



Post Mortem for

Flipp: A Page Turning Device

Project Team:	Daniel Miess Rajdeep Singh Kamal Ezz Hesam Bagheri Azghadi
Contact Person:	Daniel Miess dmiess@sfu.ca
Submitted to:	Dr. Andrew Rawicz – ENSC 440W Steve Whitmore – ENSC 305W School of Engineering Science Simon Fraser University
Issue Date:	December 22 nd 2015
Revision:	1.3

Table of Contents

Table of Contents	ii
List of Figures	ii
List of Tables	ii
1. Introduction	1
1.1 Background.....	1
2. System Overview	2
3. Financial Overview	3
4. Schedule	4
5. Team Dynamics	5
6. Individual Reflections	6
6.1 Individual Reflections – Daniel Miess	6
6.2 Individual Reflections – Raj Singh	7
6.3 Individual Reflections – Kamal Ezz	8
6.4 Individual Reflections – Hesam Bagheri Azghadi	9
7. Conclusion	10
References	11
Appendix A.....	12

List of Figures

Figure 1 - Artist's rendering of Flipp	1
Figure 2- The completed Flipp device	2
Figure 3- Gantt chart comparing projected timeline to actual timeline.....	4

List of Tables

Table 1- Financial Data for the Project	3
Table 2- Workload breakdown for team members	5

1. Introduction

This post mortem describes the final completed proof-of-concept for Flipp: A page turning device. The document will also contain information detailing the design process behind the device as well as various project details including schedule, team member roles and financial information. Included with this document in Appendix A are meeting minutes collected over the course of the project.

1.1 Background

The Lex-Aid Flipp is a device designed for turning the pages of a book. As the population of Canada ages the prevalence of diseases that restrict fine motor movements is increasing. This is leading to a large population of people that do not possess the dexterity required to turn the pages of a book. Lex-Aid intends to help solve this problem with its landmark device Flipp. Using a series of mechanical arms, motors and clamps the device will turn the pages of a book placed on its platform. Pictured below in Figure 1 is an artist's rendering of Flipp.

