Project 2 Final Reports

Thursday July 13, 2017

SHEN/VAGNETTI/ZHENG

Thanks to Nick Welch-Bolen and
Dr. Shane Johnson

Before writing your final report, ask yourself these three questions:

1. What are were trying to do?
2. Who are we trying to convince?
3. What do we want them to know?

ACTION VERBS

Improve the interest and accuracy of text by selecting action verbs
See list on Canvas

Before writing your final report, ask yourself these three questions:

1. What are were trying to do?
   a. To convince people that our project is worth investing in.

ACTION VERBS

Improve the interest and accuracy of text by selecting action verbs
See list on Canvas

Before writing your final report, ask yourself these three questions:

1. What are were trying to do?
   - To convince people that our project is worth investing in.
   - Be persuasive…How?
2. Who are we trying to convince?
   - Profs. Shen and Vagnetti.
   - Profs. Zheng and Vagnetti

ACTION VERBS

Improve the interest and accuracy of text by selecting action verbs
See list on Canvas

Before writing your final report, ask yourself these three questions:

1. What are were trying to do?
   - To convince people that our project is worth investing in.
2. Who are we trying to convince?
   - Profs. Shen and Vagnetti.
   - Profs. Zheng and Vagnetti
3. What do we want them to know?
   - A detailed description of a project that solves a problem AND details how that solution was achieved.

Cover Slide

Table of Content

ZHENG

REVISED: SYMPOSIUM CONTENT

- Introduction
  - Problem -Problem Statement +Engineer Goal
  - Need -Constraints + Criteria
- Objectives
  - Methods to address the needs
  - Design to solve the problem
- Solution
- Tasks
- Schedule
- Budget
- Risk
  - Discuss any factors that may cause the proposed solution to fail or not work properly and any remedies if given more resources and time.
- Preliminary Results
  - Provide any results and a video showing a recorded demonstration of your product.

  A live demonstration of your real product during the presentation is not required but will receive bonus points.
- Conclusion
- Thank you

COVER PAGE

CONTENT PAGE

ZHENG

PROJECT TWO: FINAL REPORT

SHEN

REVISED: SYMPOSIUM CONTENT

Cover Slide

- Introduction
  - Problem: Problem Statement + Engineering Goal
  - Need: Criteria and Constraints
- Objectives
  - Methods to address the needs
  - Design to solve the problem
- Solution
- Tasks
  - Expected/projected difficulties
- Schedule
- Budget
- Conclusion
- Thank you

SHEN

PROJECT TWO: FINAL REPORT

- COVER
- CONTENT

1. Executive Summary
2. Introduction
    2.1 Problem -Problem Statement +Engineer Goal
    2.2 Need: Constraints + Criteria
3. Objectives
    3.1 Methods to address the needs
    3.2 Design to solve the problem
4. Solution
5. Tasks
    5.1 Expected/projected difficulties
6. Schedule
7. Budget
8. Key Personal
9. References
10. Appendix

EXECUTIVE SUMMARY

- The Executive Summary summarizes the entire report
- People who will not read the entire report will read the Executive Summary instead
- Because of this, you must pay careful attention to the Executive Summary
- Although the Executive Summary comes first, it is usually written last

EXECUTIVE SUMMARY

1. One paragraph long
   - No references
   - No bullet points or numbered lists

EXECUTIVE SUMMARY

Background

- What is your motivation for this report?

Purpose of the project

- What problem are you addressing?

Procedure

- How you will develop your product?

Results

- How your product will solve the problem?

Significance

- Who will benefit from having this problem solved?

INTRODUCTION

- Introduce your organization (i.e., your team)
- Provide a mission statement so your readers know who you are and what you do
- Describe your organization's abilities
- Provide evidence that your organization is competent and up to the task set forth in the Executive Summary

PROBLEM

A. Statement of the Problem
B. Summary of the Problem

PROBLEM (A)

1. Statement of the Problem
2. Engineering Goal

Possible information to include

- Length of time there of concern
- Whether problem has ever been addressed before, and what the outcome was
- Impact of the problem on the target population
- Impact of the problem on surrounding populations
  - Include statistics and data (citations!)
  - This statement will be ½- to 1-page long

