

The Dumpling Maker

EDSGN 100

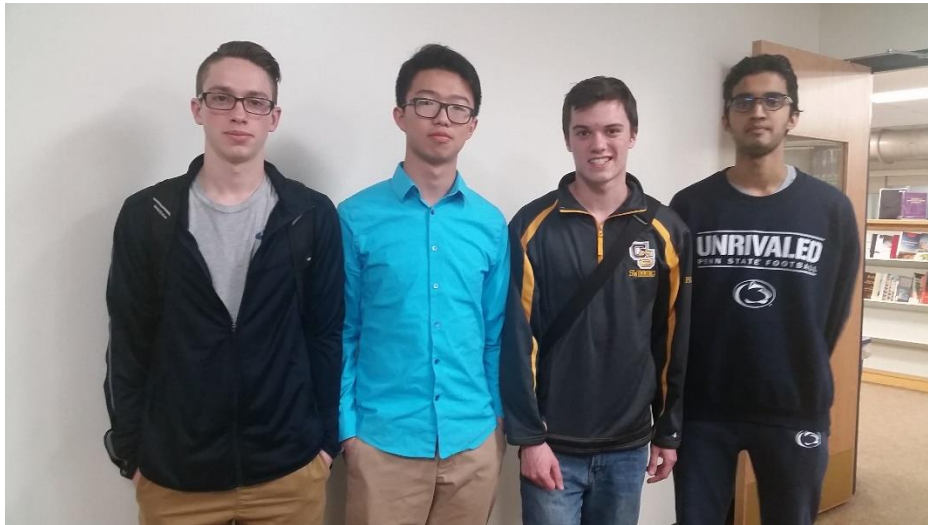
Section 009

Team 8

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http://www.personal.psu.edu/bnc5169/edsgn100/myWebPage/edsgn100_sp16_section009_team08_dp1.pdf



Abstract (Brendan Clarke)

This is the first project to showcase our work throughout the Introduction to Engineering. Covering the design process our team used to develop an automatic dumpling maker, this lab report will display the process fully supported by design plans, tables, and graphs.



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Introduction ([Brendan Clarke](#)):

As the first design project for the EDSGN 100 course, each group had to design and construct a prototype of a dumpling maker. Dumplings are a type of Chinese food consisting of a certain filling wrapped around a dough. The dumpling maker has to be considerate of and appropriate for either household or professional use (restaurant).

Description of Design Task:

Problem Statement ([Roshana Molligoda](#)):

Dumplings are of great demand at Chinese restaurants and local households. However, the problem is that they require a great amount of skills and time to cook.

Mission Statement (Brendan Clarke):

The mission is to design an automatic dumpling maker that produces up to ten dumpling per minute while keeping the dumpling maker cost-efficient, dishwasher safe, and safe for use. The dumpling maker should be usable in both personal and restaurants.

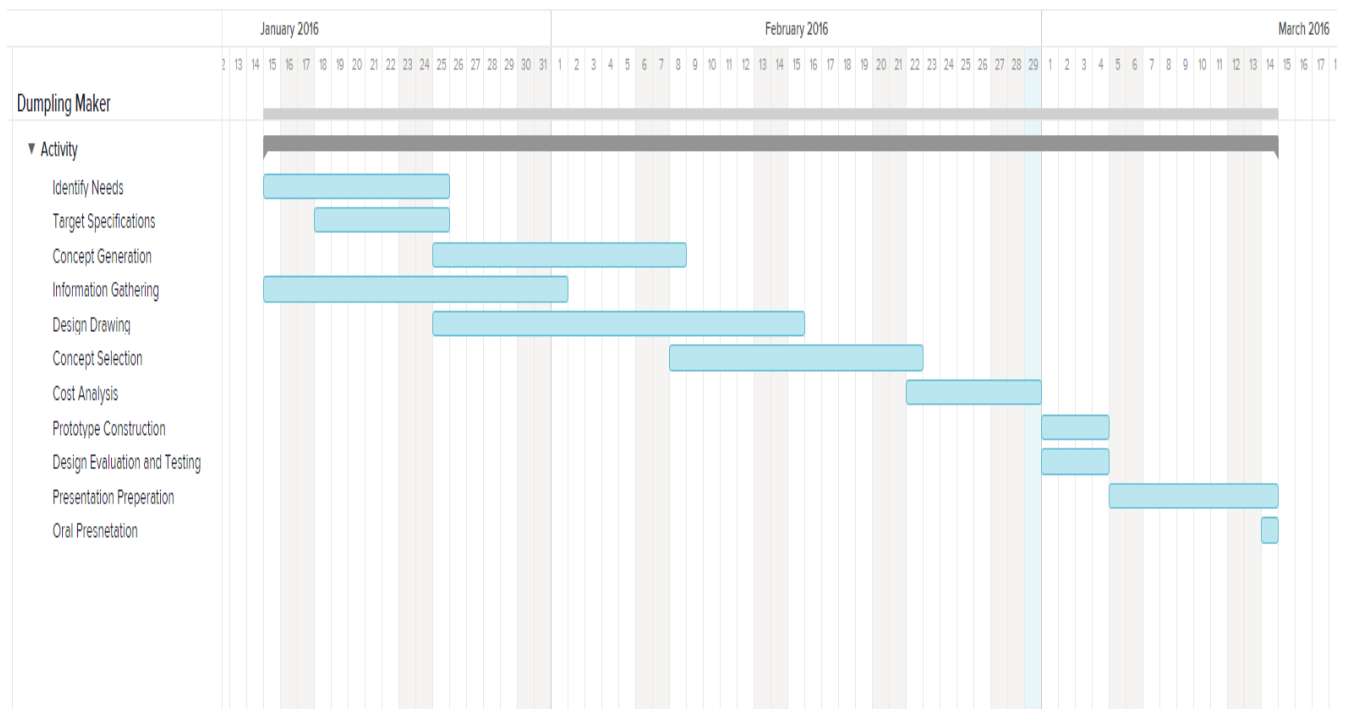
Design Specifications (Brendan Clarke):