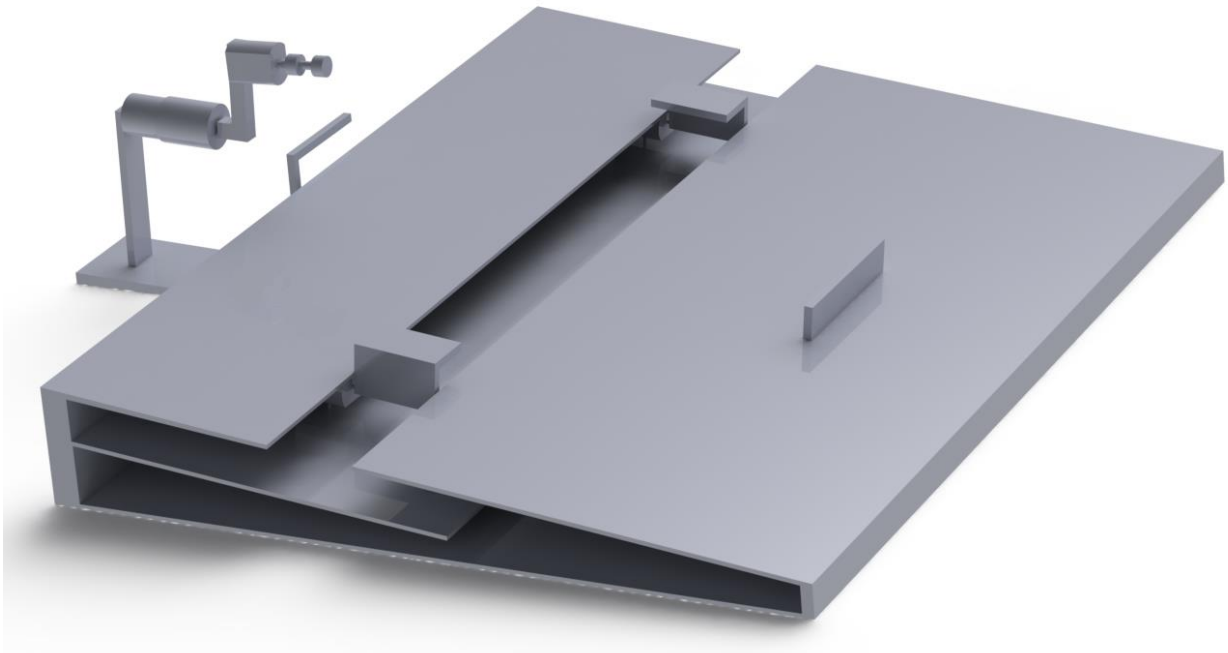


Figure 1 - Artist's rendering of Flipp

2. System Overview

The Flipp accomplishes the turning of the pages of a book through the movement of a series of arms and flaps. The user places the book that they wish to read onto the main platform of the device where the mechanical components can reach and interact with the book. The user then uses a control unit connected to the main body of the device to control the page turning operation through either a button press or a voice command. In Figure 2 below Flipp is pictured along with the control unit beside the device.

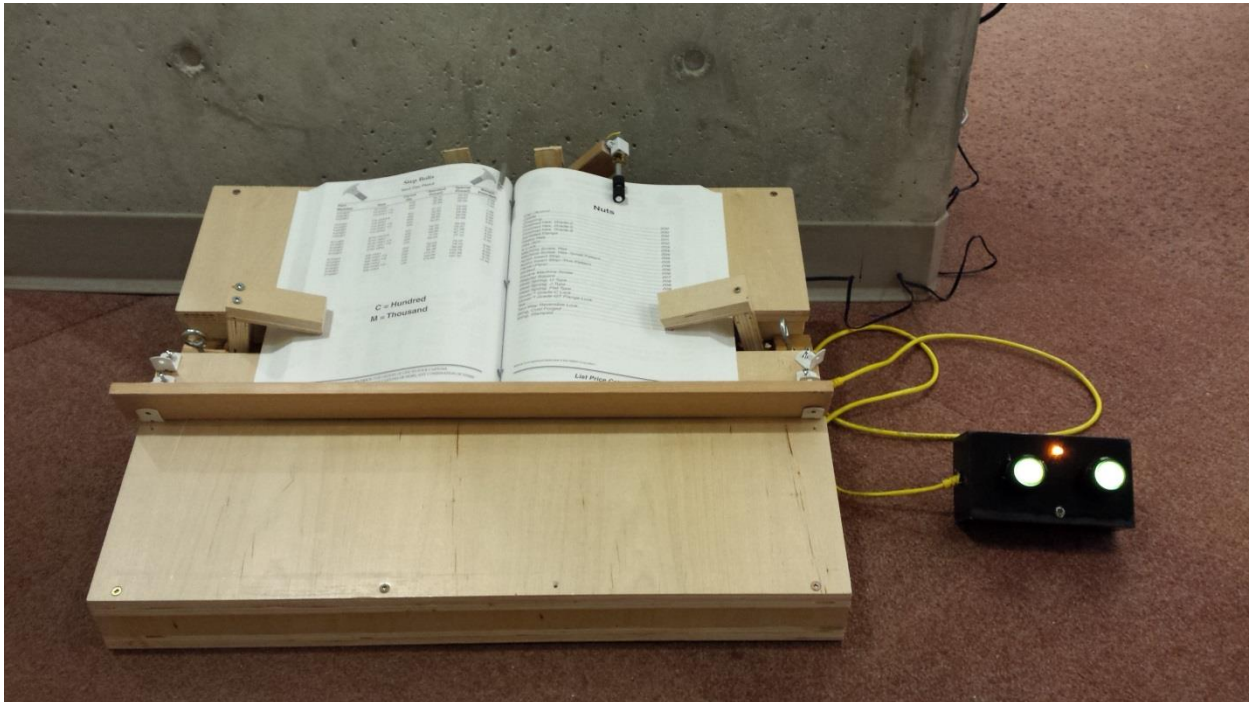


Figure 2- The completed Flipp device

Along with the electronics assembled by the Lex-Aid team, Flipp also makes use of two externally sourced circuit boards. In order to provide voice recognition functionality the control unit contains a board called SpeakUp [1]. Using a USB connection to program voice commands into the board it generates a digital I/O output upon recognition of a spoken voice command. The second circuit is a current sensor sourced from SparkFun [2]. The circuit combines a Hall Effect sensor with an operation amplifier to generate a voltage output based on the current passing through. This signal is used to detect when one of the motors has stalled in order to stop it.

