Dog Grooming tool

Team 17

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Sponsor: Engineering To Go

Background

- Dog's coat hairs are prone to matting and tangling
- Textures and characteristic of the coat vary by the dog's size and breed
  - Short Hair dogs
  - Long hair dogs
- Grooming issues
  - Takes too long
  - Tools not ergonomic
  - Unpleasant for dogs and groomers
- Provide a solution for unpleasant grooming experiences of dogs and caregivers

Background Research

- Many types of dog grooming tools on market today
  - double sided brushes
  - brushes with vacuums
- Most popular dog brush
  - The FURminator
    - Reduces shedding by up to 90%
- No brushes with removable rotating heads on the market

- Things to look at on a rotary style brush
  - Will brush head run risk of getting tangled and twisted into dogs hair?

Need Statement

"De-matting a dog's hair can be an unpleasant experience for both the dog and the groomer, especially if the matting has advanced and is deep in the hair or fur. To de-matt or de-tangle, it can be very time consuming and uncomfortable, if not painful."

Goal Statement

Design and develop a grooming tool that is able to easily untangle matted fur

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Objectives vs. Constraints

Objectives

- Design tool for use by consumers, groomers, and rescuers
- Untangle pet's hair without harm to pet
- Develop tool that is stress free on dog and groomer

Constraints

- Tool is handheld and ergonomic
- Tool works at low RPM for decreased noise
- Tool is easy to clean and sterilize
- Battery last at least 2 hours at 50% duty cycle
- Total weight is 1 pound or lower

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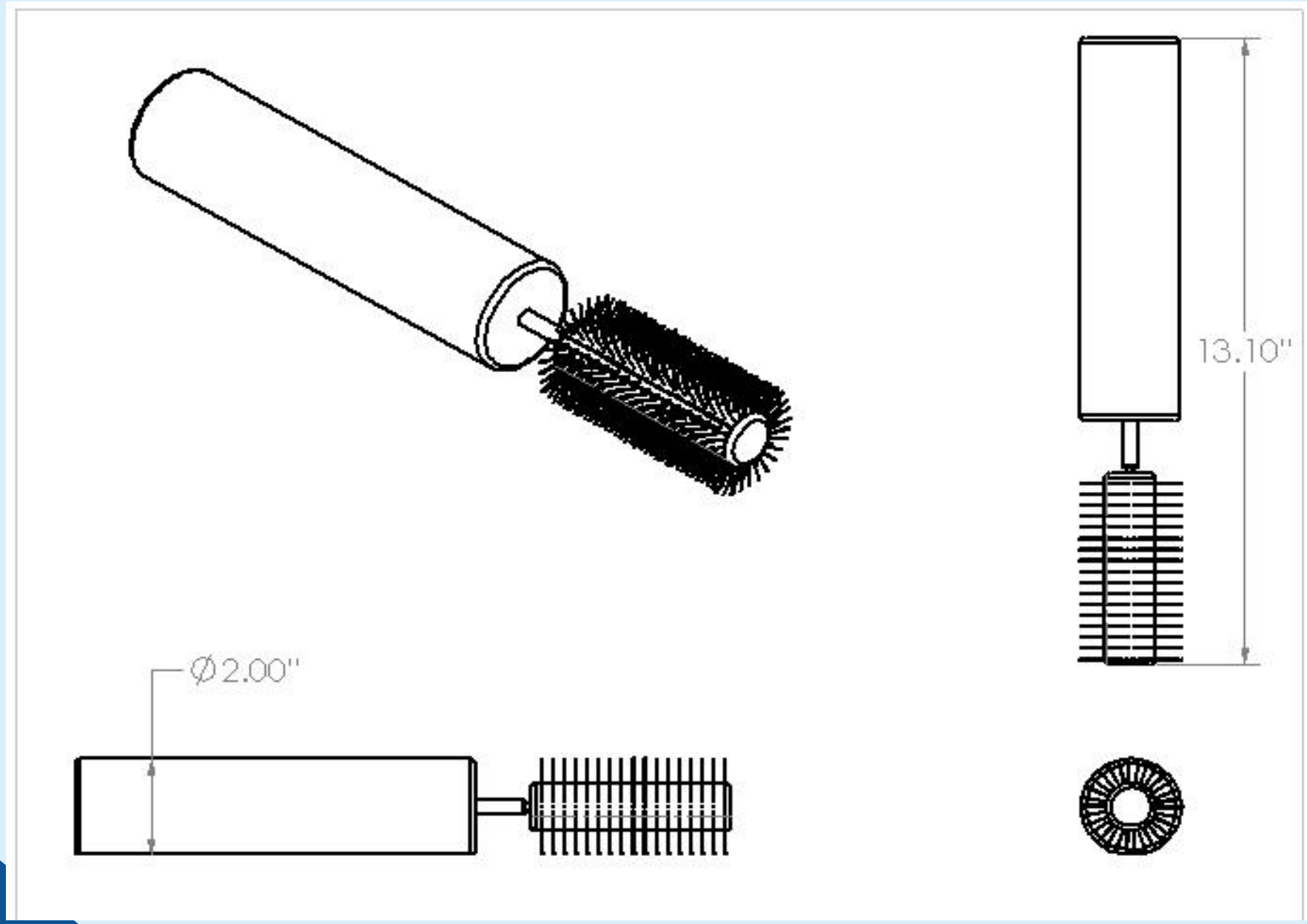
Design Concept One



