
# *Post Mortem*

## *The PillMaster*

## Team:

| | |
|---|---|
| **Jasmine Liu** | **301158722** |
| **Tony Lu** | **301107445** |
| **Chris Xiao** | **301133381** |
| **Daniel Lan** | **301129496** |
| **Ritchie Kieu** | **301149668** |
| **Jose Mendoza** | **301141082** |

## Issued Date:

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## Primary Contact:

**CEO**

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DGMasters Inc.

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# 1 Introduction

As the aging population increases, more and more elderly people cannot take care of themselves with daily medical and nutritional treatment. The reality is that a huge number of people older than 65 live in a nursing home. The medical system in nursing homes needs to be fast and reliable. Unfortunately, the actual system in nursing home is not reliable and it can cause health issues. DGMasters Inc. is dedicated to develop a fast and reliable programmable medicine dispensing system.

The PillMaster is a product that releases prescribed medication at specified times. Our product is designed to dispense pills with limited interaction from nurses and caregivers. We plan to integrate customized shafts, microcontrollers, and a pill splitter to complete these functions. These functions include:

- **Dispenser**: the PillMaster will use a customized shafting mechanism to dispense one pill at a time so that it is able to dispense the exact amount of pills from the container
- **Splitter**: the user can choose the split option to split pills for easy consumption and lower dosage
- **Clock Scheduler**: the PillMaster will schedule when to dispense and cut pills at specific times

Our product can provide convenience in many care facilities, as well as avoiding human error.

# 2 System Overview

The PillMaster can be defined as a programmable and automatic pill dispenser. The user enters the time that they want a pill to be dispensed and the machine will deliver the pill at that time. Furthermore, the user decides if they want to cut the pill. The cutting mechanism was added for further dosage control and to avoid choking hazard with the pill. In order to achieve our goal, The PillMaster was subdivided into the mechanical, electrical, and software subsystems as seen in Figure 1 below.

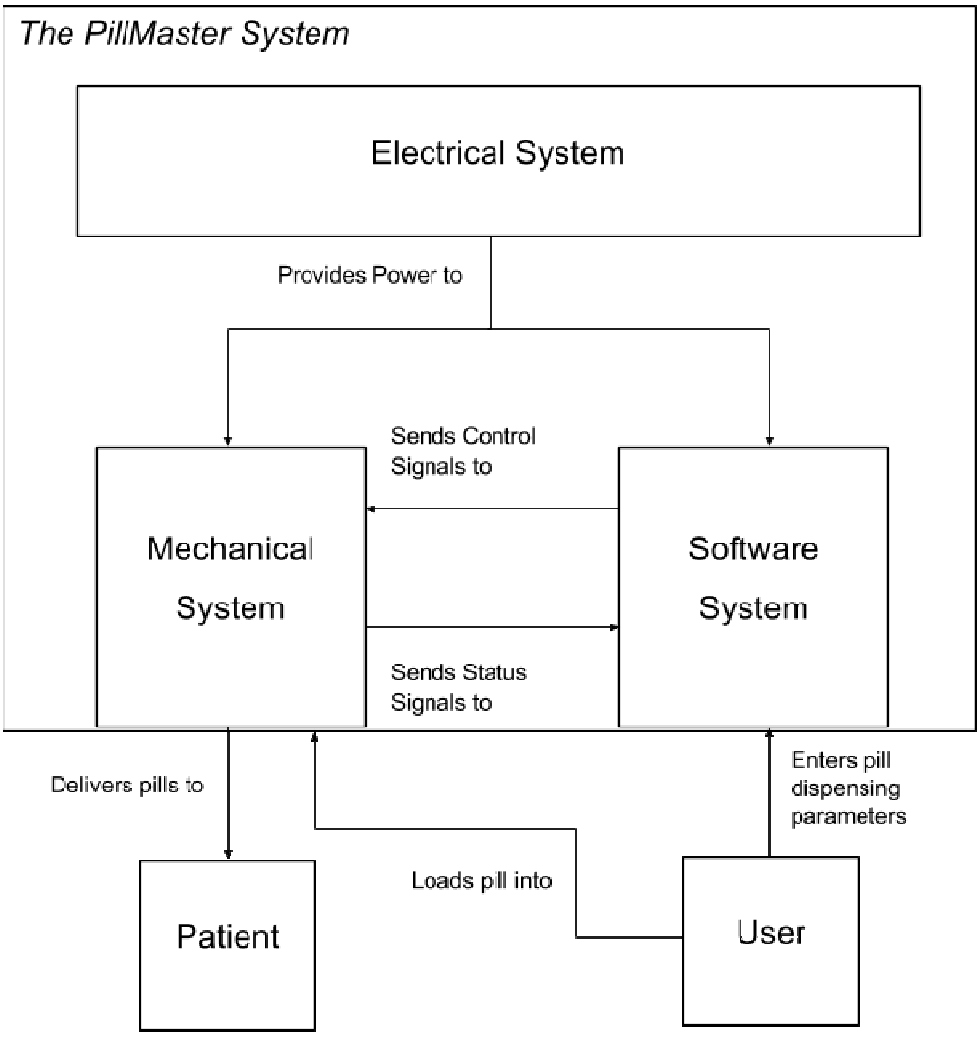


*Figure 1: PillMaster System Overview*

The *mechanical system* is the core of the device. This entity consists of the pill path, which is the path from the container to the exit that the pill takes. In addition, each of the modules of the pill path are driven by servo motors that rotates 180 degrees. The motors are controlled and scheduled by the software system. In addition the electrical system provides power for the motors.