- The dumpling maker should be automatic or semi-automatic
- The dumpling maker should produce no less than 10 dumplings per minute on average.

- The material cost for the dumpling maker should not exceed \$200 unless it can be justified.
- The dumpling maker should be safe as a food processor, easy to maintain, safe to use, and dishwasher safe.

Design Approach:

Gantt Chart: The Gantt Chart allows our team to plan out the design project over the given time period by setting a specific amount of time to each task.



Customer Needs Assessment: (Roshanna Molligoda)

To get an idea of our customer base' needs, we called two Chinese restaurants and two Chinese households which cook dumplings on a regular basis. We asked the following questions:

Great China Restaurant in Altoona, Pennsylvania

Q: How many dumplings would you expect a dumpling maker to produce on average in a minute?

A: Since we have an increasing number of customers recently, it would be great if the dumpling maker can cook 15 dumplings in a minute.

Q: How much are you willing to pay for a dumpling maker?

A: The maximum price at which we will buy a dumpling maker is \$250.

Q: Would you prefer the dumpling maker to be automatic or semi-automatic?

A: We would prefer the dumpling maker to be semi-automatic because we want our chef to have some control with cooking the dumpling rather than cooking through a fully automatic system

No. 1 Chinese Restaurant in Altoona, Pennsylvania

Q: How many dumplings would you expect a dumpling maker to produce on average in a minute?

A: Considering the current amount of dumplings we serve, it would be great if the dumpling maker can cook 10 dumplings in a minute.

Q: How much are you willing to pay for a dumpling maker?

A: The maximum price at which we will buy a dumpling maker is \$170

Q: Would you prefer the dumpling maker to be automatic or semi-automatic?

A: We would prefer the dumpling maker to be automatic so that then we can cut some of the labor cost currently occurring due to cooking hand-made dumplings.

Friend: Jamie Zhuang living in Japan

Q: How many dumplings would you expect a dumpling maker to produce on average in a minute?

A: Since I don't bring that many people to my house for a party, it would be enough if the dumpling maker can cook 6 dumplings in a minute.

Q: How much are you willing to pay for a dumpling maker?

A: The maximum price at which I will buy a dumpling maker is \$20

Q: Would you prefer the dumpling maker to be automatic or semi-automatic?

A: I would prefer the dumpling maker to be automatic so that it does everything for me.

Friend: Kuni Guo living in Japan

Q: How many dumplings would you expect a dumpling maker to produce on average in a minute?

A: For me personally, it would be enough if the dumpling maker can cook 6 dumplings in a minute.

Q: How much are you willing to pay for a dumpling maker?

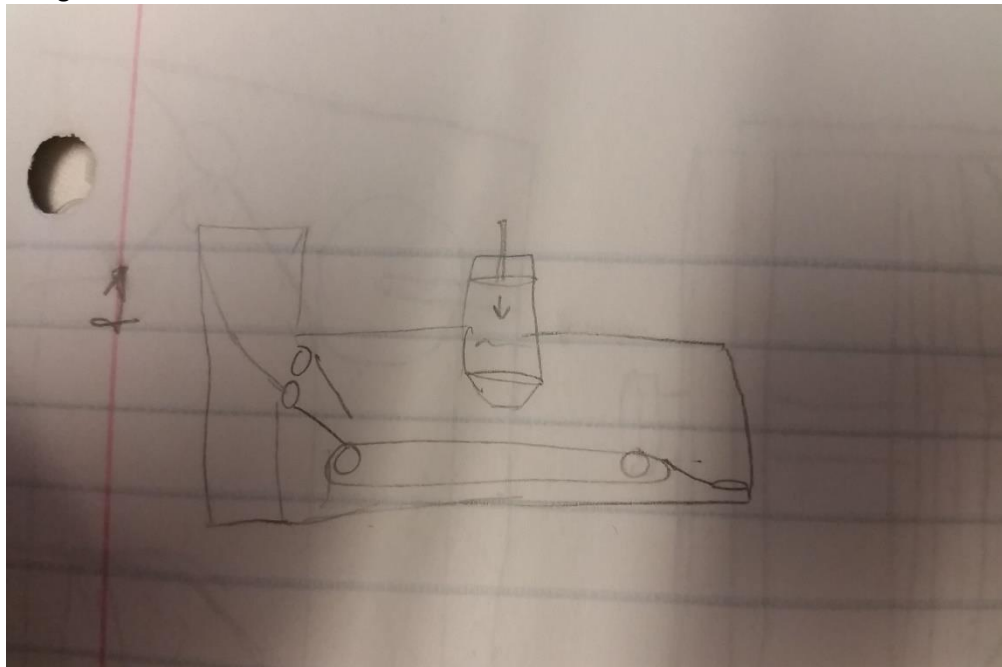
A: The maximum price at which I will buy a dumpling maker is \$25