The platform itself is constructed from a combination of regular lumber and plywood. These form the main support structure of the device. The arm which flips up the page to be turned is made of a custom machined aluminium rod with rubber wheels affixed to the end.

3. Financial Overview

Due to drastic changes in the implementation of our project from the time of the Proposal submission it is difficult to directly compare the proposed budget with the actual cost of assembly. The estimated values in the proposal were given for specific components that we intended to buy, many of which were not purchased due to changes in the design. For the purposes of this table the estimated costs are taken from the proposal and then grouped together based on broader categories with 25% contingency factored into the value. Table 1 below summarizes the final cost of the project.

Table 1- Financial Data for the Project

Project Component	Estimated Cost	Actual Cost	Difference
Materials	\$25	\$158.49	+534%
Mechanical Components	\$262.50	\$110.00	-58.1%
Electrical Components	\$475.00	\$759.91	+60.0%
PCB Fabrication	---	\$72.00	---
Total	\$762.50	\$1100.40	+44.3%

Funding for the project will come from multiple sources. Earlier in the project a grant of \$300 was secured from the SFU Engineering Science Student Endowment Fund [3]. In order to cover the remainder of the project expenses the team will seek funds from the Wighton Engineering Development Fund [4]. Afterwards, if there are still expenses outstanding all team members will contribute equally to paying them.

The issue of expenses was one of the major hurdles to the completion of this project. When work began on the project the members of the team had many ideas for how to implement a page turning device. This was complicated by the fact that none of the team members had previous experience in working with such a mechanically demanding challenge. Because of this a large part of the budget was spent on items best classified as research and development. A number of motors were purchased in the hopes that they could be used in the project however they ultimately served as a tool to further our understanding of torque and rotational power. As well, the first idea that was seriously pursued for constructing the device made use of a vacuum pump to lift a page up from the book. After purchasing a vacuum pump and running some tests with it the team determined that it would not be sufficiently reliable and the design was revised.

Because of these research and development costs the reader should keep in mind that the numbers presented in this are higher than the actual cost to build the project. If the team were to start construction again from scratch with the information gained from this experience it is likely that it could be built within the original budget estimate.

4. Schedule

The team at Lex-Aid is happy to report that the Flipp project has been completed on time for the demonstration date of December 22nd, 2015. There were some delays in the schedule, the largest of which was with the project research. Research into how to best realise the device was scheduled to be completed around the 20th of October however it continued on for nearly a month after that date. Assembly was taking place concurrent to research and often new questions would arise in the assembly process that would necessitate additional research. As well, the original estimate was to be completed all aspects of the project by December 5th however once it became clear that more time would be needed to complete the project the demonstration date of December 22nd was chosen. Figure 3 below shows the original time estimates in blue contrasted again the actual time spent in green.