The list of the pill path modules can be seen in Figure 2. Once the person has put the pill into the container, it can be dispensed using the rotation shaft. The servo motor rotates the shaft to carry the pill from the container from below. The pill is dropped into a slide that transports the pill in the correct orientation into the cutter pill slots.

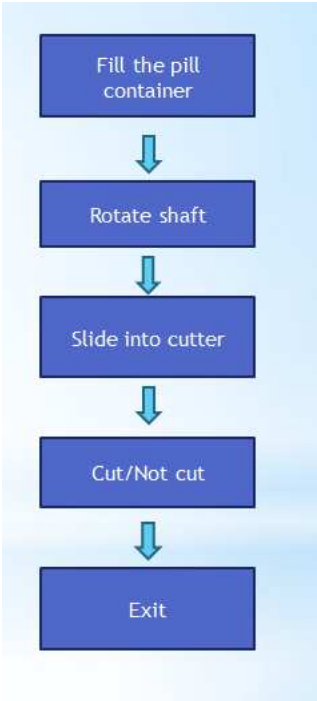


*Figure 2: Pill Path Modules*

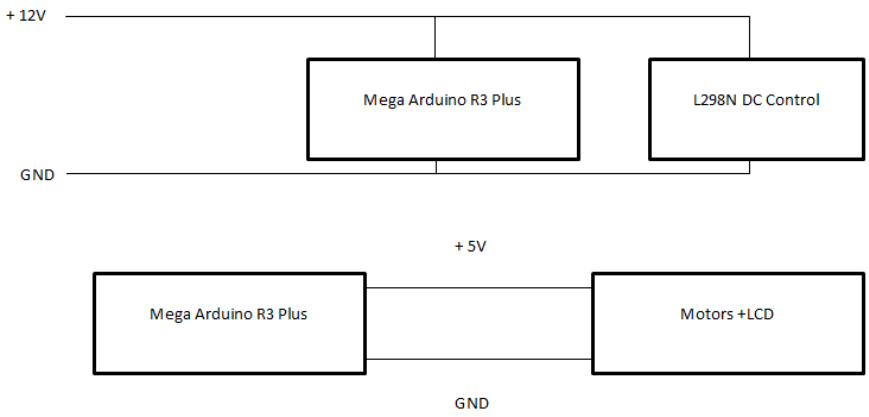


*Figure 3: Electrical System Overview*

The pill cutter closes its trapdoor using a servomotor, and proceeds to spin a saw blade mounted on a DC motor. Simultaneously, the arm holding the saw blade moves to cut the pill. Once the pill is cut, the trapdoor opens and the pill exits the device.

The *electrical system* consists of the power routing to the microcontroller board, the DC motor and the servomotors. The general schematic can be seen in Figure 3 below.

The system is fed 12 V coming from the wall. This voltage powers up the R3 Plus microcontroller and the DC Motor control and the DC motor itself. Then, the 5V supply from the microcontroller board is used to power the servomotors so that they can rotate smoothly. It mainly consists of wires and a proto-board to rout the signals to their appropriate destination.

The *software system* controls other components. It will monitor the time and input and then give corresponding responses. When there is no user interaction, the system will keep reading time from the real time clock and display the current time on screen, meanwhile, it also tracks schedules that stored in the memory to control the motors. the following figure shows it's design flow:

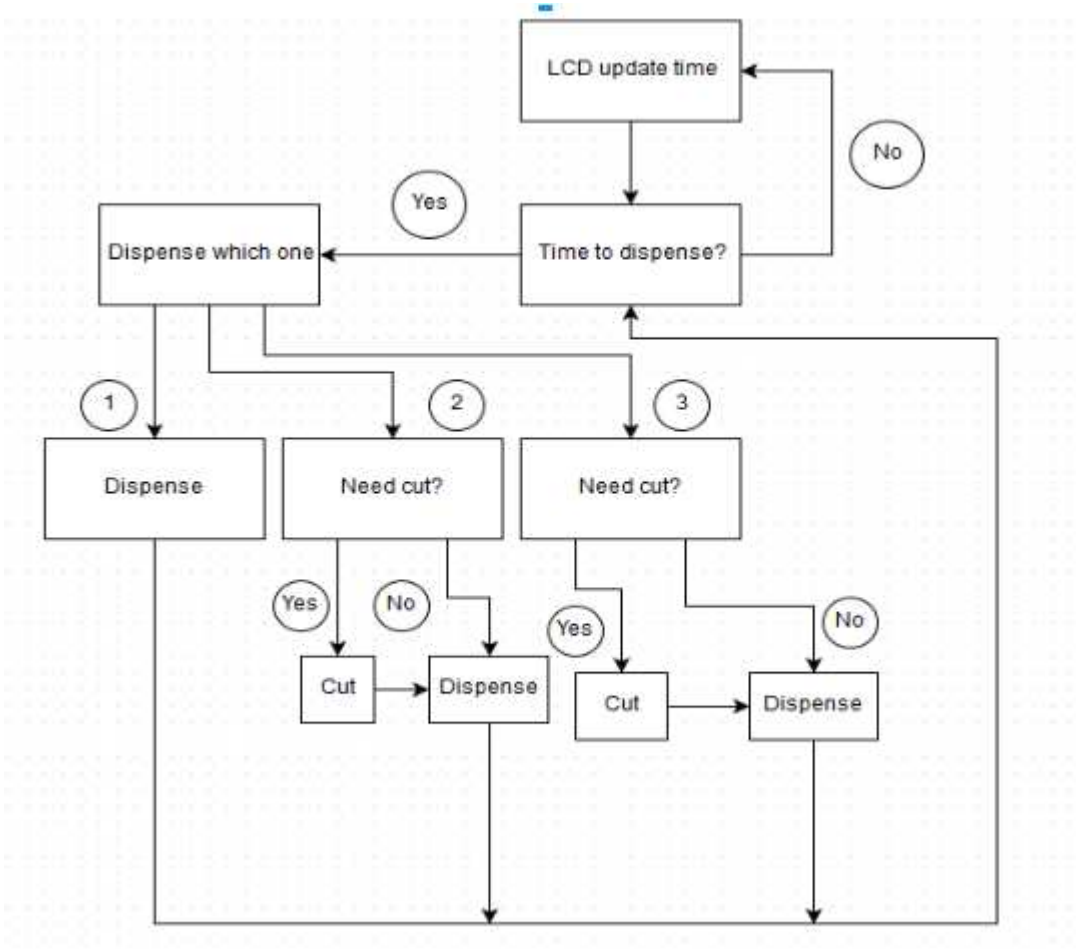


*Figure 4: Motor Control Flow Overview*

If there is user inputs, the system will display instructions on screen and store user's schedule in the memory. the following figure shows it's flow:

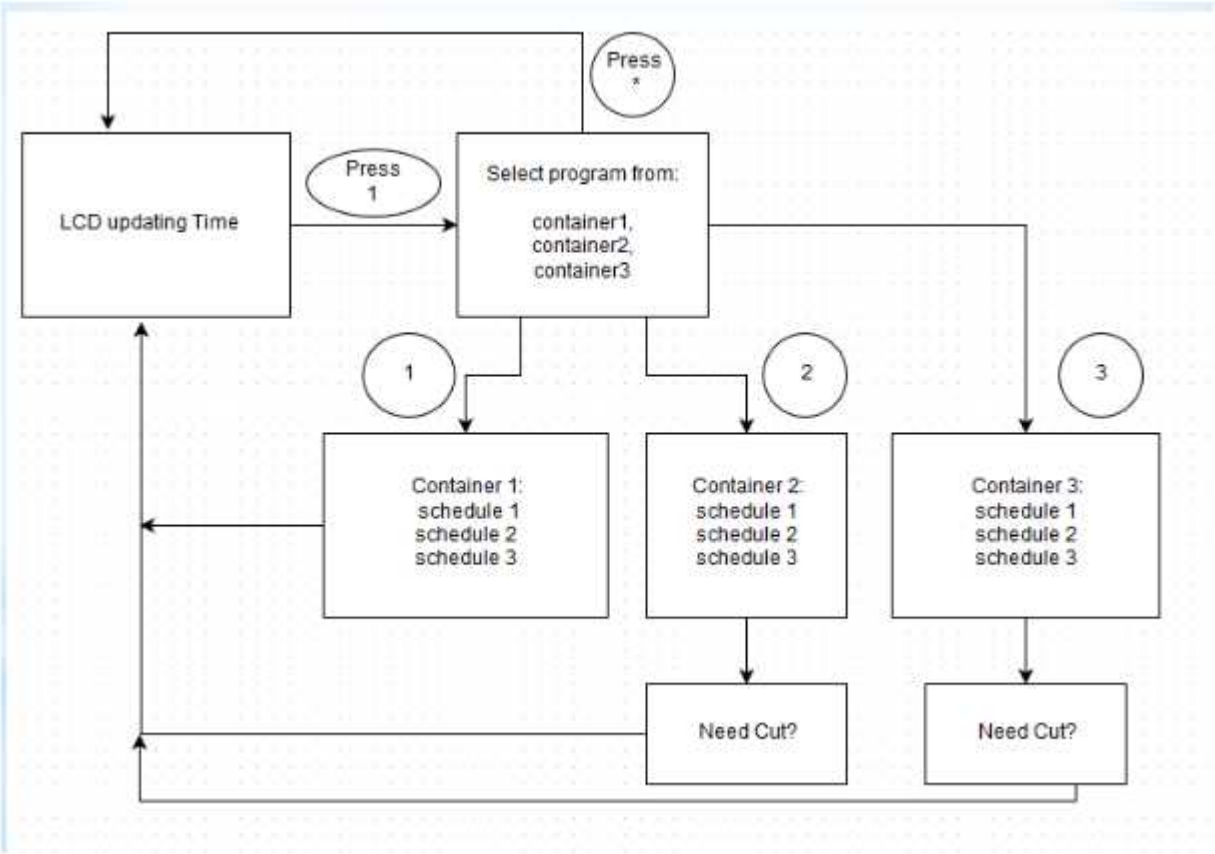


*Figure 5: User Input Flow Overview*

# 3 Components & Costs

Table 1 below describes the breakdown of the budget for the PillMaster. As of today we are over the initial budget of $450 by $35.50. We find this acceptable.

| Total Expenditures | $485.5 | | |
|---|---|---|---|
| Servo motors for the shaft x 3 | $36 | 12 keys keypad x 2 | $10 |
| DC motor | $17 | LCD screen and keypad panel | $26 |
| High torque servo x 2 | $70 | Cables | $18 |
| Saw blade | $11 | Infrared sensors x 3 | $30 |
| Black tube containers x 3 | $8 | Timer x 2 | $19 |
| Plastic tubes | $12 | Breadboard | $14 |
| Nuts and bolts | $30 | L298N Module of Arduino | $23 |
| Protoboard | $10 | Aluminum Screen | $16.50 |
| Connectors for coaxial plugs | $2 | Plastic boxes x 2 | $9 |
| Recycling bin for frame | $12 | Wood rod and screws | $12 |
| Microcontroller Mega 2560 R3 Plus | $70 | shaft connectors | $30 |
| ESSEF Funding | $450 | | |
| Total Remaining | -$35.50 | | |

*Table 1: Budget breakdown*

# 4 Schedule

As shown in Figure 1, we have mostly followed this schedule, completing this project on time. We divided our group into two smaller groups to work on the mechanical and programming at the same time. We were one week behind schedule due to some redesigning in the mechanical system. Specifically, the pill path had to be deconstructed and redesigned. We started integrating and testing each module as soon as they are done to ensure the proof of concept is delivered on time.

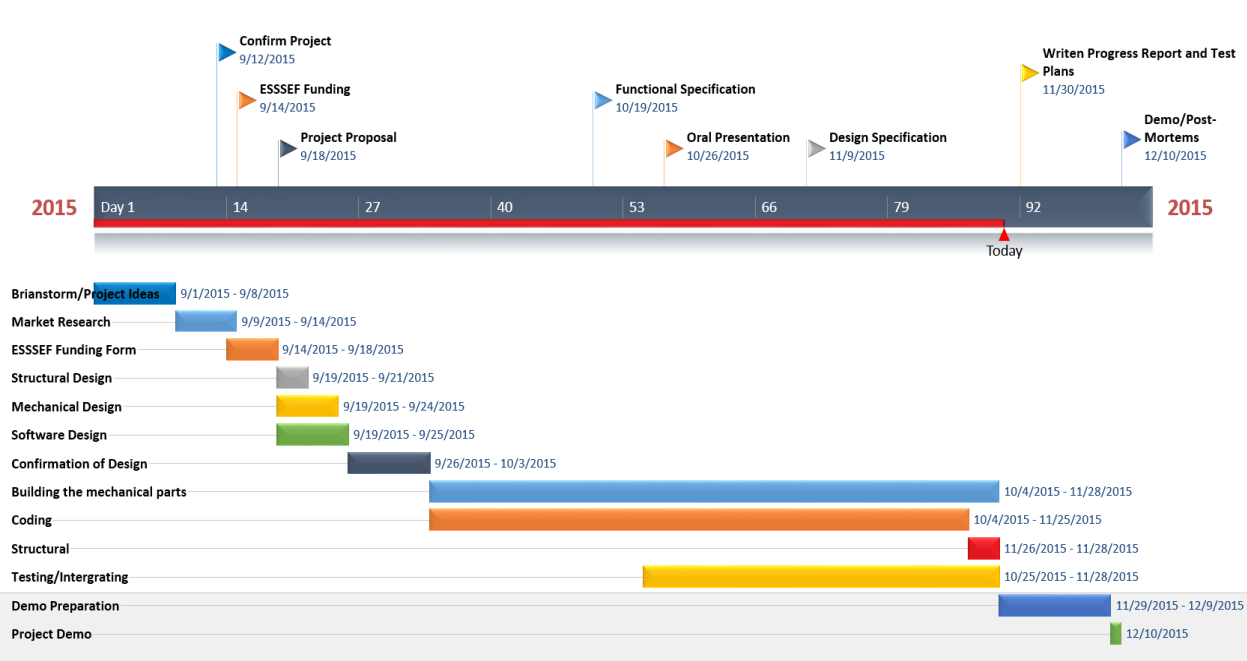


*Figure 6: Project Schedule*

# 5 Challenges

In this project we have faced several challenges. On the hardware side, the biggest problem we encountered is how to drop pills from containers one at a time. Not only the number of pills, the position of the pill needs to be in a “standing” position in order to cut across the longest axis.