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Design Concept One

Positives

- Simple handle design
- Manufacturability
- Simple brush head swapping

Drawbacks

- Lacks ambidexterity
- Requires motor reversing
- Complex head assembly

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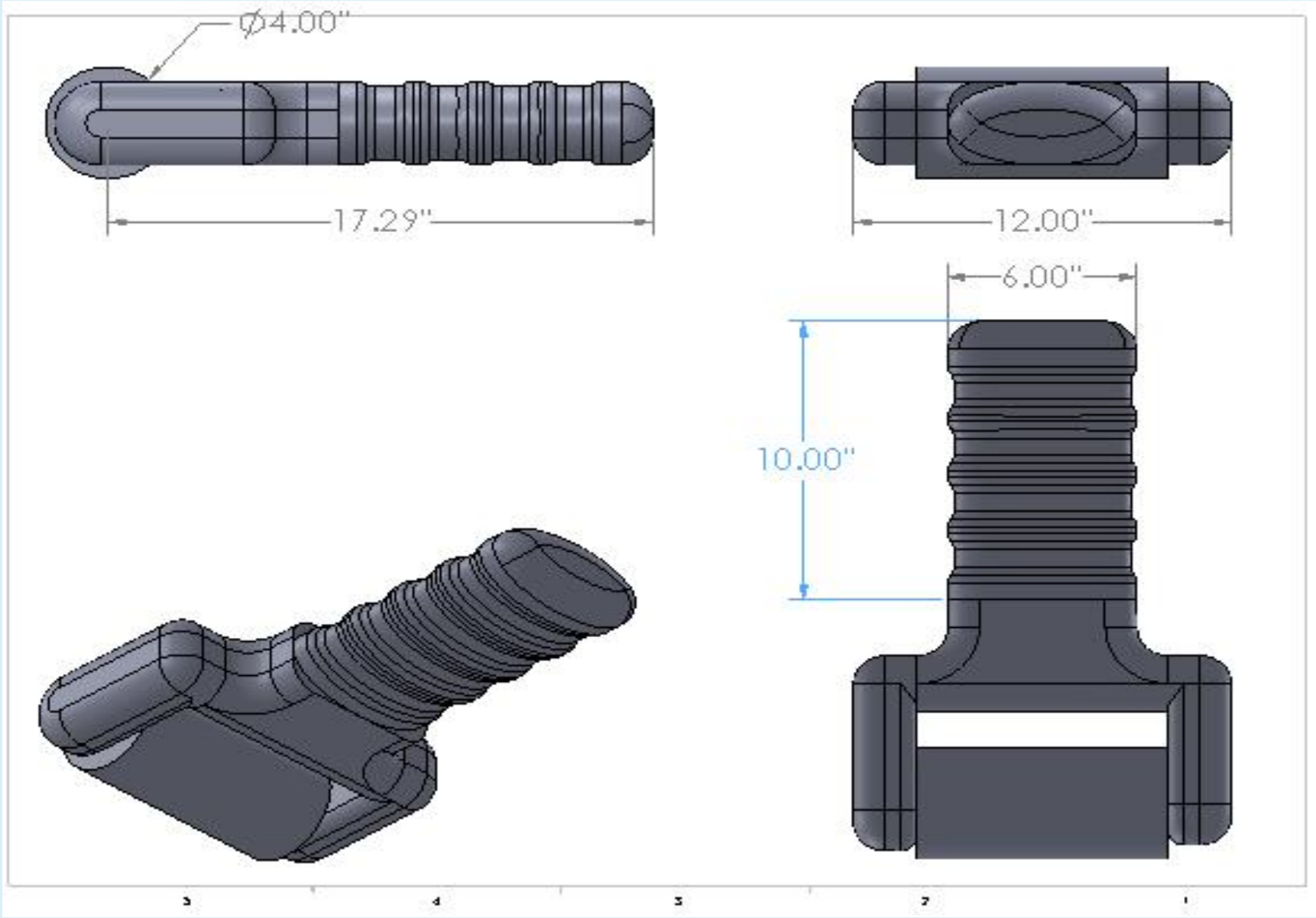
Design Concept Two