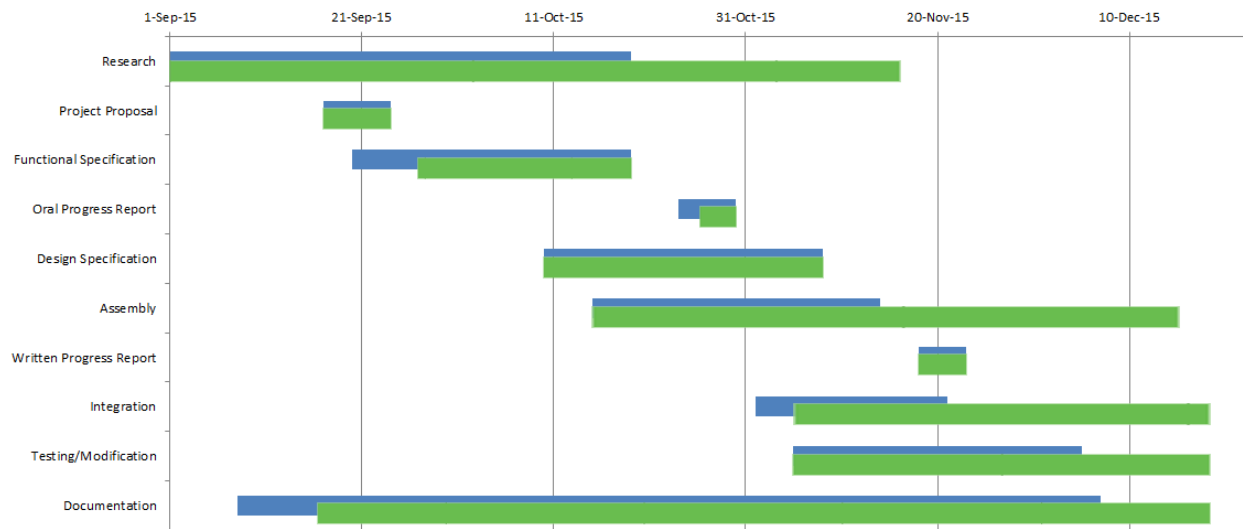


Figure 3- Gantt chart comparing projected timeline to actual timeline

5. Team Dynamics

The team at Lex-Aid is made up of a diverse group of final year engineering students. Daniel and Raj are Electronics Engineering students, Kamal is a Computer Engineering student and Hesam is a Systems Engineering student. All of the team members are competent in their field of study and have relevant co-op experience.

The team was formed through the use of the 305-planning mailing list prior to the beginning of the semester. During the semester regular meetings were held to plan and discuss the progress of the project. In between meetings the team kept in regular contact with each other through the use of a group WhatsApp chat as well as e-mail. Overall the level of communication throughout the project was adequate and all group members worked well together with major conflicts arising. Almost all team meetings took place on the SFU Burnaby campus, either in the ASB or TASC building with most of the assembly work taking place in Lab 1 and the SFU machine shop.

During the duration of the project the team made an effort to ensure that the workload was distributed as evenly as possible. Table 2 below summarises the contribution of team members to different aspects of the project.

Table 2- Workload breakdown for team members

Project Aspect	Daniel Miess	Raj Singh	Kamal Ezz	Hesam Bagheri Azghadi
Administration	HIGH	LOW	MEDIUM	LOW
Finance	MEDIUM	LOW	LOW	HIGH
Documentation	HIGH	MEDIUM	MEDIUM	MEDIUM
Mechanical Dev.	LOW	MEDIUM	HIGH	MEDIUM
Enclosure	LOW	LOW	HIGH	MEDIUM
Electrical Dev.	HIGH	MEDIUM	LOW	LOW
PCB Dev.	MEDIUM	HIGH	LOW	LOW
Software Dev.	HIGH	HIGH	MEDIUM	LOW
Graphic Design	LOW	HIGH	LOW	HIGH

6. Individual Reflections

6.1 Individual Reflections – Daniel Miess

Right from the beginning this project was an ambitious one and certainly the most ambitious of my undergraduate career. Not only was it a large project in terms of scope but it also required a very large mechanical component to it, something which neither I nor anyone else on the team had previous experience with. It was this ambition though that made the project a delight to work on from start to finish. I felt like nearly every time I sat down to work on the project I was learning something new.

My major contributions to the project were in the areas of electrical and software design. I had never before used motors in any kind of project so over the course of the semester I was able to learn a lot about the different properties of motors and how those properties affect their application. While I had used an Arduino before for independent projects this project was my first opportunity to an Atmel microcontroller as a bare chip. I was able to learn about the life support circuitry needed for one of these chips including how the clock is wired up and the working of the reset pin. This was also my first experience using a Hall Effect sensor to measure current. For this project due to time constraints we bought a simple PCB with the Hall Effect sensor on it but after studying the schematic I'm confident that I could build it on a breadboard or onto a PCB of my own.

Towards the end of the project I had the opportunity to work alongside Raj designing my first surface mount circuit board. While it was a lot of work to put it all together it was a very rewarding experience. I feel like I now possess the skills to design my own surface mount PCB in the future. While problems with the microcontroller meant that the PCB wouldn't be used in the final project it was both fun and interesting to work with the entire way through. I was also surprised how little it cost to have made, with the final total for the board itself at under \$75 for 10 boards.

As the team member with the title of CEO, this project gave me an opportunity to work on my leadership skills. Using the 305-planning mailing list I was able to put together a team with diverse talents made up of members who at the time were scattered all over the globe. When the semester started we all got a chance to meet face to face and from there worked together as a cohesive unit with relatively few hiccups. I acted as a facilitator over the course of the project planning out meetings, ensuring that critical deadlines were met and keeping discussion during meetings on track.

It was a delight to see both the project and the team evolve over the course of the semester. I am proud of the device that we have created as well as the process by which it was created. It was a pleasure to work with the members of this team and I wish them success in their future endeavors.