To drop the pill one at a time, we made a hole the shape of each pill in wooden shafts in order to contain exactly one pill. Once rotated, the container sits on the shaft, so that a pill can enter the shaft hole. We then rotate the shaft by 180 degrees to dispense the pill. The problem then becomes how to let the pill properly slide into hole, located on the cutter, and remain in a standing position. Since there

is a positional shift between our container and the cutter, there needs to be a slide with tunnel that transports the pill from the shaft to the cutter.

Due to limitation of funding and material, we built this tunnel with recyclables when we constructed the case. There is a decent success rate, but we could not eliminate the possibility of incorrectly placing the pill or the possibility of the pill causing a jam.

On the software component, the biggest challenge we faced is how to bypass the limitation of Arduino microcontroller. Our functions required multi-tasking which is important for updating the current time on the LCD screen and also keeping track of keyboard input and control output simultaneously. However, our Arduino Mega 2560 microcontroller does not have the multi thread feature that can process more than one task at the same time. It's designed to have only one main loop and the loop occupied the only thread.

In order to implement our feature, we needed to pause one function in order to run another. For example when the microcontroller is controlling motor motion, the LCD time update is disabled. When the motor motion is complete, the time updating will resume its function.

# 6 Group Dynamics

DGMasters Inc. did not have explicit organization. We worked with the least amount of hierarchy as possible to avoid conflicts. Therefore, this section will discuss the nature of the team.

In terms of managing the tasks, we adopted the philosophy of "everyone is president of their own work". Each person would work in their area of interest. No one imposed tasks on other people. The only person who had the last saying on a task was the person who was responsible for it. If another person suggested a change or addition to the system, then they would be responsible to implement the change or addition. The most important value that we had as a team was the courage to tear apart designs and implementations in order to get the best results. We were very compliant with meetings and group work; furthermore, we helped and supported each other when needed.

DGMasters Inc. proved to be a very enthusiastic team. We could find a balance between our creative differences and come up with reliable and satisfactory designs. The team was very open to discussions and ideas. Furthermore, all the members were cooperative with the tasks they had to perform; nevertheless, we were critical of the results we obtained. Even though it resulted in more work to complete each task, the satisfaction of doing a good work was always present.

In terms of budget managing, we had restrictions on prices, but we allowed members to acquire what they needed. No one had power over anybody else about money and budget. However, everyone had to buy the components themselves and keep track of the money we were spending via receipts. Below is the work distribution table.

# 7 Workload Distribution & Individual Learning

Table 2 below shows the distribution of the workload.

| Task | | Jasmine Liu | Ritchie Kieu | Daniel Lan | Chris Xiao | Tony Lu | Jose Mendoza |
|---|---|---|---|---|---|---|---|
| Mechanical Design | Pill Cutter Design | | xxx | | xxx | | |
| | Pill Cutter construction and testing | | x | x | xxx | | x |
| | Frame design and construction | | x | xx | xx | | xx |
| | Motor timing design, implementation and testing | xxx | | | | xx | |
| | Slide Mounting | xx | xx | xxx | xx | | x |
| | Component Mounting | | x | xxx | xx | xx | xx |
| Electronics Design | Power distribution design | | | x | | x | xxx |
| | Power Distribution construction and testing | | | x | x | x | xxx |
| Software Design | LCD, Clock scheduler | xxx | | | | xxx | |
| Communication/ Organization | | xxx | xxx | | x | x | |

*Table 2 - Individual Load/Work Distribution Chart*

*(xxx = primary responsibility; xx = moderate responsibility; x = limited responsibility)*

## *Jasmine Liu*

Since I had come up with the idea of this project at the beginning of the semester, I was elected to be the CEO of our company and the project Team Lead. Some of my responsibilities included:

1) Delegating tasks
2) Organizing documents
3) Keeping the team on schedule
4) Communicating with all members to ensure everyone kept to the set goals
5) Making timelines
6) Keeping track of the meeting minutes
7) Setting up meetings as needed
8) Ensuring everyone held up their end of tasks

Our team of six was further subdivided into two smaller groups in order to focus on both the mechanical and software development aspects of the project simultaneously; I collaborated with Tony to develop the software while the rest of the team worked on the mechanical part. During this time, I gained proficiency in programming an Arduino board in Arduino(Language).