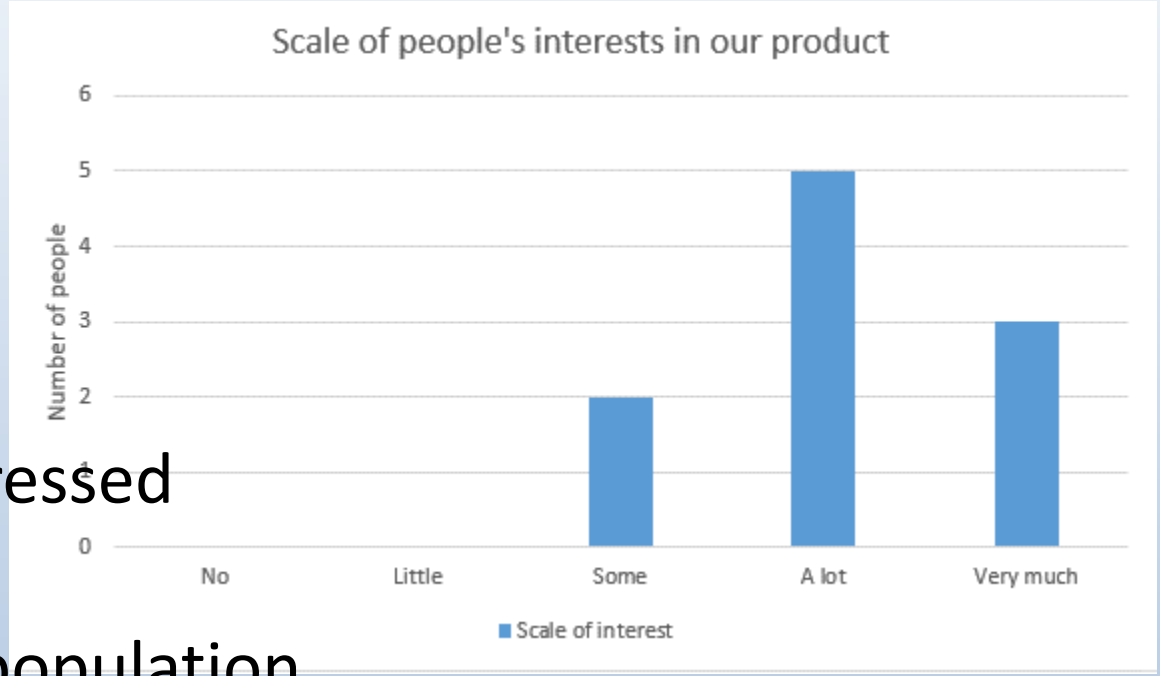


Figure 3: Survey Results 1

This is not a figure: What is it?

PROBLEM (B)

Summary of Problem

- End the Problem section with a bullet-point summary of the most important problems
- Use **Bold** Font

NEEDS

1. Identify the needs to be addressed
2. Needs are EXPRESSED in Constraints + Criteria
3. Needs exactly match the problem
   - Use a bullet list
   - Use **bold** font
   - Single space
   - Should be ¼- to ½-page long

OBJECTIVES

1. Methods to address the needs
   - What cutting edge technology will be used to address the needs?
     - State the desired goals and objectives to address the needs stated in the sections above
     - **Include the key benefits of reaching your stated objectives**
     - Each objective must have a correspond **task!**
     - Describe the objectives and the benefits in 1 or 2 sentences