Q: Would you prefer the dumpling maker to be automatic or semi-automatic?

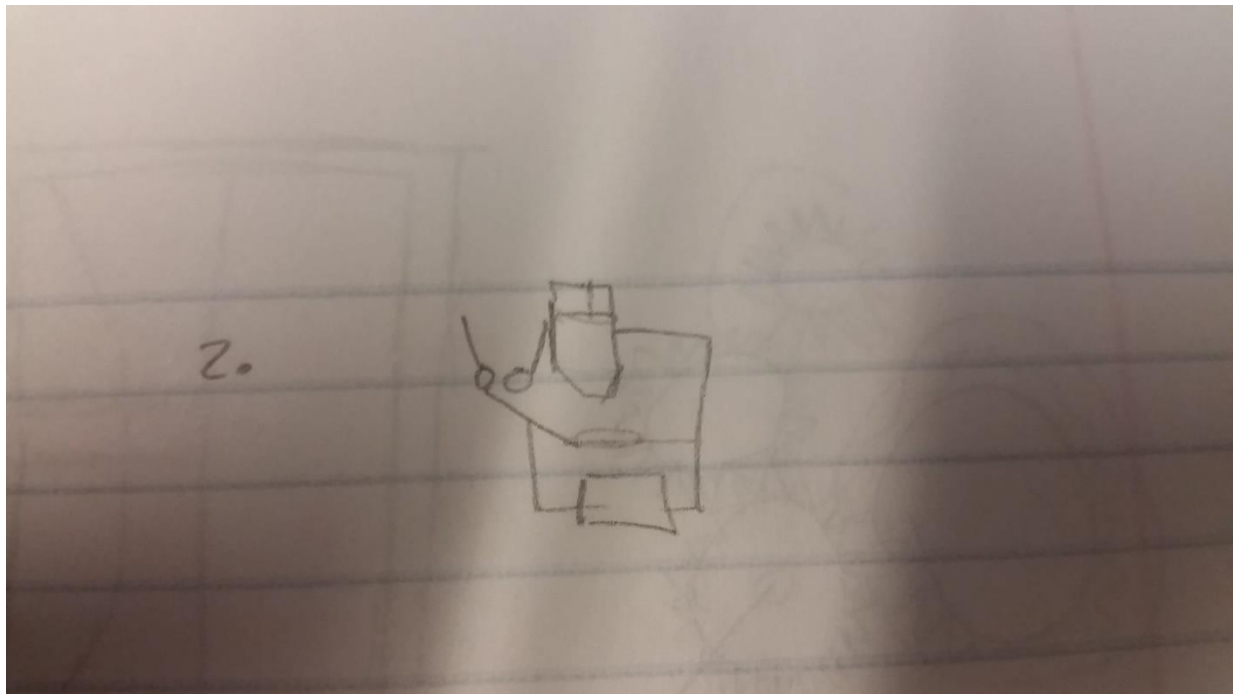
A: I would prefer the dumpling maker to be automatic because then I can spend that time making something else.

Concept Generation: ([Paul Mica](#))

