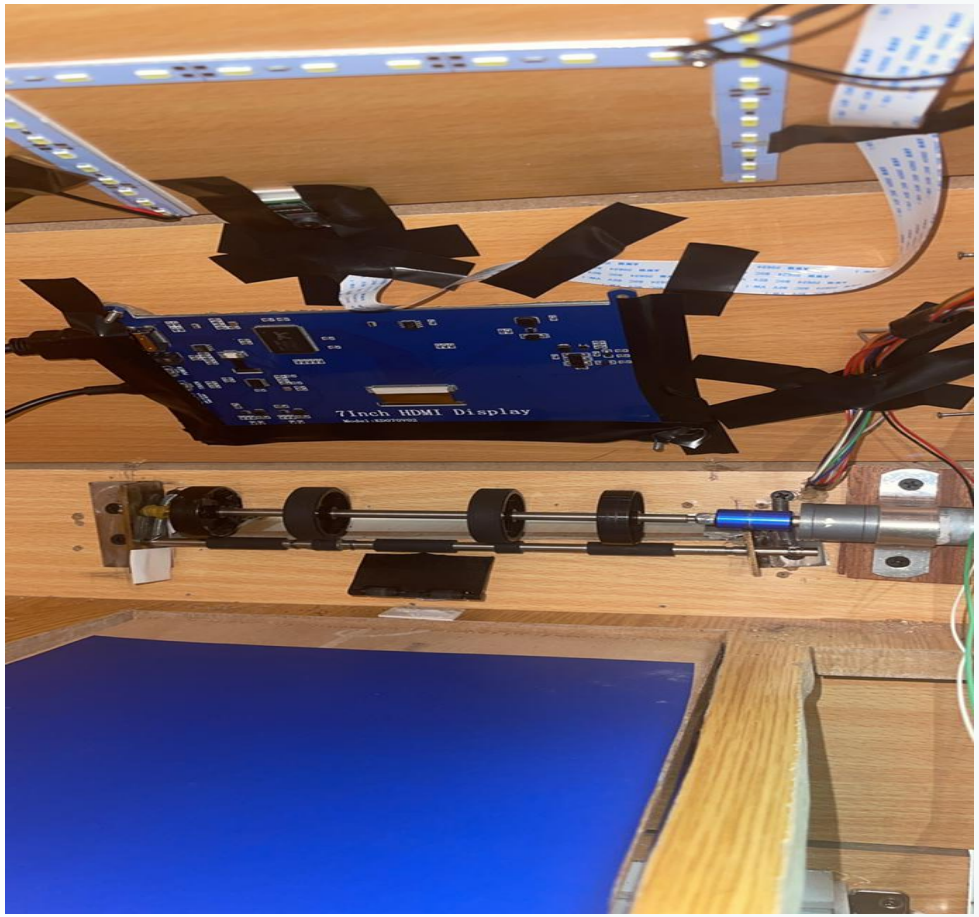
Design Subsystem II: Testing

Design Subsystem III: Hardware & Software Interfacing



Design Subsystem III: Testing





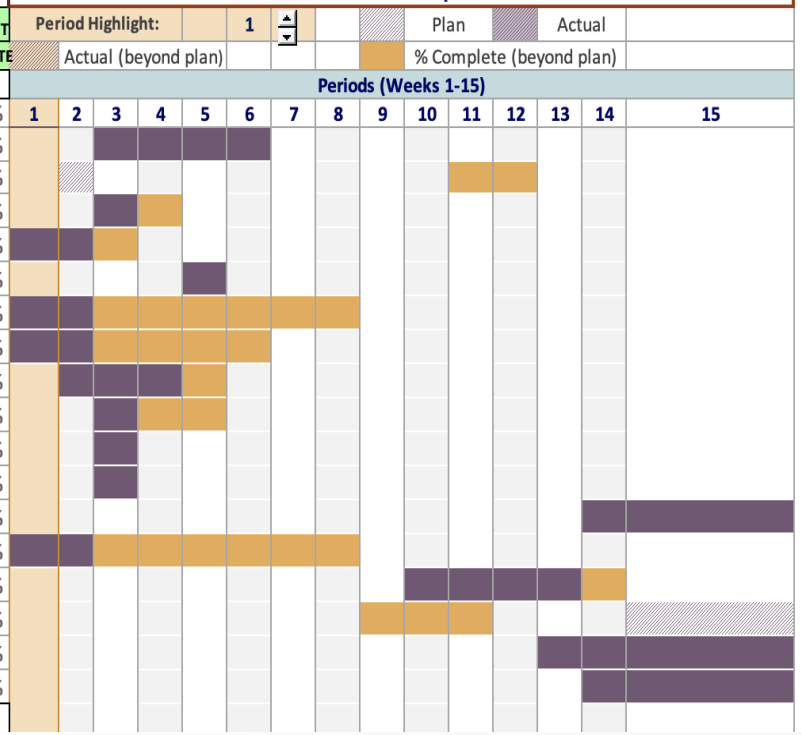
Design: Completed Work

- Design subsystem I (Dropbox Design).
- Design subsystem II (OCR).
- Design subsystem III (Hardware & Software Interfacing).