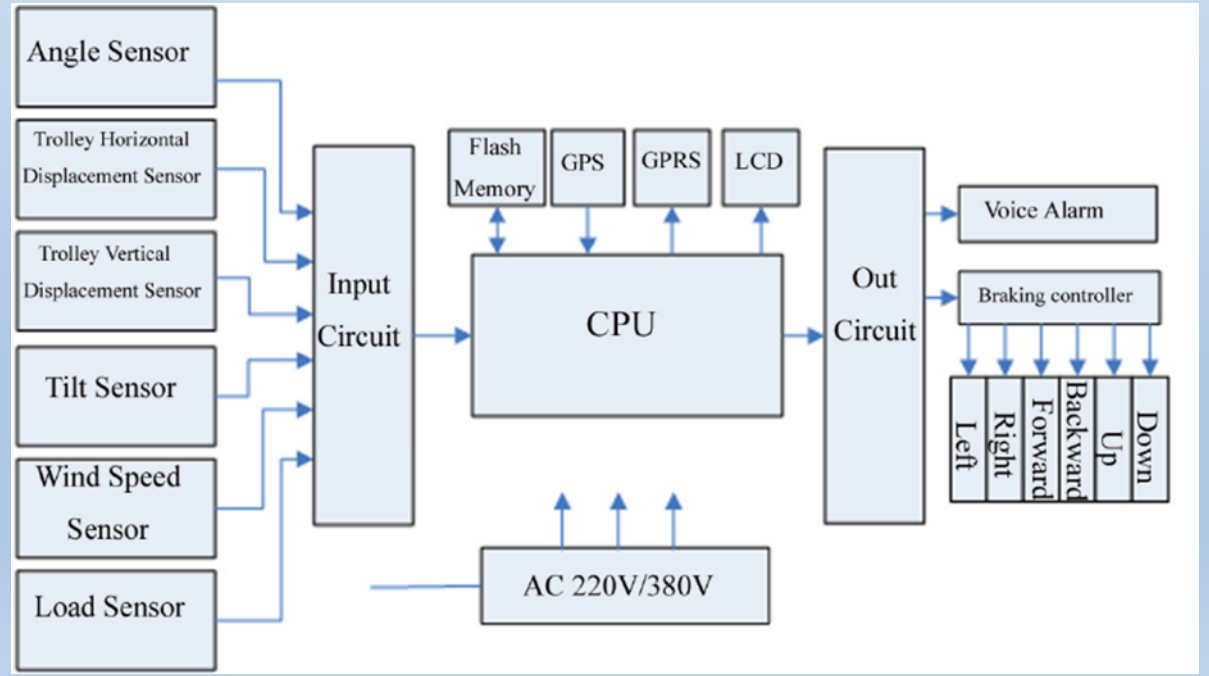
OBJECTIVES

2. Design to solve the problem

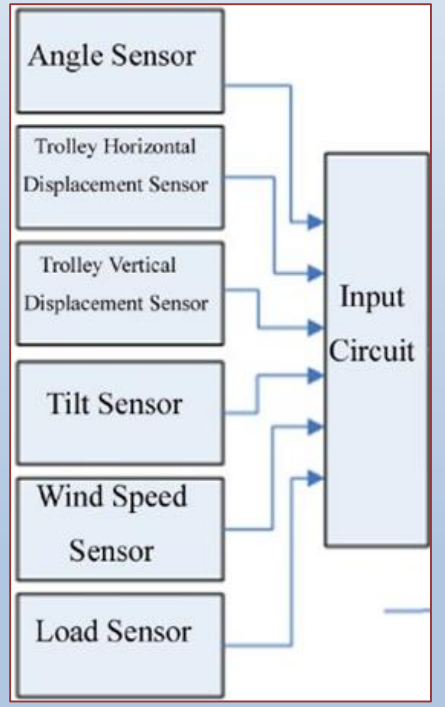
– What are the functional components of the system?

– Describe how each component relates to the system

– Provide Visuals of the system



over view



close-up

THE SOLUTION … (Project Name)

1. Start with a numbered list of what your solution entails in **bold**
2. Describe the functional components of your proposed system and how they work
3. Give details about its functional components
   - The description should be 1-2 pages long
   - Provide equations, experimental results, quotes from the other scientists or other technical details (anything that helps prove that your system will work—citations!)
   - Be persuasive

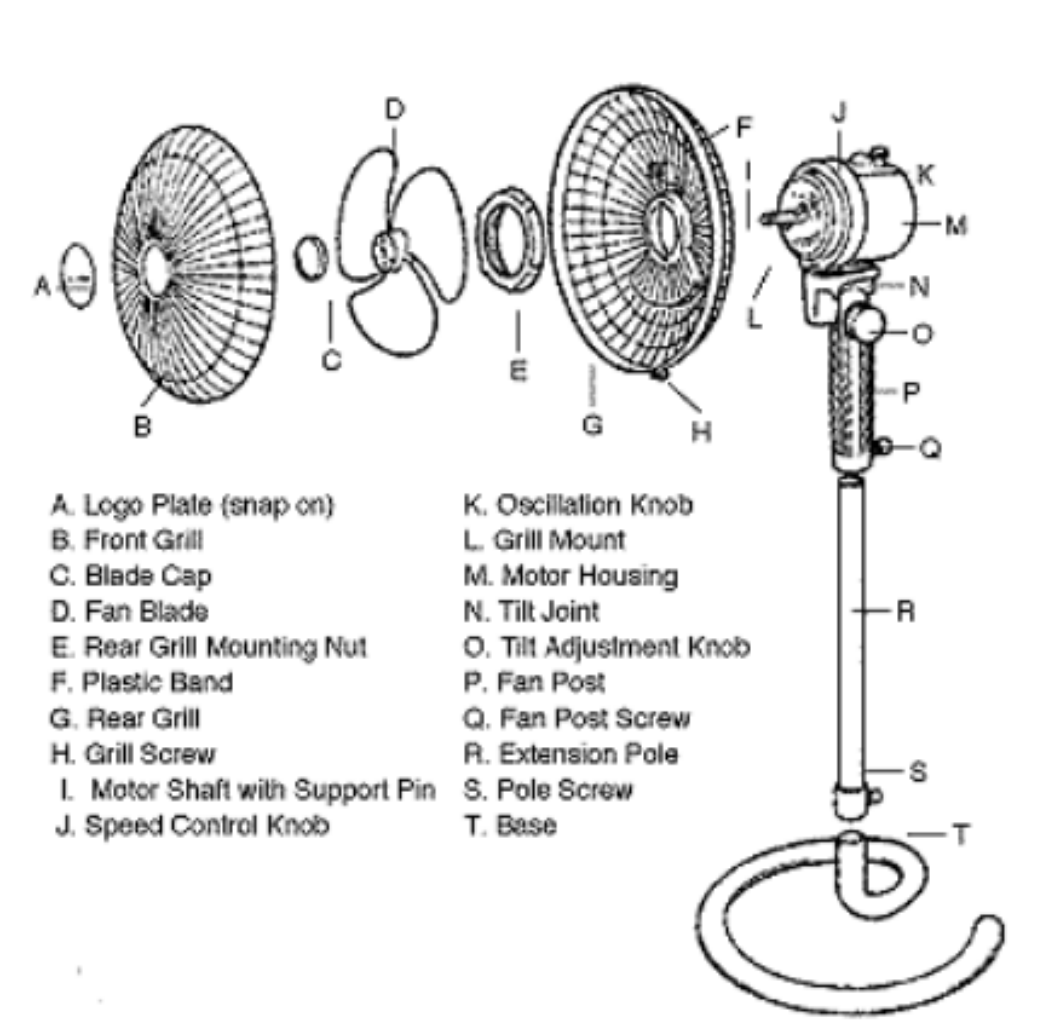
THE SOLUTION … (Project Name)