6.2 Individual Reflections – Rajdeep Singh

I believe that the capstone project is a very useful course for engineering students. In the past four months, I had the opportunity to learn about various aspects of system design and team dynamics. Due to the open-ended concept of the course, it challenged me to improve both my technical and communications skills.

Flipp consists of two major subsystems: electrical and mechanical. The team split in to two groups of two members. Since Daniel and I have more experience in the electronics, we worked mainly on the electrical circuit. The technical skills I needed to design, debug and implement the circuit were learnt through SFU's applied science courses. Throughout the design of the project, I would be applying engineering thinking and knowledge to solve the problems. Also, my previous coop experience at intel helped me with the PCB design and assembly. I learned that I am able to appropriately use the skills I have acquired during my degree program.

I was fortunate to get experience in the mechanical subsystem as well. The machinist from SFU's shop showed us how to couple a rod to a motor, which was very interesting. Before working on the project, I didn't have any experience with mechanical components. I learnt a lot about different types of motors and what features to look at when selecting a motor.

I met the members of the LexAid team for the first time in the beginning of the semester. The team dynamic remained professional, especially when the member's ideas conflicted with each other. The solution we choose would be the one that was best for our product. I've had a great experience working with the members of the LexAid team. I am proud of the final results of our product.

6.3 Individual Reflections – Kamal Ezz

This project has been tremendously useful for me. For the past four months, I have developed a lot of technical as well as interpersonal skills and I also learnt a lot more about myself. Although there were some times where I was lost and I was looking around for guidance, yet I was able to meet and exceed the expectations of my tasks.

During this amazing journey, I got a chance to communicate with 3 multi-disciplinary engineering students, majoring in Electronics and Systems engineering. Putting together the knowledge of each individual and dividing tasks in accordance to our specialization, our project came together with huge success. Although I believe this was the most challenging experience I have had throughout my previous 4 years of engineering, yet it has been the most valuable and rewarding.

Despite the fact that I am majoring in Computer Engineering and I am more familiar with software and electronics, yet I was responsible to work on dense amounts of mechanical aspects. This gave me a chance to expand and broaden my knowledge towards other Engineering fields and get an idea of how systems are integrated to function together. Being the Mechanical Systems Manager, I started the semester with having very little knowledge of what material to use for our project, a vague idea of how to build our platform, and minimal thoughts of how to couple our motor shafts to the rotating arms. As the implementation phase of the project kicked in and by communicating with the rest of the team, I was able to gain better ideas and come across obstacles that eventually turned out to help develop more efficient strategies. By switching to a completely different material than I have initially intended to use and putting together new strategies, I was able to deliver the project's mechanical aspects to be integrated with the circuit.

I have to admit that this project has not particularly made me apply my knowledge throughout the years. Instead, it made me think more like an engineer by seeking solutions to problems with the help of logic reasoning, backing it up with research. I believe this is what really makes one a good engineer.

Lastly, I would like to acknowledge my team members for the hard work they have been putting throughout the semester. We worked hard and it paid off, which makes me very proud. Although we came across some minor conflicts, yet such situations were handled in professional manners. We always had one compromising and accepting the other's ideas, making sure we all are seeking the best for the team and the project. Overall I am grateful for the experience and I am very proud of our project Flipp.

6.4 Individual Reflections – Hesam Bagheri Azghadi

Over the course of this semester, I realized why capstone project plays an essential role in my future engineering career. Having witnessed the entire development of Flipp, from brainstorming project ideas, designing and implementing features, I gained exposure to the many stages of general project development and processes required for prototyping a working model for demonstration. Capstone is not a technical skillset or a particular specialization that imbues an engineer with employable value, but rather the ability to learn, adapt, and create reliable, original solutions to novel problems using only a broad knowledge base and creativity.

By acting as a Chief Financial Officer at Lex-Aid, I was able to challenge and improve my financial management skills. In term of responsibility, I was in charge of reimbursements, contacting possible sponsors, keeping track of all the expenses and trying to maintain the costs close to the companie’s budget. In addition, my technical knowledge in mechanical design, fabrication and CAD design helped me to take apart the initial design stage of this project by designing and fabricating the component in Solidworks. My main role in the design stage was to design all the components of the Flipp and assemble them all together.