Project Management and Teamwork

Title: Smart Dropbox with OCR.	Advisor: Dr. Sadiq AlHuwaidi	Design II (ASSE 3)	Spring 2022
Faisal Aldossary (FD) 201700817		Project PLAN & Progress	
Adel Almutairi (AM) 201702264		ProgRpt No. 6	
Saad Alzuabi (SZ) 201502138		Plan updated (Date): May 17, 2022	
Bandar Alghamdi (BG) 201602764		Instructor: Dr. Sadiq Alhuwaidi	

ACTIVITY	PLAN START	PLAN DURATION	Assigned To	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Write a plan	1	1	ALL	1	1	100%
Design subsystem 1 (Dropbox Design)	3	4	ALL	3	4	100%
Test subsystem 1	2	1	ALL	11	2	100%
Interfacing Dc Motor with the roller	3	1	FD,SZ	3	2	100%
Ordering sub-systems parts	1	2	ALL	1	3	100%
Prepare midterm Presentation	5	1	FD,AM	5	1	100%
Design subsystem 2 (Optical Character Recognition)	1	2	AM,SZ,FD	1	8	100%
Test subsystem 2	1	2	AM, FD	1	6	100%
Design subsystem 3 (Software and Hardware Interfacing)	2	3	FD,SZ,AM	2	4	100%
Test subsystem 3	3	1	FD,SZ	3	3	100%
Testing the slider with Dc Motor	3	1	FD,SZ	3	1	100%
Interfacing RFID with Solenoid Lock	3	1	FD,BG	3	1	100%
Prepapre final report	14	2	ALL	14	2	100%
Implementing coding for OCR	1	2	AM	1	8	100%
Test all sub-systems	10	4	ALL	10	5	100%
Final presentation	15	3	ALL	9	3	100%
Submit Rpt/PPT/Brochure/Video...etc.	13	3	SZ,BG	13	3	100%
Prepare project demo	14	2	FD,AM	14	2	100%



Project Management and Teamwork

Task	Faisal	Adel	Saad	Bandar
Search & acquire components	25%	25%	25%	25%
Design & Implement Subsystem I	30%	30%	30%	10%
Design & Implement Subsystem II	30%	40%	20%	10%
Design & Implement Subsystem III	30%	30%	30%	10%
Testing	30%	30%	30%	10%
Write Reports & Presentations	25%	25%	25%	25%

Project Management and Teamwork

Challenges & Decision Making:

- Dropbox design.
- LCD selection.
- The movement of the rotation degree of the servo motor.

Risk Management

	Source	Events	Threats	Response
1	**Servo Motor**	Rotates in one direction	Not applicable with the stand	by change the type of servo motor
2	**GSM Module**	The module does not support email	Can not send an email notification.	Replacing the GSM module with ESP8266 NodeMCU.

Impact of COVID-19 on our project

- Social distancing.

- Online courses.

Impact of Project

- Improving the method of submmition.
- Solving the conflict of students and instractors schulade.
- Secured submission.

Skills Acquired and Applied

- Cost management.
- Time management.
- Technical skills.
- Critical thinking skills.

Budget

Item	Quantity	Unit Cost (SR)	Subtotal
Raspberry Pi	1	484	484
Solenoid Lock	1	36	36
Ultrasonic Sensor	3	23	69
ESP8266	1	35	35
Dropbox	1	550	550
LCD Panel	1	345	345
Arduino Uno Board	1	45	45
LEDs	3	0.25	0.75
RFID	1	28	28
Developer Roller	1	24	24
Relay	1	45	45
H-Bridge	1	37	37
Servo Motor	1	27	27
Total	1725.75 SR		

References

- https://www.kth.se/polopoly_fs/1.987202.1589830463!/tunbergjacob_52111_2870370_The%20smart%20mailbox%20100-1.pdf
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- http://umpir.ump.edu.my/id/eprint/12129/1/FSKKP%20-%20NAZARIAH%20ABDULLAH%20(CD9144).pdf
- https://ieeexplore-ieee-org.library.pmu.edu.sa/stamp/stamp.jsp?tp=&arnumber=9262379
- https://www.theseus.fi/bitstream/handle/10024/159920/Smart%20Mailbox.pdf?sequence=1&isAllowed=y

Demo Video:

- https://streamable.com/01zi2m