Concept Diagrams

- Address all the functional components within the figure
- Give the reader a basic understanding of the project
- Be consistent (use the same font, use similar sizes for diagram labels and shapes, such as arrows)

SOLUTIONS

Exploded View and/or 3D CAD



http://www.mit.edu/course/21/21.guide/grf-expl.htm

Exploded views show the components of an object slightly separated by distance and their relation or order of assembly. They are useful for quick, at-a-glance introduction of complex objects but do not allow you to focus on parts of the apparatus.

TASKS

- Begin by describing what this section will discuss, show a flow diagram, then discuss each task in detail
- Provide detailed information about your procedures and the scope of your work
- Include information on activities such as recruiting and training personnel, testing, and actual work required

TASKS

Task Flow Diagram

A simple image that schematically guides the reader to the final deliverable of your project

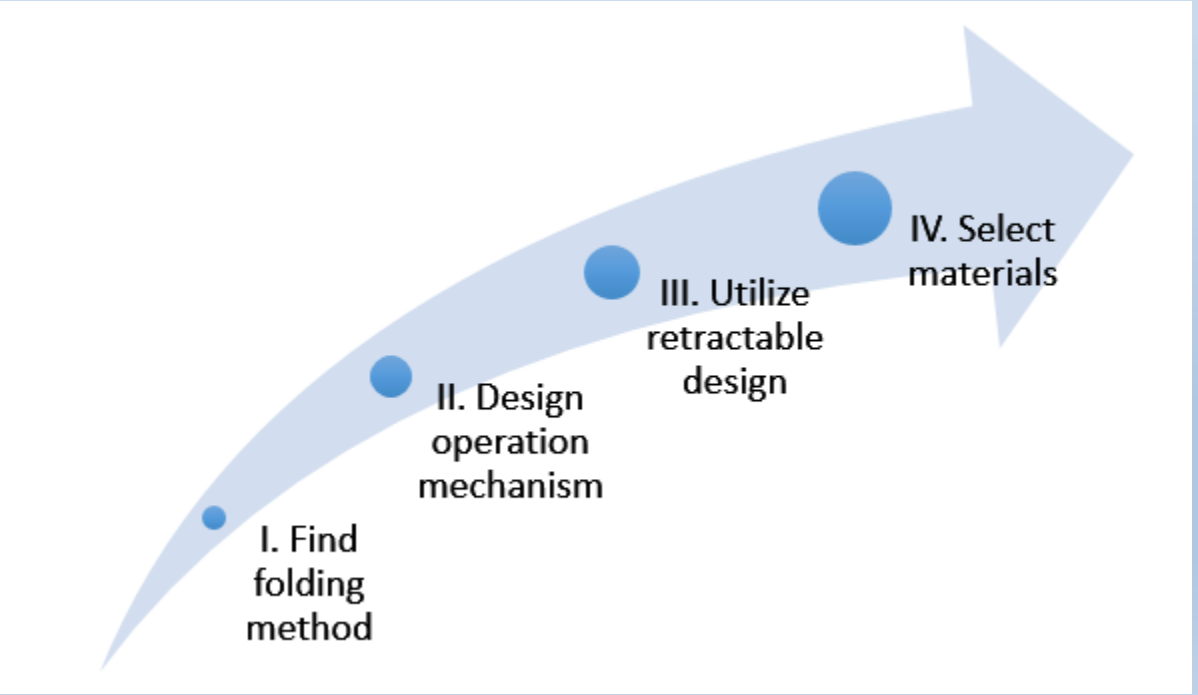


Figure 24: Task Flow Diagram of the Automatic Folding Machine

TASKS

1. Tasks must match their corresponding **Objectives**
2. Discuss each task in detail
   - Each task description should be 1-2 paragraphs long
   - Use a figure to visually demonstrate the task

TASKST Proposals

Task 1: Develop computational fluid dynamics model in ANSYS Fluent, including both the airbag, human, seat (with connectivity to the vehicle frame)

The bag will first be analyzed such that the effect of different bag materials may be analyzed.