Furthermore, Kamal and I, were also responsible for creating, assembling and fabrication of the platform. This include purchasing all the required parts, making the platform, placing all the arms and motors on platform and using different tools in machine shop. Through this whole process, I learned valuable information on assembling of the parts, when we had to be super precise on placing the arms and motors in proper spot, in order to perform the required functionality. I also enhanced my mechanical skills by going through different problems and consulting with Engineering and professors.

Interpersonally, I familiarize myself to tackle challenges, work in a team environment, enhance my communication skills and advance my project management skills. I also took this opportunity to allow myself to be open to any suggestion and accept other ideas. Of course, it was some lack of communication and weakness at some point, but our group were able to handle them all perfectly with no negative effect on our final results.

I have also used this opportunity to improve my writing skills. Prof. Whitmore and his teaching assistants guided me and my team members through all the documentation required for this project. Their invaluable teaching showed us how to make our reports precise, detailed and at the same time to the point.

It was such a great experience to go through all the steps of making the Flipp. I would like to thanks everyone who helps us in this accomplishment including Dr. Rawicz, all the teaching assistance, Fred Heep, Gary Shrum, Daniel Miess, Kamal Ezz and Raj Singh. Without their support, this product would not have been the same as it is today.



7. Conclusion

There is certainly no doubt that working on this project has been an immensely beneficial learning experience. Despite large changes in implementation and a number of setbacks the Lex-Aid team is proud to deliver a proof-of-concept device that successfully performs its function. Going forward, the Lex-Aid team will give consideration as to whether they will be able to commit to the additional research required to further develop Flipp.

References

- [1] MikroElektronika. (2015). "SpeakUp" [online]. Available: <http://www.mikroe.com/click/speakup/> [Accessed: 21 – Dec – 2015]
- [2] SparkFun. (2015). "SparkFun Low Current Sensor Breakout – ACS712" [online]. Available: <https://www.sparkfun.com/products/8883> [Accessed: 21 – Dec – 2015]
- [3] SFU Engineering Student Society. (2015). "Engineering Science Student Endowment Fund" [online]. Available: <http://esss.ca/essef/> [Accessed: 21 – Dec – 2015]
- [4] Dr. A. Rawicz. (2015). "Wighton Engineering Development Fund" [online]. Available: http://www2.ensc.sfu.ca/~whitmore/courses/ensc305/pdf%20files/Wighton_Fund.pdf [Accessed: 21 – Dec – 2015]



Appendix A

Post Mortem for a Page Turning Device



Lex-Aid

AGENDA

September 11, 2015

10:05am - 10:50am

ASB Lounge

Purpose of Meeting: To discuss more details about the idea of text reader for blind people

Items for Discussion:

- Reader must be able to read the book based on edge of the book
- It does automatically move toward the end of each page and read the whole page at the same time
- Come up with company name and logo
- Think about the device name
- Email this idea to Andrew/Steve for approval
- Set up the next meeting time



Post Mortem for a Page Turning Device

Lex-Aid
MINUTES

September 11, 2015

10:05am - 10:50pm

ASB Lounge

Present: Daniel Miess, Kamal Ezz, Raj singh, Hesam Bagheri Azghadi

Absent:

Purpose of Meeting: To discuss more details about the idea of text reader for blind people

Minutes: 50 min



Lex-Aid

AGENDA

September 14, 2015

11:00am - 12:00pm

ASB Lounge

Purpose of Meeting: To brainstorm project ideas after previous idea was not well received by professors

Items for Discussion:

- Brainstorming of project ideas
- Daniel will present update on locker status
- Time permitting, determine what parts of proposal can be started



Lex-Aid

MINUTES

September 14, 2015

11:00am - 12:00pm

ASB Lounge

Present: Daniel Miess, Kamal Ezz, Raj singh, Hesam Bagheri Azghadi

Absent:

Purpose of Meeting: To brainstorm project ideas after previous idea was not well received by professors

Minutes:60 min



Lex-Aid

AGENDA

September 18, 2015

10:20am - 11:10am

ASB Lounge

Purpose of Meeting: In order to discuss individual tasks for writing proposal

Items for Discussion:

- Set each group member individual tasks
- Each member needs to briefly explained what they have accomplished in their academic years and send it to Raj before our next meeting
- Conclusion and Executive summary will be done in group work
- Come up with some choices for company's name
- Group decided to go with last option which is Lexaid
- Daniel will set up the time for our next meeting
- Hesam will do the Agenda 1 & 3