The microcontroller we implemented was to be used by the operator to control the motor at different times. The biggest challenge we faced while programming was coming up with the ideal plan/design for how the prototype would run without an actual product being made, i.e. we have to design our code in such a way that is flexible enough to be able to be changed but was also fully functional at the same time.

Once the semester was rounding up, the two smaller groups got together once again to integrate the modules and to test each module with the software, ensuring that they were compatible. During the merge, I helped with a part of the mechanical design where the pill would drop into cutter; this was somewhat tricky because the pill needed to drop in the cutter right side up for it to be cut.

Overall, I am really happy with the results of this project, as well as working with my teammates. Everyone was extremely helpful towards each other, and flexible with their time and roles, even when it meant working extra long hours on the weekend. The clear cut communication among the six of us was quite impressive; everyone knew what and how to complete their assigned tasks within the given time frame. On a personal level, I was able to to gain both technical and interpersonal skills such as project planning, time management, communication, developing prototype, programming, etc during the course of this project.

## *Jose Mendoza*

My role in this project varied a lot throughout the semester. I helped with the design of the frame and electronics mostly. I interfaced a lot with all the members of the team in terms of design ideas and implementations. Furthermore, I helped to evaluate the designs of the shafts to pick the pills, the pill cutter and the system as a whole. I provided suggestion to solutions of our problems and encouraged my peers into building their own prototypes. In addition, I helped in the building of prototypes for the shaft to transport the pills from the containers to the rest of the device. I also helped in the construction for prototypes of the slides to guide the pills into the cutter. I soldered the electronic components and routed the power to its correct location. Furthermore, I tested the functionality of each route with the help of the software team. It was a very dynamic role and I really enjoyed that.

The biggest challenge I had personally was the method of design that this course demands. During the whole semester I had the impression that a lot of the important design documentation had to be done before the construction of our proof of concept. However, I only have experience doing it after the prototype. For that reason, I had a lot of problems trying to put my design ideas into formal documentation since I had no physical model. Without a physical entity to encompass my design I oversaw several critical details of my design. For example, the size of the holes turned out to be more critical than I thought at first. When I was designing the shafts I always took the holes to fit the pills for granted and so I did not document properly for them.  That made this course very difficult for me, but it helped me consolidate my style of my design.

The Only thing I would have done differently is getting more engineering intuition. I lack the ability to think in simple terms and rely on software for errors in my design. I realized that such practice can only lead to unreliable devices. For this reason, I will be more curious and gain more knowledge on a wide array of fields. This course made me realize that I want to have skills that are broad and more general, rather than a specialized set of skills.

## *Daniel (Tian) Lan*

It has been a great experience to work as a part of DGMaster Inc. to create our PillMaster project. Throughout these four month, all while designing, integrating, developing, and testing, it has been a challenge for us to build our project. We began as 5 team members and ended up as 5 good friends.

At the beginning of this semester, we organized our group, with absolutely no idea what we were going to build. We discussed and brainstormed lots of fantastic ideas and we chose the pill dispenser as our Capstone project. The project workload and final expectations were high enough to complement our group of 6 people. I have to say it is my honor to work and study with these brilliant engineers. The success of our project is thanks to our entire team.

Since our project is divided into hardware and software parts, I was focusing on hardware mechanism part. I was primarily working with Jose, Chris and Ritchie for hardware design, assembly, debugging and testing. In my coop experience I gained a lot of software and hardware testing experience. I could apply these skills to testing and development on our final product. Also, I learned lots of hands on, mechanical skills like drilling, soldering, cutting from other team members. We faced many difficult problems throughout our project. We always provided a solution and prepared a backup plan.

Beside the technical skills, I realized the importance of teamwork and communication skills. Only efficient teamwork and communication could get our project done on time. Due to the importance of our Capstone project, we sacrifice most weekends to work on our project to ensure we were on schedule. I also learned to simultaneously contribute to work collaboratively using Google Docs.

Overall, I enjoyed working with my talented group members and completing our project within the timeline. The experience is really precious to me and I built lots of useful skills for my career. I am willing to work with them again on projects such as our PillMaster.

## *Lei (Chris) Xiao*

First of all, I have been exhausted over the past semester, but I am also very pleased. The difficulty and frustration of this project is way beyond my expectation. However, it was very exciting when we solve our problems and complete the project. I feel so lucky that I met Jose, Jasmine, Tony, Daniel and Ritchie, and formed a group together. They are always helpful and positive.

I am a fourth year electronics engineering student with experience of software and electronics. In this project, the most challenging part is the hardware and mechanism since we all don't have enough knowledge of mechanical engineering. Therefore, I mainly focused on mechanical design with Jose, Ritchie and Daniel. The core mechanism of our project is to dispense one pill per time. This simple mechanism caused much more problems than I expected. We have to dispense different types of pills and transport them into our pill cutter with precise angle and direction. When I was doing my co-op, I was just doing software testing and development. I never thought that the design process of hardware can be extremely hard. I have learned to use many kinds of tools to build the actual body and mechanism of this project. I have learned how to drill holes, cut wood and metal, and solder wires. I tried my best to deliver imagination and creativity for this project. I also improved my testing and debugging skills when I build different components. Every small component requires smart ideas and great number of testing.