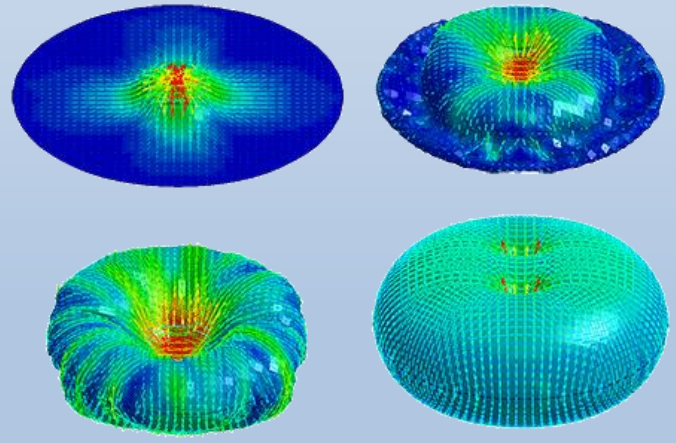


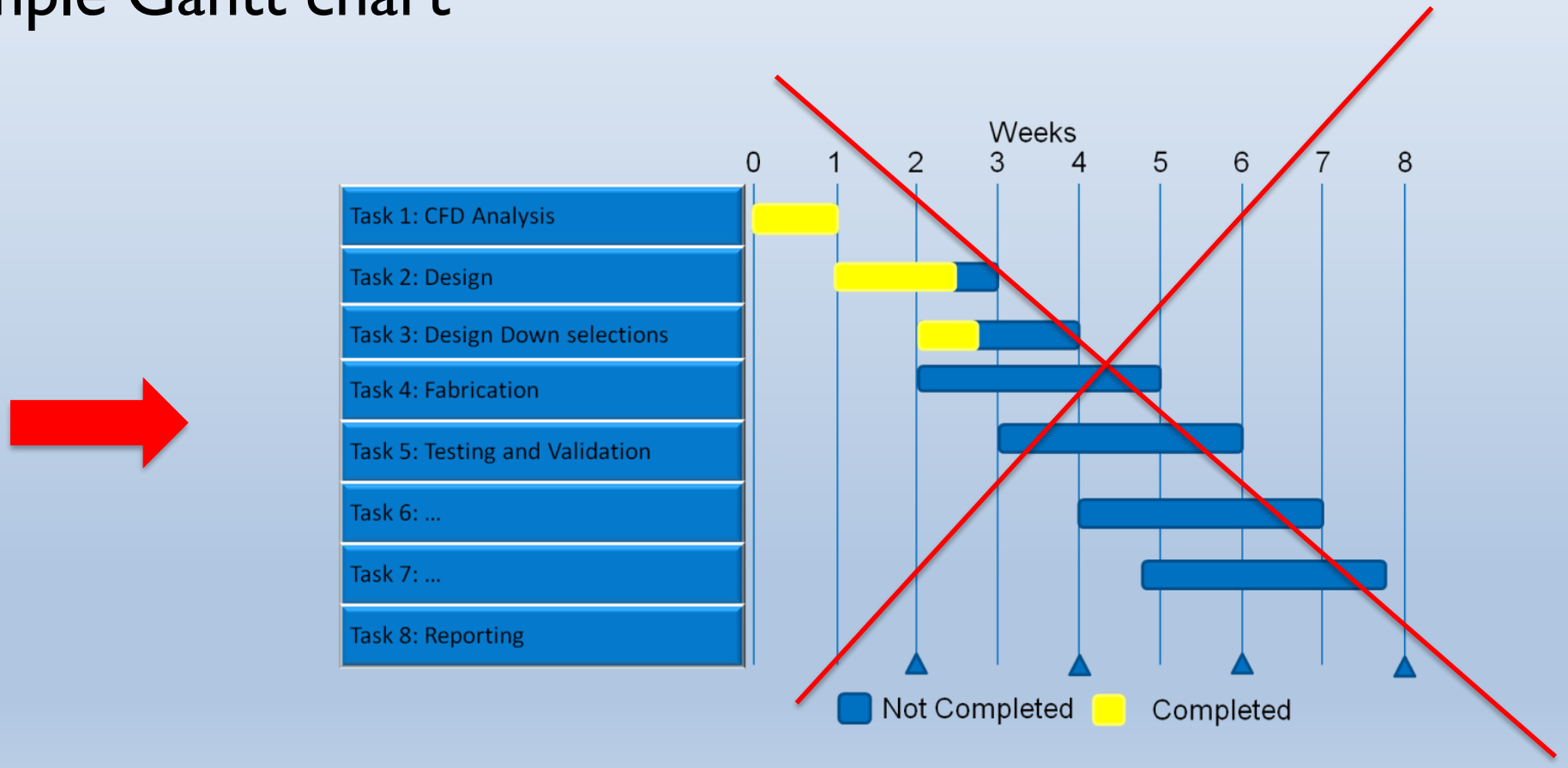
Figure 4: Airbag computational fluid dynamics analysis