Lex-Aid

MINUTES

September 18, 2015

10:20am - 11:101m

ASB Lounge

Present: Hesam Bagheri Azghadi ,Daniel Miess, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting:

Minutes: 50 min

Details:

- **Group tasks:**
 - Hesam: project planning – cost consideration – Agenda 1 & 3
 - Raj: company details – presentation/organization – logo
 - Daniel: research rationale – rhetorical issue
 - Kamal: Introduction/background – scope/risk/benefit
- **Company's name options:**
 - Flipper
 - Lexical
 - Lexiflip
 - Lexip
 - Libro
 - Libras
 - Lexaid
- **Next meeting:**
 - Tuesday sept 23 at 1:30



Lex-Aid

AGENDA

September 22, 2015

1:30pm - 2:10pm

ASB Lounge

Purpose of Meeting: To check the status of the proposal completion

Items for Discussion:

- Hesam will do the Agenda
- To check member's contribution toward completing the proposal
- To set the new task in order to finish the proposal
- To set the plan for coming meeting on Thursday
- Come up with device name

Lex-Aid

MINUTES

September 22, 2015

1:30pm - 2:10pm

ASB Lounge

Present: Hesam Bagheri Azghadi ,Daniel Miess, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting: To check the status of the proposal

Minutes: 40 min

Details:

- **Group tasks:**
 - Raj : will do the first page of the proposal
 - Hesam : will send the Gantt chart to Daniel for coming ESSEF presentation
 - Daniel : will do the presentation
- **Device name:**
 - Flipper
 - Lexi
 - Bird
 - Dolphin
 - Flipp
- **Upcoming plan:**
 - Parts + cost of each part
 - System plan
 - Job title for each group member
 - Executive summary + Conclusion
- **Next meeting:**
 - Tuesday sept 23 at 12:30 pm



Lex-Aid

AGENDA

October 6, 2015

1:30pm - 2:20pm

ASB Lounge

Purpose of Meeting: To check some of the requirement for the coming functional specification

Items for Discussion:

- Hesam will do the Agenda
- To test the purchase vacuum (purchased by Kamal)
- To set the new tasks in order to finish the functional specification paper on time

Lex-Aid

MINUTES

October 6, 2015

1:30pm - 2:20pm

ASB Lounge

Present: Hesam Bagheri Azghadi ,Daniel Miess, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting: To check some of the requirement for the coming functional specification

Minutes: 50 min

Details:

- **Group tasks:**
 - Raj : General view
 - Hesam : Page lifting arm
 - Daniel : page flipping arm
 - Kamal: Control Box
- **Test result:**
 - Purchased air pump was working
 - Functionality did not meet with our requirement
 - Raj supposed to do more investigation on purchased vacuum(aquarium air pump)
- **Next meeting:**
 - Consider better option for page lifting section
 - Review the result of testing the purchased pump



Lex-Aid

AGENDA

October 23, 2015

10:30am - 12:30am

ASB Lab 1

Purpose of Meeting: To review some of the requirements for design section

Items for Discussion:

- To check the main requirements in order to start the design paper
- To check the possible motor options
- To set some tasks to each member for our next meeting
- Come up with some possible options to purchase the electronic stuff

Lex-Aid

MINUTES

October 23, 2015

10:30am - 12:30pm

ASB Lab1

Present: Hesam Bagheri Azghadi ,Daniel Miess, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting: To review some of the requirements for design section

Minutes: 120 min

Details:

- **Group tasks:**
 - All member will review the old design paper
 - Come up with the list of all requirements for completing design paper
 - Each member will do some research on the required parts for the first prototype
 - Need to come up with some ideas for powering all the motors using Arduino

- **Motor-options:**
 - Regular motor
 - Stepper motor
 - Servo motor

- **Electronic suppliers:**
 - rp-electronic (in town)
 - Lee's-electronic (in town)
 - Digi-key (online)
 - Sparkfun (online)



Lex-Aid

AGENDA

November 8, 2015

10:30am - 2:30pm

ASB Lab 1

Purpose of Meeting: To finish the design paper and plan the future steps

Items for Discussion:

- Everyone's accomplishment on design paper
- To test the new purchase motor
- To plan the next step of the project
- Total cost of the project up to this date