Beside the technical skills that I have learned from this project, I also improved my communication skills and gained more experience of team work. We had to organize the meetings and share all the progress to each other. Furthermore, I improved my writing skills significantly since we finished several documents for our project. This project is more professional than the projects I have ever had before, I practiced a lot of presentation skills for our project demo.

My experience with DGMaster Inc. is precious to me. I enjoyed the journey with my teammates. I can never overcome the problems and failures without my team. Moreover, thanks to all the people who have provided us valuable advices.

## *Tony (Liangze) Lu*

Work with DGMaster's team is a great experience of learn and study. We distribute work, plan, discuss, make good ideas and bring ideas to reality through the past 4 month. We face challenges, handle different thought and unify the team with open mind and friendship. It is glad to work with these 5 amazing brothers and sisters that can be communicate free and wise.

My main task is focus on the software programming part to implement our plans and communicate with other components. The reason why I choose software is because in my past Co-op work I had done so many programming works that I think it is helpful for the team. I have learned to send signal to screen, control motors, handle memory, catch user input from keypad, read signal from other components and connect every components to the microcontroller.

However programming with microcontroller like Arduino is still a very new experience to me, it has more direct control to the mechanical part which means I need a clear communication with other groups, know their design, calibrate their work and ask for their advice when I write a certain function.

In fact I had problem during the programming that caused by misunderstanding of the other parts. Later when we figured it out, the program written does not match the mechanical part so we have to redesign either the mechanical or the program, sometimes even the whole mechanism. So this is one of the greatest thing I've learned in this project: teamwork, debate and communication are the most advanced skill to handle problem.

This will be one of the best experience of my life, I really wish to have another opportunity with my five good friends.

## *Ritchie Kieu*

At the beginning of this semester, our group started out the first weeks struggling to decide on a feasible, marketable, impressive, and challenging project. This is when we decided to construct an automated pill dispenser, our beloved PillMaster, and thus, DGMasters Inc. was born. Given a time frame of four months, we had to learn the ins and outs of designing the PillMaster by implementing the software component, electrical component, and unfamiliarly, the mechanical component. Though in unfamiliar territory, this did not stop us from doing our best. We were also able to apply our knowledge and skills that we accumulated throughout our years at SFU.

Building the PillMaster, I worked on developing the mechanical component with Chris - specifically the pill cutter and providing tools, supplies, and a place to work for the pill dispensing mechanism. I had never worked with servo motors, and dc motors, and the last time I had even touched any hardware tools was nearly half a decade ago in high school. Working on this part taught me the mechanical skills to work with these motors, the safety of working around tools and blades, and how challenging it can be to integrate this with the software component into a working model.

This project has also taught me the importance of communication, planning, and teamwork. Working in a large group on a multi-stage project for four months required lots of preliminary planning and excessive discussion in order to not fall behind our schedule. We did lots of research to ensure that our project would be useful and effective in its implementation. One thing I would have liked to have done differently, is to refer to the expertise of the TAs when we ran into a problem. Though I have asked some professionals for their advice, discussing this with the TAs who were more familiar with our situation would have saved us lots of time and agony, though we were able to solve most of our problems.

Overall, ENSC 440W/305W has been a pleasurable experience, and one that I will forever cherish. If not for this course, I may have never had the chance to work on a fun project with Jose, Chris, Tony, Daniel, and Jasmine. Throughout this course, I will never forget building these long lasting, important friendships. I want to thank each of them for their hard work and dedication in completing our PillMaster as DGMasters Inc.

# 8 Conclusion & Future Plans

This documentation explains the general function of our project, the PillMaster. The materials budget and the schedule, both estimated and actual are included. There was mutual assistance and excellent team communication. Documentation and workload was equally distributed and done as a team. This document also indicates problems that DGMaster Inc. had faced during the process. Most of the problems we faced are when we try to mount each part on the container and test the whole project. Every team member provides their own skills and efforts on the project in order to solve every problem as best we could. All members have sacrificed weekends and contributed to achieving our goal. Our Capstone project has been accomplished on schedule.

A project like the PillMaster requires a lot of attention and extra research. Steps for further development of the product would require field research of our target market. Furthermore, it would need more funding since we are out of budget. After a long discussion in the group the project was decided to disband. Half of the company already has different plans that require their total attention. The other half have to continue their studies in order to graduate. Consequently, it was decided that the team cannot provide the attention needed to finalize the product. As a result DGMasters Incorporated has been dissolved and will live as a pleasant memory.