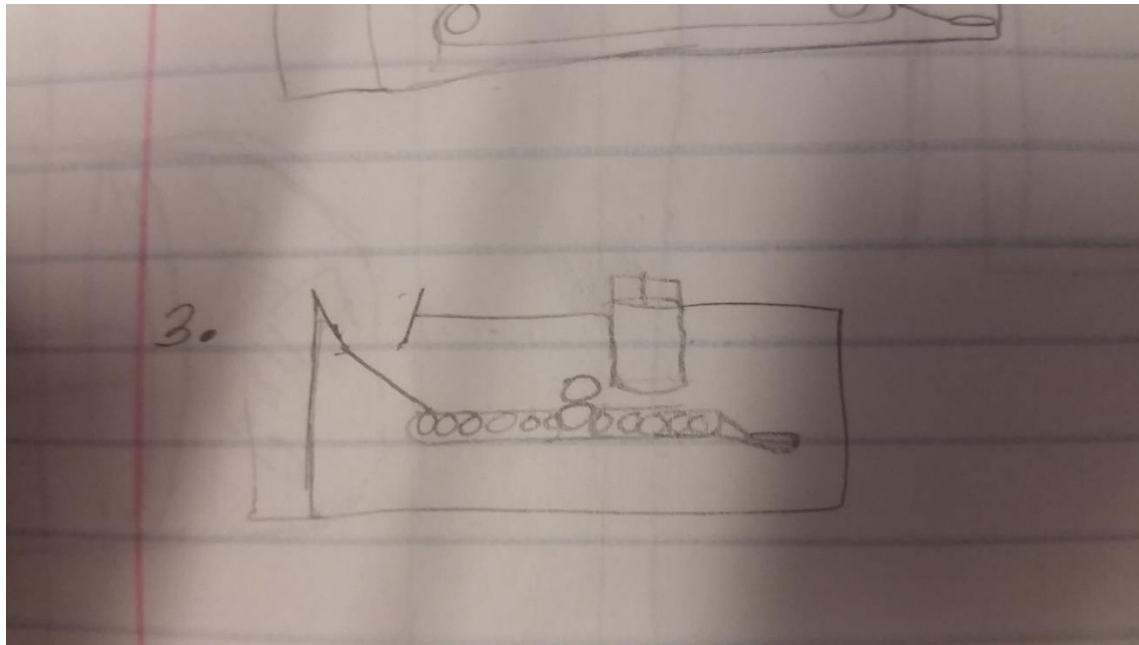
Design 1



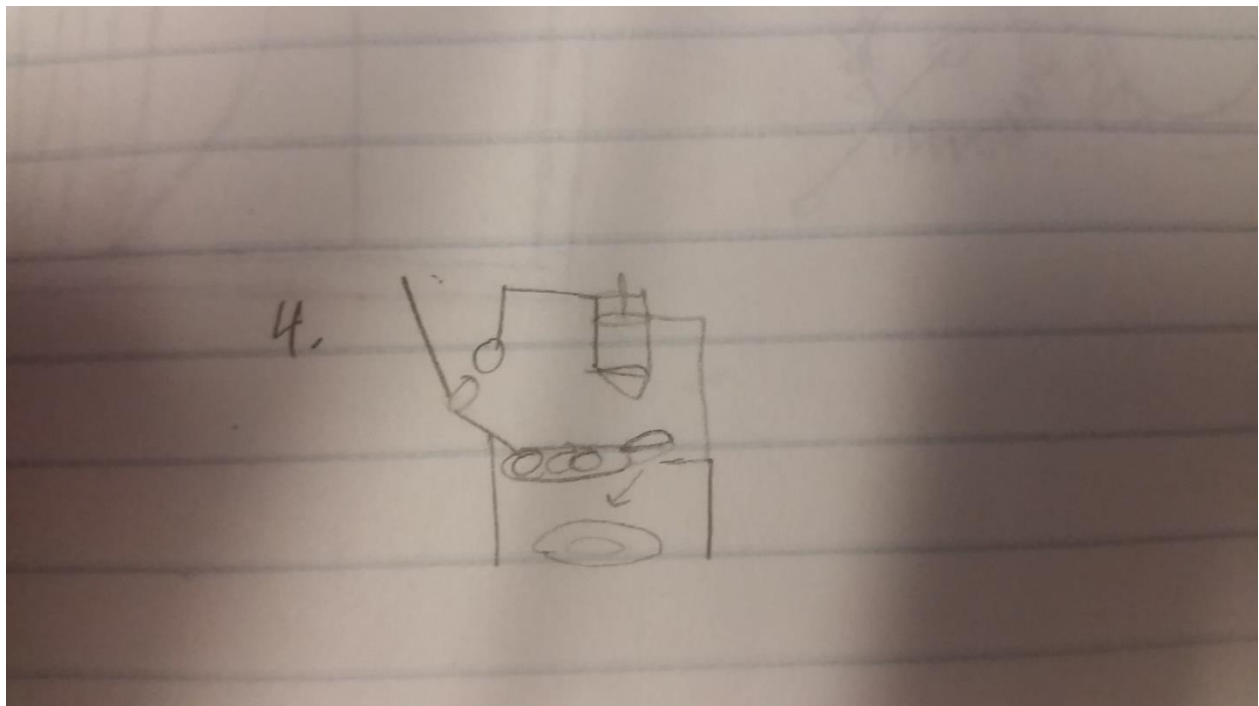
Design 2



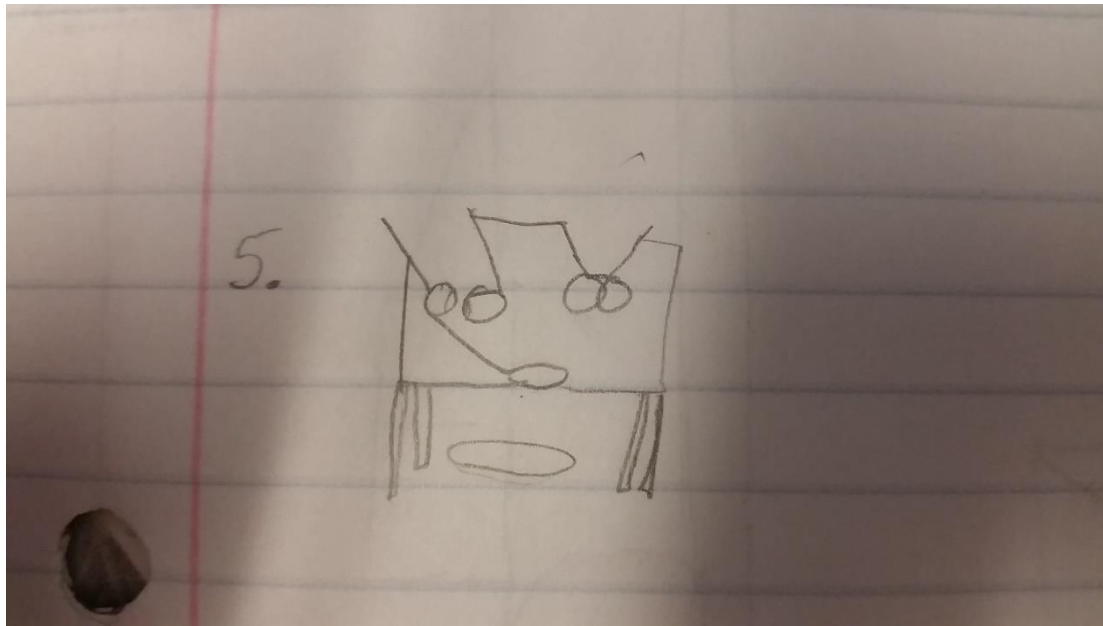
Design 3



Design 4



Design 5 (Final Design)



Design Matrices:

Design Matrix: This is a tool we used to help decide on our final design. The design matrix uses a plus minus and neutral system with a reference (A) to decide which design excels in certain areas.

A	B	C	D	E	F
	A	B	C	D	E
Selection Criteria					
Size	0	+	-	+	+
Creativity/ Innovation	0	+	-	0	+
Effectiveness	0	0	+	-	0
Working mechanism and operation instructions are clear	0	-	-	-	+
Ease of Operation	0	0	0	0	0
Safe to use	0	0	0	0	0
Cost Efficient	0	+	-	+	+
Sum +	0	3	1	2	4
Sum -	0	2	4	2	0
Sum 0	7	2	2	3	3
Net Score	0	1	-3	0	4
Rank	3rd	2nd	5th	3rd	1st

Selection Matrix: ([Lichen Zheng](#)) The selection matrix is the tool used to decide by percentage the best design between the first and second design found in the design matrix.