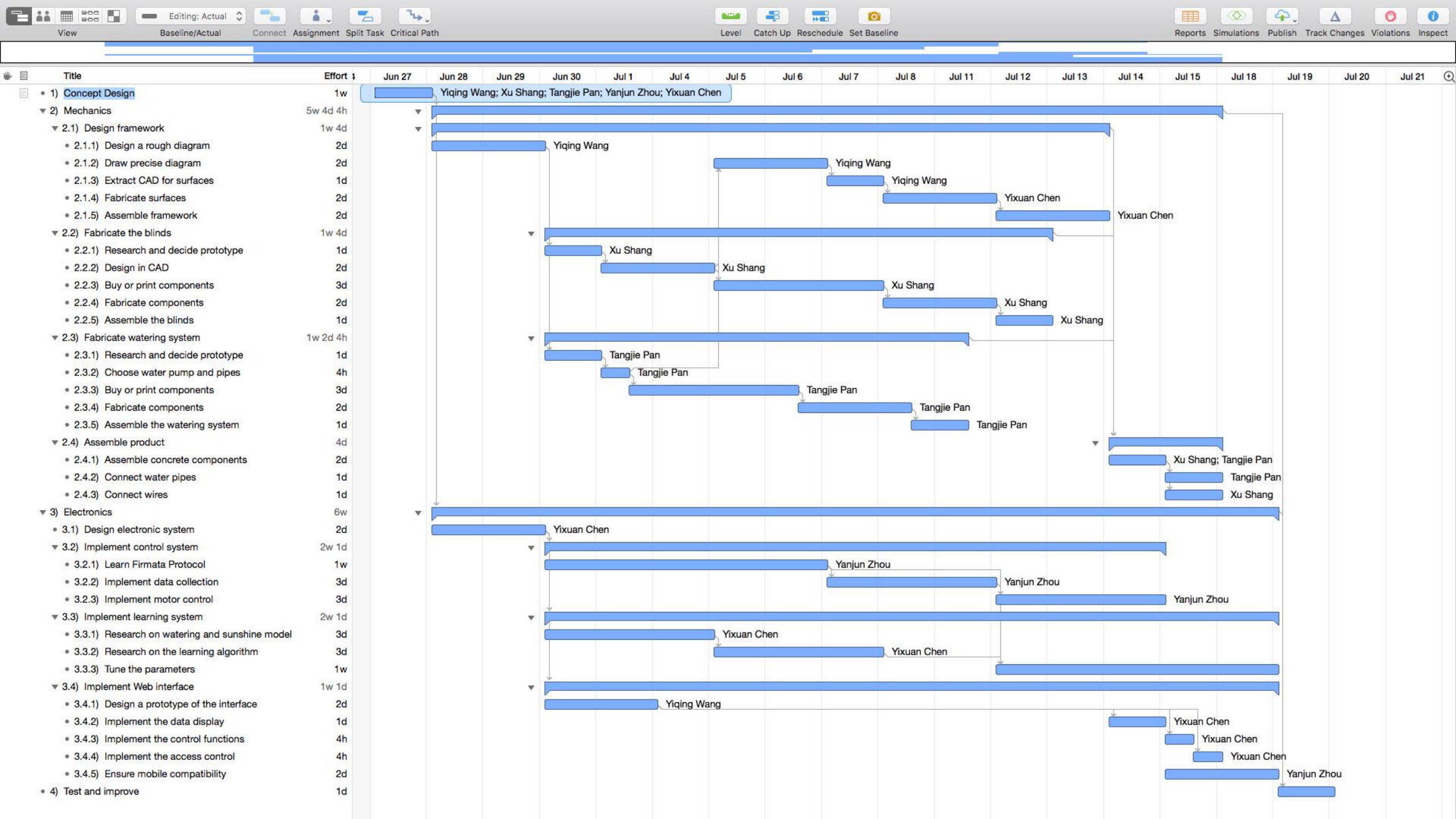
SCHEDULE

1. Provide detailed information on the expected timetable for the project
2. The time for completion of each task should correspond **exactly** to the tasks previously described