# Appendix

**September 7 - 2:00-2:30 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda**: Decide on a project

**Minutes:**

A. Project idea pitches
Action: We have to vote on the following projects

- Electromagnetic gloves
- Pill Dispenser
- Food Warmer

B. Future meetings
Action: We decided that meeting Wednesdays are good for everyone

C. ESSEF Funding
Action: Jose needs to fill up the application

**September 14 - 2:00-2:30 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine

**Absent**: Daniel, Chris, Tony

**Agenda**: Discuss or proposal to Andrew

Minutes:

A. Ideas to make dispenser unique to the market: dispenser may prepare medicines for the user.
i.e.: shake, mix with water, crush, sign saying 'take as is'
Action: We need more discussion

B. Talk to Andrew about dispenser idea
Action: We went to his office and he liked the idea

C. Task assignment
Action: Jasmine and Tony are

D. ESSEF Funding specifics
Action: Jose needs to do the power point

**September 16 - 2:00-3:30 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Detailed overview of program

Minutes:

A. discuss specifically what dispenser needs to do (brainstorm and try to finalize)
Action: Created block diagram

B. problems it will solve (automating the Administering & Dispensing reducing human error)
Action: Made a list of the problems to solve

C. targeting one user at a time, many users current market products and how ours is better/different/more efficient than those
Action: Researched and discuss about the market

**Date: September 20 - 2:30-5:20 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Brainstorm implementation ideas

Minutes:

A. discuss specifically what dispenser needs to do
Action: Created more detailed block diagram

B. list of specific functions and expectations
Action: Created comprehensive list

C. ESSEF funding application form
Action: Revised the form

D. list all the parts we need
Action. Made preliminary list of components

**September 22 - 2:30-8:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Funding Presentation

Minutes:

A. ESSEF funding presentation
Action: Delivered Presentation

**September 23 - 2:30 - 4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Proposal document discussion

Minutes:

A. Proposal document division
Action: Everyone will decide what they will want to do in the document

B. division of labour
Action: Decide which modules we want to build

**September 28 - 6:30-7:00 p.m.**
**(SFU Lab 1)**

**Present**: Jose, Jasmine, Tony

**Absent**: Chris, Daniel, Ritchie

**Agenda:** Finish proposal documents

Minutes:

A. proposal editing
Action: Finished the proposal document

**October 7 - 2:30 - 4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Functional specs discussion

Topic:

A. Parts we ordered/brought
Action: Confirmed we received desired parts

B. function specs
Action: People will decide which art they will want to write

**October 15 - 2:30-4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Final work division

Minutes:

A. individual tasks get assigned to each person
Action: Work was divided as follows:

- Tony: Pressure sensor
- Ritchie & Chris: cutter
- Jose: Rotating shafts/motors
- Jasmine & Tony: Programming

**October 21 - 2:30-4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Discuss Progress so far

Minutes:

A. Progress
Action: Everybody presents what they have built so far

**November 9 - 2:30-4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Discuss progress and integration

Minutes:

A. Integrating software & hardware
Action: We tested hardware and software integration

B. problems we have so far on the mechanical/software team
Action: Discussed solutions for the problems

C. work schedule
Action: Discuss what to do in the next month

**November 11 - 12:00 - 1:50 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Discuss Progress

Minutes:

A. Discuss leftover stuff to do

Action: We decided what is left to do is the following:

- Cutter:
-tubing
-motor control speed
-automated gate control
-perfboard
-dust issue

programming:

-scheduling saving in memory
-servo motor rotation scheduling
-sensor signal displaying
-dc motor enabling + timing

framework:

-build rotating shafts
-tube/container/funnel mounting
-sizing
-sensor mounting

power:

-perfboards separated with a layer of thick plastic
-power to motor and microcontroller connections

**November 19 - 2:30-6:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Discuss Pill Dispensing Mechanism Problems

Minutes:

A. motors
Action: tested the software controlling the motors

B. rotating shaft
Action: Tested pill dispensing capabilities

**November 25 - 1:30 – 4:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Debugging

Topic:

A. servo motor timings
Action: Tested the scheduling modules

B. mechanical and software integration discussion
Action: Integrated only the servomotors

C. dc motor switch
Action: Tested the switch with wires soldered

**November 29 - 11:00 - 5:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Power Testing

Topic:

A. perfboard and dc motor switch integration
Action: Soldered the wiring

B. pill cutter testing and integration
Action: Tested and took videos

**December 4 - 1:00 - 5:00 p.m.**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Post Mortem document discussion

Topic:

A. post-mortem write ups
Action: Divided the sections between members

B. presentation preparation
Action: Started the powerpoint presentation

C. pill cutter testing and integration
Action: Mounted cutter

**December 8 - 1:30 - 9:30 p.m**
**(SFU Lab 1)**

**Present**: Ritchie, Jose, Jasmine, Chris, Daniel, Tony

**Absent**: None

**Agenda:** Demo Preparation

Topic:

A. System integration
Action: Final testing and videos

B. Presentation
Action: Rehearsed presentation and demo