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Design Concept Two

Positives

- Ergonomically molded handle
- Keeps hand away from moving parts
- Allows for ambidexterity
- Motor doesn't have to be reversible

Drawbacks

- Overall size is larger than competitor designs

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Decision Matrix

Characteristics	Design One	Design two
Ergonomics	2	3
Cost	3	1
Manufacturability	4	4
Safety	1	2
Appearance	2	4

Ranked on a scale of 1-5 with 5
Being the Best

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Potential Challenges of Project

Risk

- Allocated budget is not sufficient for product fabrication
- Materials are not delivered on time
- Deadlines get pushed back such as machining extending past deadline
- Failure to develop functioning prototype

Contingency Plan

- Narrow scope, perform cost analysis
- Order parts and materials early
- Stick to Gantt Chart and find areas later to catch back up
- Have multiple concepts ready for fabrication

Potential Challenges of Product Continued

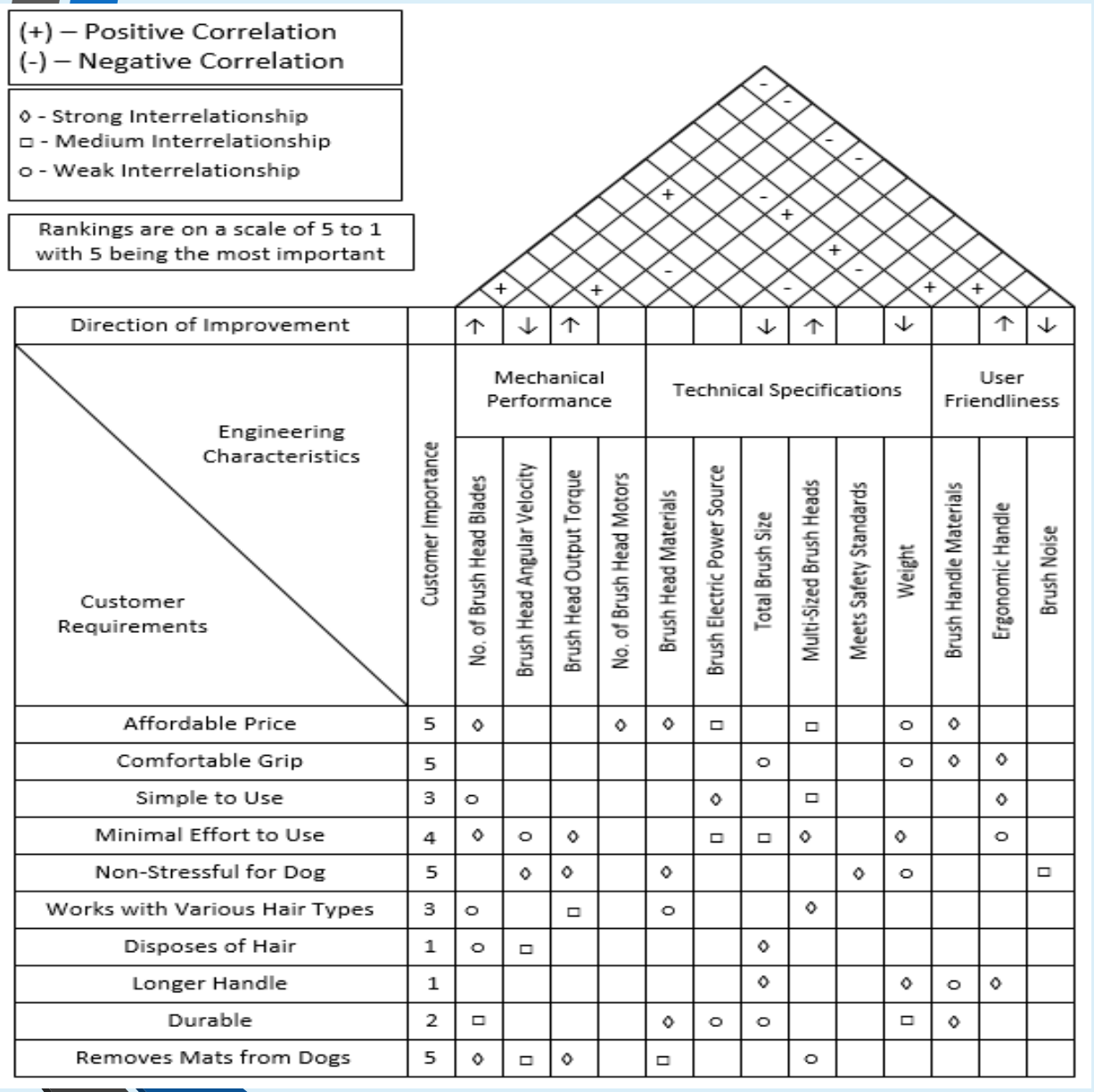
Risk

- Bristles harm pet when operating tool
- Getting electrocuted when constructing tool
- Operator gets harmed from tool
- Bristle head spins at dangerous speed

Contingency Plan

- Design safety bumper to keep bristles from getting too close to skin
- Wear personal protective equipment
- Design an ergonomic handle and test to see any complications
- Use low speed motor and test until get a desired speed

House Of Quality



- Customer Requirements from Voice of the Customer
- Engineering Characteristics evaluate essential product components
- Matrix displays the relationship strength between characteristics and requirements