SCHEDULE

Sample Gantt chart




View
Baseline/Actual
Editing: Actual
Connect
Assignment
Split Task
Critical Path
Level
Catch Up
Reschedule
Set Baseline
Reports
Simulations
Publish
Track Changes
Violations
Inspect
Title
Effort
Jun 27
Jun 28
Jun 29
Jun 30
Jul 1
Jul 4
Jul 5
Jul 6
Jul 7
Jul 8
Jul 11
Jul 12
Jul 13
Jul 14
Jul 15
Jul 18
Jul 19
Jul 20
Jul 21
1) Concept Design 1w
Yiqing Wang; Xu Shang; Tangjie Pan; Yanjun Zhou; Yixuan Chen
2) Mechanics 5w 4d 4h
2.1) Design framework 1w 4d
2.1.1) Design a rough diagram 2d
Yiqing Wang
2.1.2) Draw precise diagram 2d
Yiqing Wang
2.1.3) Extract CAD for surfaces 1d
Yiqing Wang
2.1.4) Fabricate surfaces 2d
Yixuan Chen
2.1.5) Assemble framework 2d
Yixuan Chen
2.2) Fabricate the blinds 1w 4d
2.2.1) Research and decide prototype 1d
Xu Shang
2.2.2) Design in CAD 2d
Xu Shang
2.2.3) Buy or print components 3d
Xu Shang
2.2.4) Fabricate components 2d
Xu Shang
2.2.5) Assemble the blinds 1d
Xu Shang
2.3) Fabricate watering system 1w 2d 4h
2.3.1) Research and decide prototype 1d
Tangjie Pan
2.3.2) Choose water pump and pipes 4h
Tangjie Pan
2.3.3) Buy or print components 3d
Tangjie Pan
2.3.4) Fabricate components 2d
Tangjie Pan
2.3.5) Assemble the watering system 1d
Tangjie Pan
2.4) Assemble product 4d
2.4.1) Assemble concrete components 2d
Xu Shang; Tangjie Pan
2.4.2) Connect water pipes 1d
Tangjie Pan
2.4.3) Connect wires 1d
Xu Shang
3) Electronics 6w
3.1) Design electronic system 2d
Yixuan Chen
3.2) Implement control system 2w 1d
3.2.1) Learn Firmata Protocol 1w
Yanjun Zhou
3.2.2) Implement data collection 3d
Yanjun Zhou
3.2.3) Implement motor control 3d
Yanjun Zhou
3.3) Implement learning system 2w 1d
3.3.1) Research on watering and sunshine model 3d
Yixuan Chen
3.3.2) Research on the learning algorithm 3d
Yixuan Chen
3.3.3) Tune the parameters 1w
3.4) Implement Web interface 1w 1d
3.4.1) Design a prototype of the interface 2d
Yiqing Wang
3.4.2) Implement the data display 1d
Yixuan Chen
3.4.3) Implement the control functions 4h
Yixuan Chen
3.4.4) Implement the access control 4h
Yixuan Chen
3.4.5) Ensure mobile compatibility 2d
Yanjun Zhou
4) Test and improve 1d

BUDGET

- State the costs and budget of the project
- Use a table for visual clarity

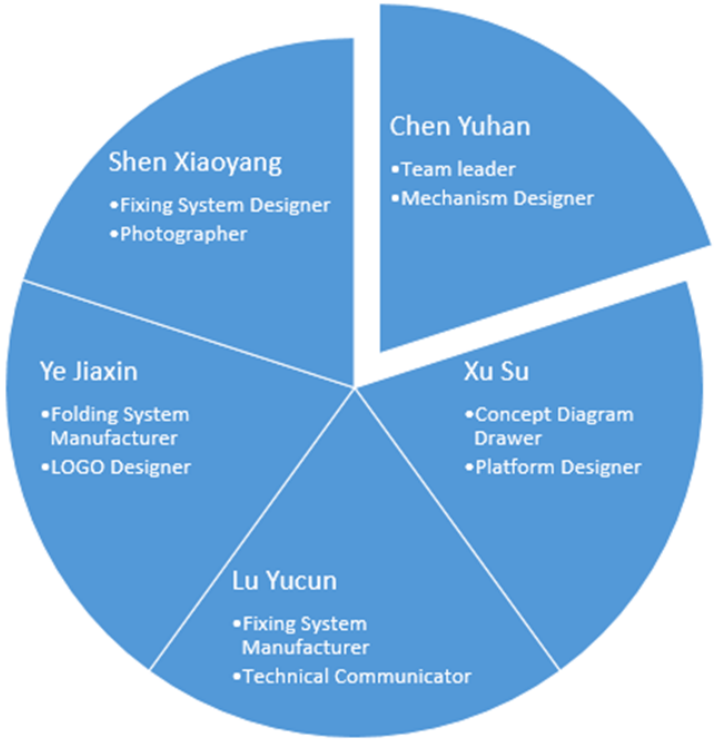
The overall budget is 815.75 RMB, the detail of which is shown in the figure 38. The Folding System takes up around half of the total cost, since the four high-power digital servos in them are quite expensive. In general, the budget reaches our expectation of making a product which is affordable for ordinary families.