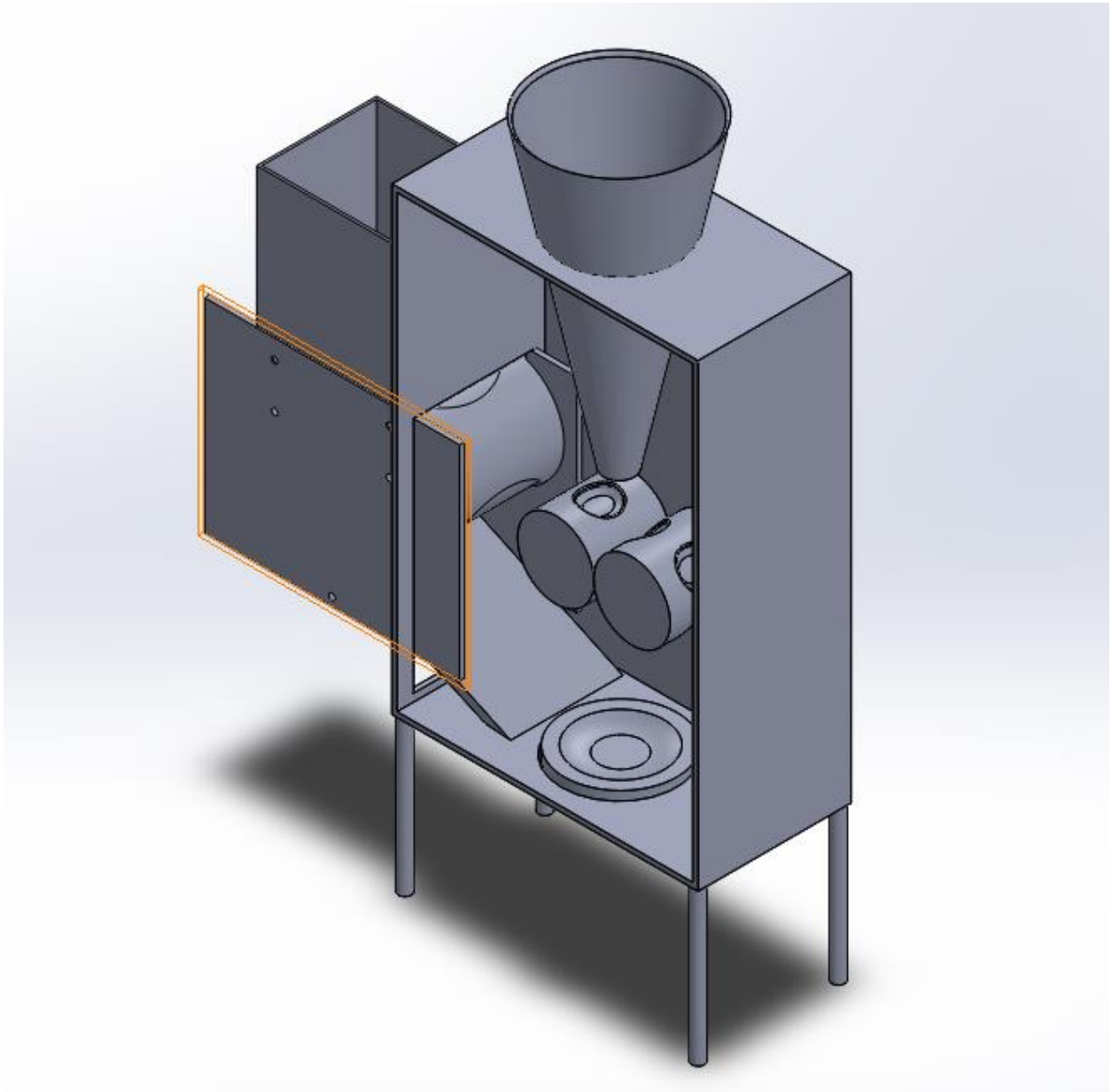
A	B	C	D	E	F
		B		E	
Selection Criteria	Weight %	Rating	Score	Rating	Score
Size	5%	4	0.2	4	0.2
Creativity/Innovation	5%	3	0.15	5	0.25
Effectiveness	15%	3	0.45	5	0.75
Working mechanism and operation instructions are clear	25%	4	1	4	1
Ease of Operation	25%	4	1	4	1
Safe to Use	10%	4	0.4	4	0.4
Cost Efficient	15%	4	0.6	3	0.45
Total Score			3.8		4.05
Rank			2nd		1st

Final Design and Prototype:

Operation Instructions: To operate machinery, load premade dough into the left container.

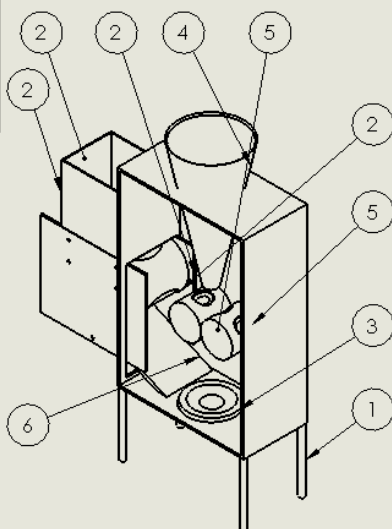
Then place desired filling into filling cone. Finally place a plate or bin underneath machine and press power.

Prototype:



Prototype Drawing and Bill of Materials:

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Box		1
2	Rolling Cutout		1
3	press		1
4	funnel		1
5	Filling roller		2
6	Slide		1