Lex-Aid

MINUTES

November 8, 2015

10:30am - 2:30pm

ASB Lab1

Present: Daniel Miess, Kamal Ezz, Raj singh, Hesam Bagheri Azghadi

Absent:

Purpose of Meeting: To finish the design paper and plan the future steps

Minutes: 240 min

Details:

- **Group tasks:**
 - All members have finished their parts for the design paper
 - Add all the separate sections into one paper
 - All members do the last revision of the design paper

- **Gear-motor:**
 - Testing the performance of the motors
 - Considering different rpm with respect to voltage
 - Come up with the best possible option

- **Budget:**
 - Spend around \$200 at this stage

- **Future plan:**
 - Look up for possible platform that match with our specifications
 - Researching on custom platform as an alternative option
 - Moving forward on electronic circuitry
 - Meet up with TA for getting some advice on existing problem



Lex-Aid

AGENDA

November 23, 2015

11:30am - 1:30pm

ASB Lab 1

Purpose of Meeting: To check the status of platform and electronic circuitry

Items for Discussion:

- To present the finalize custom platform
- To assemble all the arms on platform
- To test the existing circuitry on gear motors
- Make a list of required parts
- To plan for progress report
- To plan for final testing
- Future plan

Lex-Aid
MINUTES

November 23, 2015

11:30am - 1:30pm

ASB Lab1

Present: Hesam Bagheri Azghadi, Kamal Ezz, Daniel Miess, Raj singh

Absent:

Purpose of Meeting: To check the status of platform and electronic circuitry

Minutes: 120 min

Details:

- **Part assembly:**
 - Big motor
 - Big arm with lifting motor
 - Rotating arm
 - Supports for rotating arm
 - Side flaps
 - Book holder

- **Testing:**
 - Bi-directional rotation of 6 motors using the circuit
 - Using different book sizes to attach parts to platform

- **Progress report/Test plan:**
 - Review the paper requirement
 - Split the tasks between group members
 - Come up with different strategy for testing method

- **Future tasks:**
 - Purchase of all the require parts for assembling
 - Assemble all the parts on platform
 - Finish the circuitry
 - Working on schematic for PCB
 - Perform some testing with all parts assembled



Lex-Aid

AGENDA

December 14, 2015

10:30am - 12:30pm

ASB Lab 1

Purpose of Meeting: to check the final status of the project

Items for Discussion:

- To review the result of the testing
- To find the best and fastest solution for existing problems
- To Add all the missing parts to platform
- To Make a list of final tasks before demo

Lex-Aid

MINUTES

December 14, 2015

10:30am - 12:30pm

ASB Lab1

Present: Daniel Miess, Hesam Bagheri Azghadi, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting: to check the final status of the project

Minutes: 120 min

Details:

- **Test results:**
 - Will work in some cases
 - Some tiny problem in synchronization
 - Some issue with rotating arm
 - Hard time flipping the first couple of pages

- **Possible solution:**
 - Modify the Arduino code
 - Add support
 - Make the books more flat

- **Missing parts:**
 - Side flaps
 - Book holder
 - Rotating Arm support

- **Future tasks:**
 - Make the control box ready
 - final testing of the project with some problem solved
 - Create the presentation
 - Organize the Agenda
 - Apply for wighton funding



Lex-Aid

AGENDA

December 20, 2015

10:30am - 1:30pm

ASB Lab 1

Purpose of Meeting: To be prepared for demo day

Items for Discussion:

- To make the final prototype of our project ready for demo
- To perform final testing of the device
- To create all the required documentation
- To practice the presentation

Lex-Aid

MINUTES

December 20, 2015

10:30am - 1:30pm

ASB Lab1

Present: Daniel Miess, Hesam Bagheri Azghadi, Kamal Ezz, Raj singh

Absent:

Purpose of Meeting: To be prepare for demo day

Minutes: 190 min

Details:

- **Final device:**
 - All parts assembled on platform
 - Minor changes with respect to design specifications

- **Final test:**
 - It works for most of the pages
 - All motor are acting in order
 - Minor problem with some specific type of books

- **Documents:**
 - Post mortem
 - Details of purchase for funding
 - Time agenda

- **Presentation:**
 - Make the slides ready
 - Specify the individual part of presentation
 - Group practice of presentation