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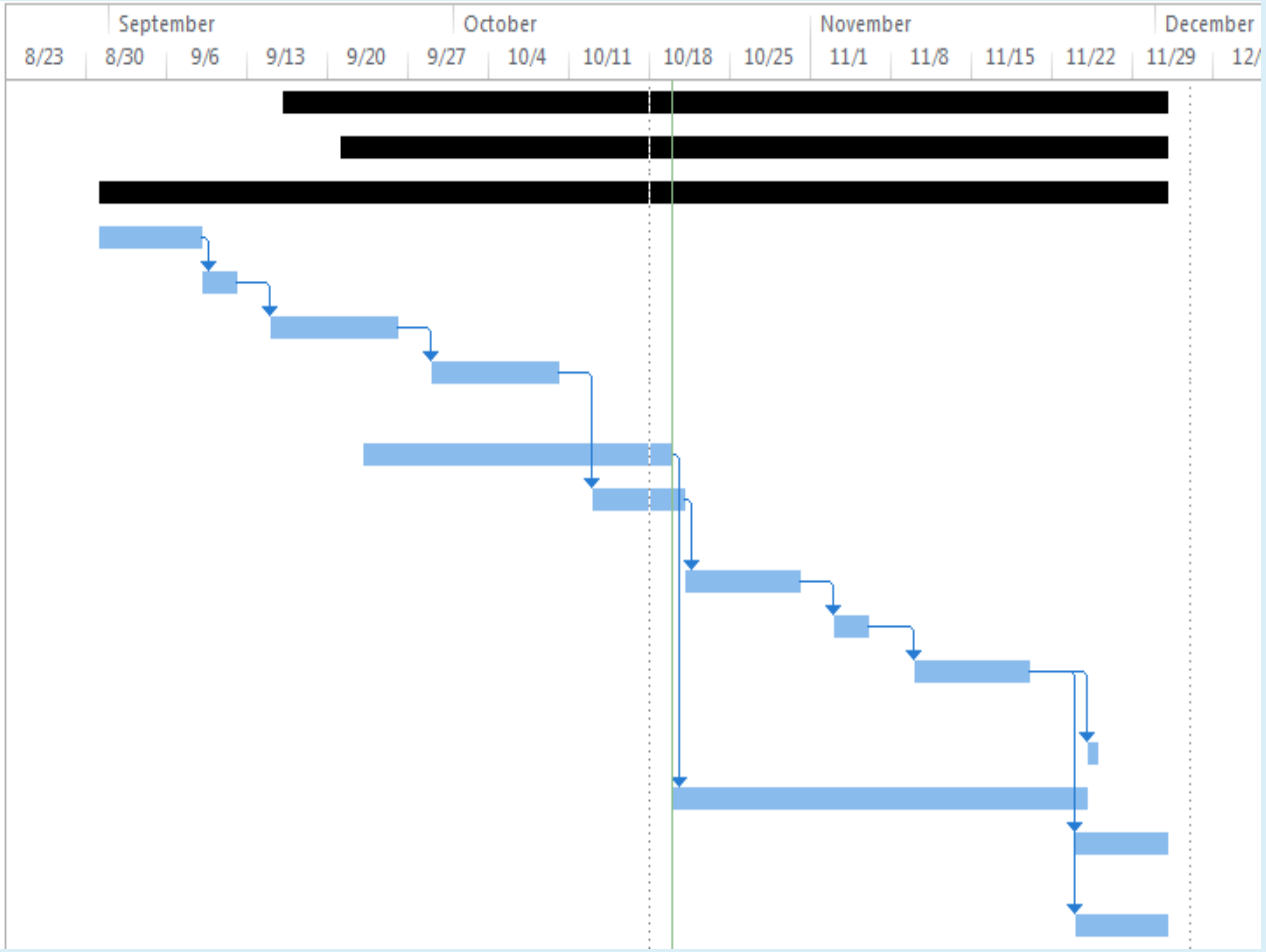
Project Gantt Chart