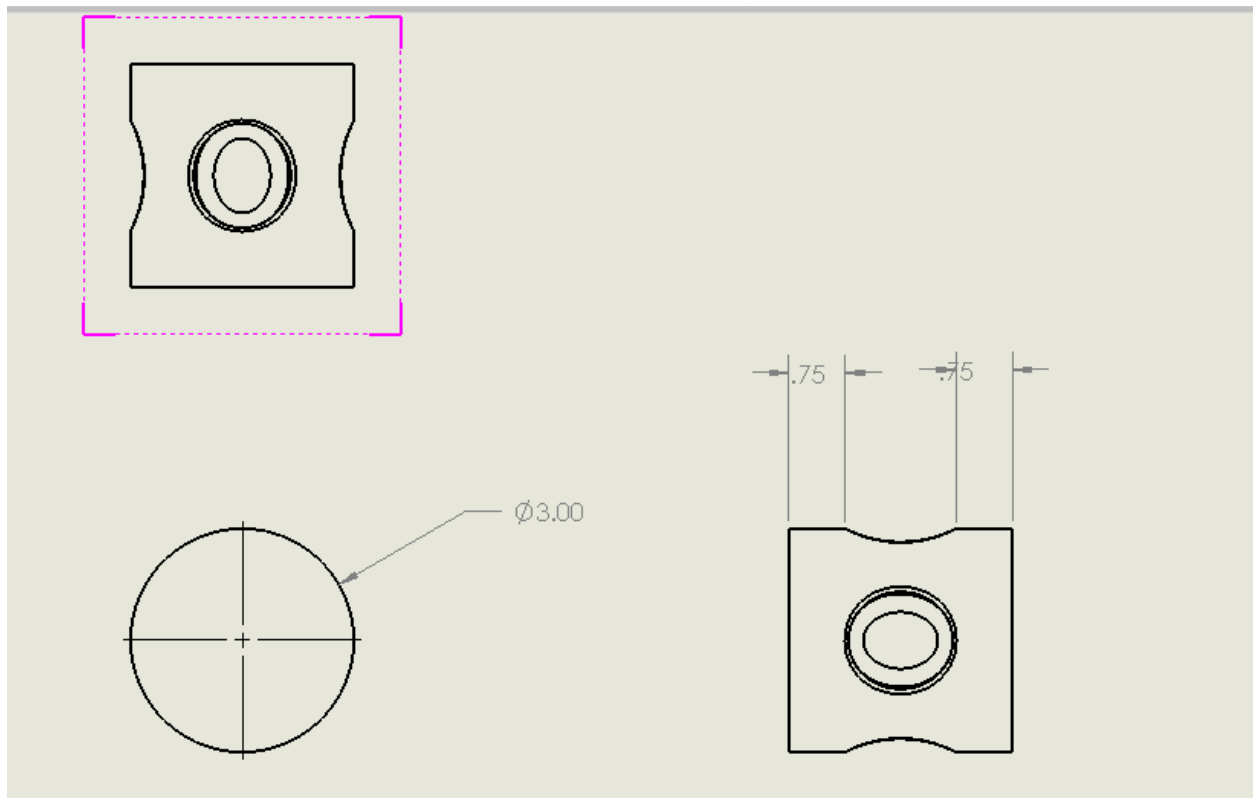
Design Features:

Our design includes a male and female roller which cuts the dough into a circular shape. Our design also includes two rollers to allow the perfect amount of filling to fall from the funnel, and finally the press which is operated by the motor to press the dumplings into their semi-circular shape. The press is also rotated after it presses the dumpling to drop it onto the container below.

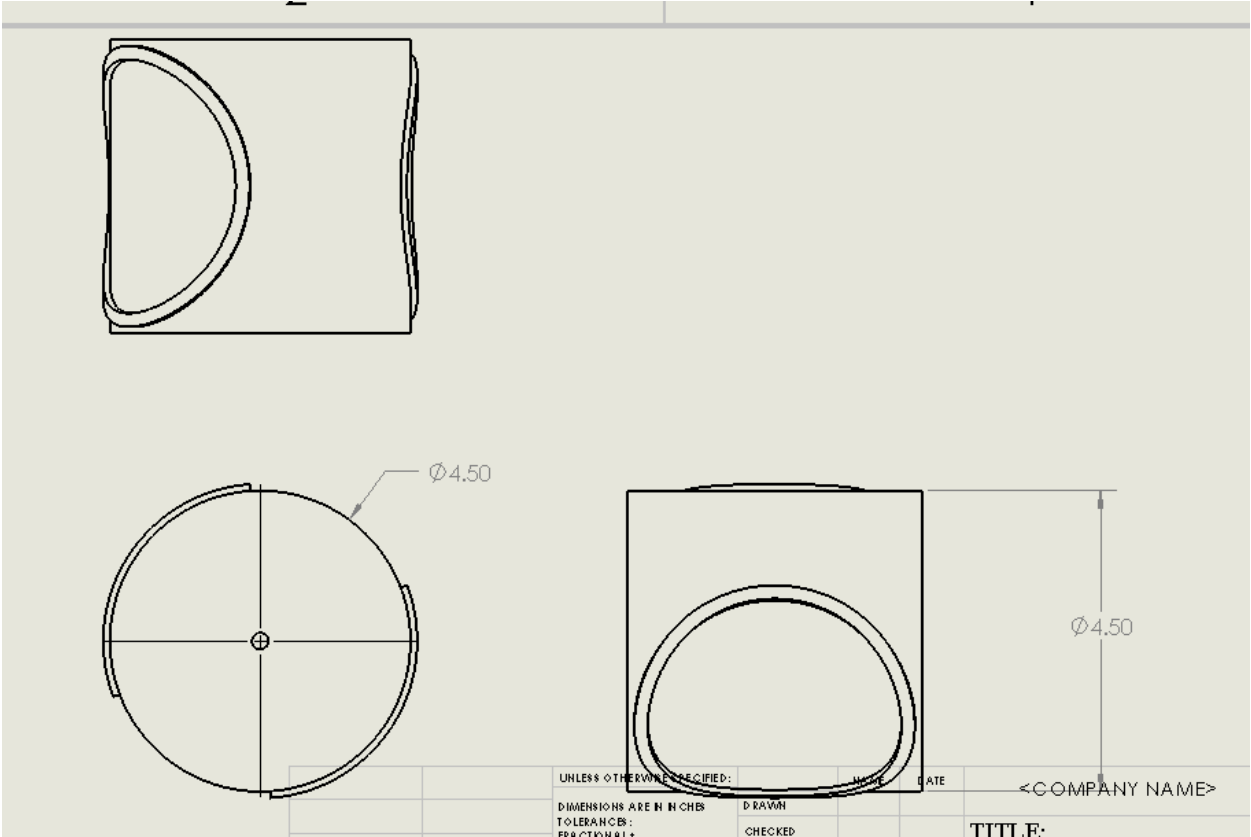
Engineering Analysis:

Working Drawings:

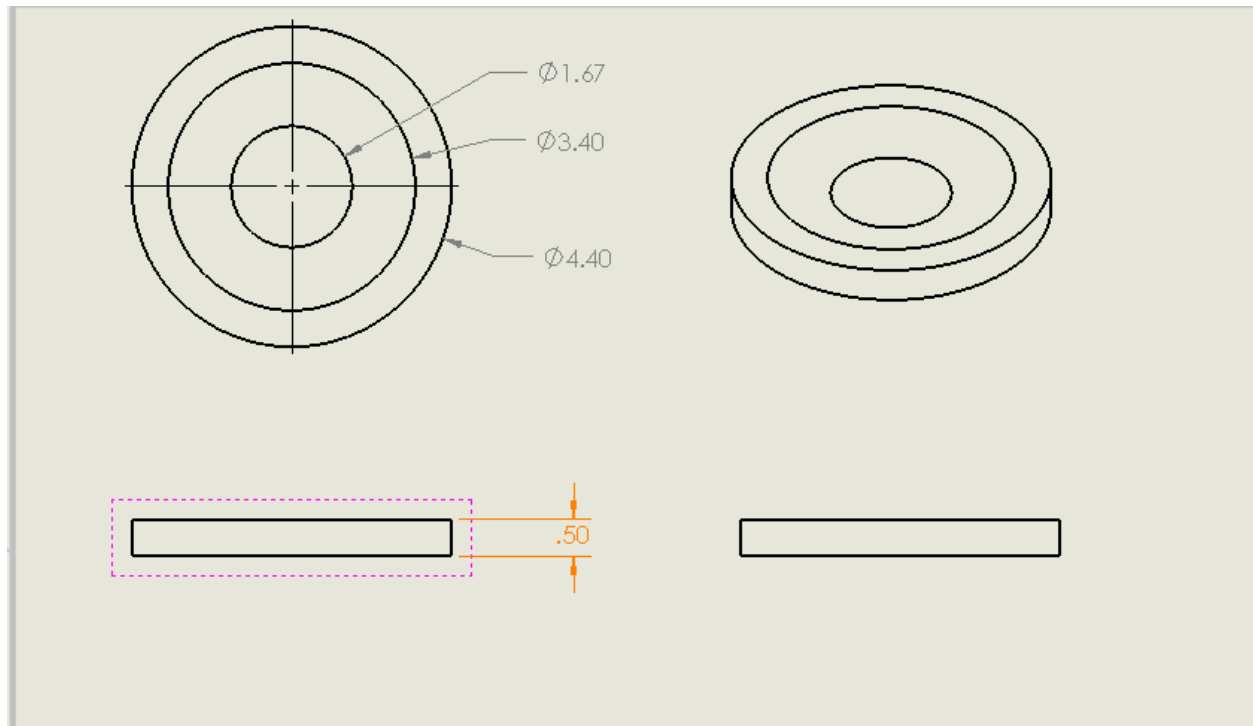
Filling Roller Part:



Dough Cutout Roller:



Dumpling Press:



Cost Analysis:

A	B	
Items Needed	Cost	
Plastic: 4 ft x 4ft	\$54.72	
Cutout Rollers x2	\$12.50	
Filling Rollers x2	\$18.25	
Motor x1	\$24.99	
Total Price:	\$110.46	

Summary and Conclusion:

Summary:

Our team worked together to complete the Dumpling maker. Our design is usable in home and in a restaurant setting, and is easily washable but not storable. This project was a good insight into the design process and the creativity along with the documentation and design of a concept. Starting with the Gantt Chart and ending with a final report, our team worked diligently to complete this project, and we feel ready for the task of Design Project 2.

Conclusion:

This project has been a success. We have created a dumpling maker that is under 200\$, and is easy for the consumer to use. However, this is not a smaller device, this maker takes up a good amount of space. It is easily washable and simple to take apart. Though we worked every work day on this project, there seems to have been slight communication issues for the completion of the project. We could have done better with the given time that we had.