NO.	item	quantity	unit price (RMB)	link
Fixing System (71.36 RMB)				
1	D-shape axle	2	2	https://item.taobao.com/item.htm?spm=a210c.1.0.0.IbqfCW&id=534116838493
2	axle coupler	2	6	https://item.taobao.com/item.htm?spm=a210c.1.0.0.yPW3nj&id=44872348141
3	N20 DC geared motor	2	19.8	https://item.taobao.com/item.htm?spm=a210c.1.0.0.tQhlQZ&id=42709192047
4	1103 plastic connecting rod	10	0.6	https://item.taobao.com/item.htm?spm=a1z09.2.0.0.EpnS6e&id=43818790305&_u=12gnd6bj1327
5	3m steel tape	2	4.88	https://detail.tmall.com/item.htm?id=38325328300&spm=a1z09.2.0.0.EpnS6e&_u=12gnd6bjfba2&skuId=3169922070723
Folding System (456.49 RMB)				
6	aluminum profile 4040	1	28.49	https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.T8D1Y8&id=14125464606
7	4040 corner fittings	10	1.8	https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.0aqD0D&id=14301056852
8	NSK bearing	15	1.2	https://item.taobao.com/item.htm?spm=a210c.1.0.0.Jgp5jM&id=521473266232
9	SCX10 20 kg digital servo	4	98	https://item.taobao.com/item.htm?spm=a210c.1.0.0.b0FmhF&id=41821157773
Platform (185.9 RMB)				
10	Positioning screw rod motor	2	38	https://item.taobao.com/item.htm?spm=a210c.1.0.0.HHmJzY&id=529651923949
11	M3 Hexagon pillar	10	0.39	https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.6b7IfV&id=21907987502
12	42 stepper motor	1	35	https://item.taobao.com/item.htm?spm=a210c.1.0.0.8vNwgp&id=520850137972
13	7075 aluminum alloy rod	2	10	https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.8RQ875&id=38959338814
14	Acrylic board	1	35	https://item.taobao.com/item.htm?spm=a210c.1.3.4.vrAPAl&id=16006379584
15	screw rod	1	16	https://item.taobao.com/item.htm?spm=a210c.1.0.0.sTBQSk&id=38101656826
Power (45.5 RMB)				
16	220V to 12V60W DC transformer	1	28	https://item.taobao.com/item.htm?spm=a210c.1.0.0.fBE0RZ&id=523363071628
17	5A75W Adjustable step-down module	1	12	https://item.taobao.com/item.htm?spm=a210c.1.0.0.oVRrXl&id=528052179442
Control (61.5 RMB)				
18	Arduino MEGA2560 R3 board	1	55	https://item.taobao.com/item.htm?spm=a210c.1.0.0.kCfpgA&id=42152345290
19	L298N motor driver board	1	6.5	https://item.taobao.com/item.htm?spm=a210c.1.0.0.7yFr2r&id=523249786903
Total: 815.75 RMB				

KEY PERSONNEL

- List key personnel involved in the project
- Use an organizational tree for visual clarity
- State who is responsible for which tasks in the development of your proposed idea

Chen Yuhan: Team leader; Mechanism Designer
Xu Su: Concept Diagram Drawer; Platform Designer
Lu Yucun: Fixing System Manufacturer; Technical Communicator
Ye Jiaxin: Folding System Manufacturer; LOGO Designer
Shen Xiaoyang: Fixing System Designer; Photographer



REFERENCES

- List references using ASME citation format

[1] https://item.taobao.com/item.htm?spm=a210c.1.0.0.IbqfCW\&id=534116838493

[2] https://item.taobao.com/item.htm?spm=a210c.1.0.0.yPW3nj\&id=44872348141

[3] https://item.taobao.com/item.htm?spm=a210c.1.0.0.tQhIQZ\&id=42709192047

[4] https://item.taobao.com/item.htm?spm=a1z09.2.0.0.EpnS6e\&id=43818790305\&_u=12gnd6bj1327

[5] https://detail.tmall.com/item.htm?id=38325328300\&spm=a1z09.2.0.0.EpnS6e\&_u=12gnd6bjfba2\&skuId=3169922070723

[6] https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.T8D1Y8\&id=14125464606

[7] https://detail.tmall.com/item.htm?spm=a220l.1.a22015.4.0aqD0D\&id=14301056852

[8] https://item.taobao.com/item.htm?spm=a210c.1.0.0.Jgp5jM\&id=521473266232

APPENDIX

- Provide supporting material for your proposal, where necessary

1. GANTT CHART
2. Coding
3. Purchase list