	Task Name	Duration	Start	Finish
1	Sponsor Meetings	55 days	Wed 9/16/15	Tue 12/1/15
2	Faculty Advisor Meeting	52 days	Mon 9/21/15	Tue 12/1/15
3	**Project Deliverables**	**67 days**	**Mon 8/31/15**	**Tue 12/1/15**
4	Marshmallow Deliverable	7 days?	Mon 8/31/15	Tue 9/8/15
5	Code of Conduct	3 days	Wed 9/9/15	Fri 9/11/15
6	Needs Assessment	9 days	Tue 9/15/15	Fri 9/25/15
7	Project Plans and Product Specs	9 days	Tue 9/29/15	Fri 10/9/15
8	Interim Web Page Design	19 days	Wed 9/23/15	Mon 10/19/15
9	Midterm Presentation I: Conceptual Design	6 days	Tue 10/13/15	Tue 10/20/15
10	Midterm Report I	8 days	Wed 10/21/15	Fri 10/30/15
11	Peer Evaluation	3 days	Tue 11/3/15	Thu 11/5/15
12	Midterm Presentation II: Interim Design Review	8 days	Tue 11/10/15	Thu 11/19/15
13	Peer Evaluation	1 day	Wed 11/25/15	Wed 11/25/15
14	Final Web Page Design	26 days	Tue 10/20/15	Tue 11/24/15
15	Final Design Poster Presentation	6 days	Tue 11/24/15	Tue 12/1/15
16	Final Report	6 days	Tue 11/24/15	Tue 12/1/15



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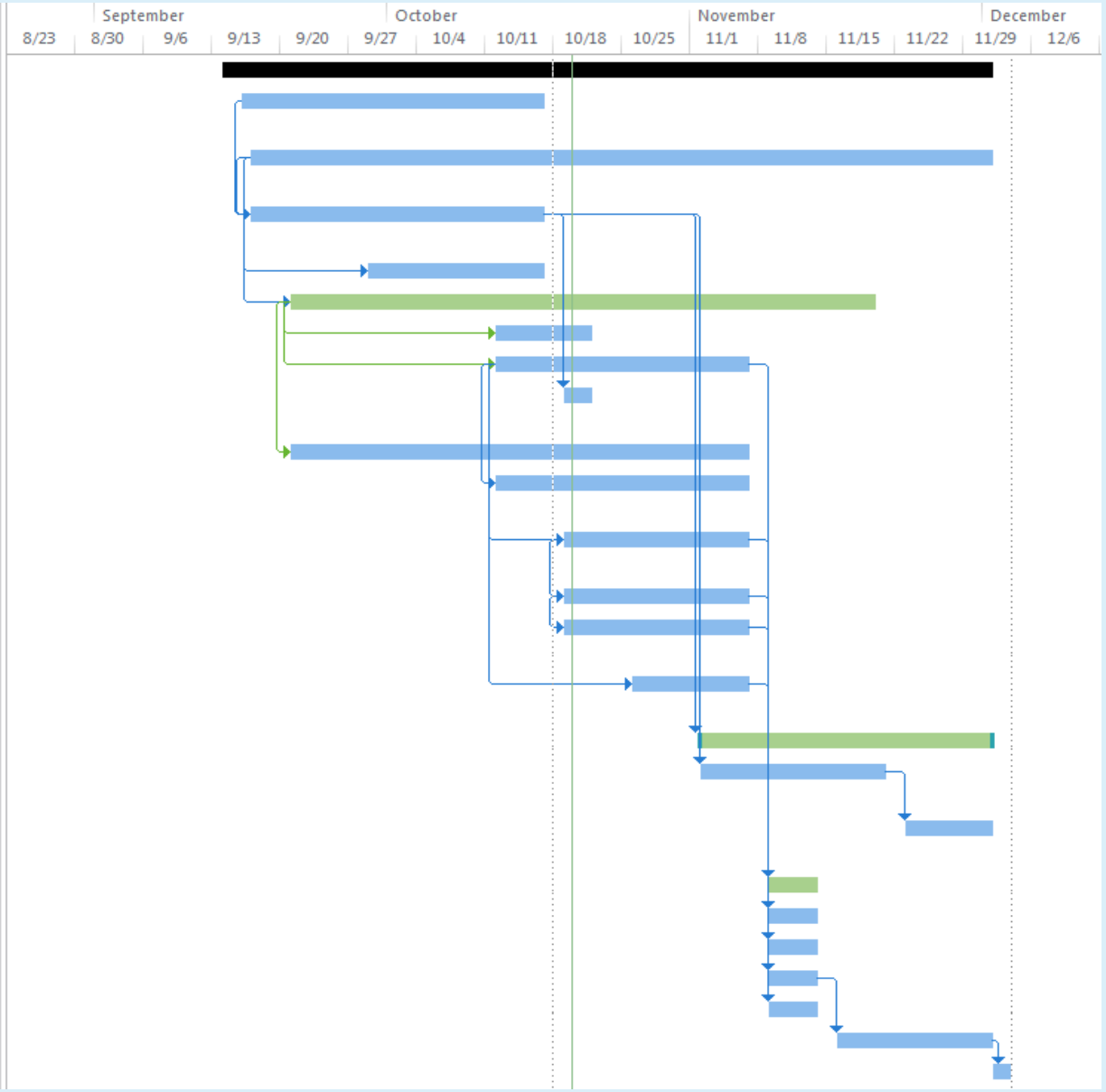
Product Gantt Chart

	Task Name	Duration	Start	Finish
17	**Product Deliverables**	57 days?	Mon 9/14/15	Tue 12/1/15
18	Define Product Specifications	23 days	Wed 9/16/15	Fri 10/16/15
19	Research Grooming Process	54 days	Thu 9/17/15	Tue 12/1/15
20	Obtain Voice of the Customer I	22 days	Thu 9/17/15	Fri 10/16/15
21	Develop House of Quality	14 days	Tue 9/29/15	Fri 10/16/15
22	**Initial Conceptual Designs**	44 days	Mon 9/21/15	Thu 11/19/15
23	Risk Assessment	8 days	Mon 10/12/15	Wed 10/21/15
24	Design Decision Matrix	20 days	Mon 10/12/15	Fri 11/6/15
25	Voice of the Customer Report	3 days	Mon 10/19/15	Wed 10/21/15
26	Research Similar Designs	35 days	Mon 9/21/15	Fri 11/6/15
27	Research Essential Design Components	20 days	Mon 10/12/15	Fri 11/6/15
28	Research Fabrication Options	15 days	Mon 10/19/15	Fri 11/6/15
29	Research Retail Options	15 days	Mon 10/19/15	Fri 11/6/15
30	Research Material Possibilities	15 days	Mon 10/19/15	Fri 11/6/15
31	Research Assembly Options	10 days	Mon 10/26/15	Fri 11/6/15
32	**Begin Marketing Product**	22 days	Mon 11/2/15	Tue 12/1/15
33	Obtain Voice of the Customer II	15 days	Mon 11/2/15	Fri 11/20/15
34	Formulate Product Testing Group	7 days	Mon 11/23/15	Tue 12/1/15
35	**Design Selection**	5 days	Mon 11/9/15	Fri 11/13/15
36	Select Material	5 days	Mon 11/9/15	Fri 11/13/15
37	Select Fabrication Method	5 days	Mon 11/9/15	Fri 11/13/15
38	Select Retail Option	5 days	Mon 11/9/15	Fri 11/13/15
39	Select Assembly Method	5 days	Mon 11/9/15	Fri 11/13/15
40	Order Parts	12 days	Mon 11/16/15	Tue 12/1/15
41	Begin Assembly	2 days	Wed 12/2/15	Thu 12/3/15



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Conclusion and Future Work

- Continue researching effective grooming methods
- Research essential design components
- Shadow dog groomers at Paws and Claws
  - Gain valuable methodical knowledge
- Finalize drawings for selected design
- Continue following contingency plan for facing challenges
- Time and Schedule Management are key!!
  - Schedule must be kept to have adequate testing time
- Begin Design Selection
  - Components and Materials

Questions?