MAE 508
John C. Hsu, Ph.D.,P.E
Class Exercises #1-5

Jessica Blay, Uyen Bui, Lawrenz Esguerra, Kassem Hammoud, Hanna Mac New,
Cindy Pham, Cindy Su

Due Date: 4/16/2020

Class Exercise #1

Customer Requirement	System Requirement	Design Requirements
CR1: Space for manageable amount of garbage	SR1: The trash can shall be dimensioned 14.9 inches x 17.2 inches x 25.5 inches.	DR1: The trash can shall be manufactured to 14.9 inches x 17.2 inches x 25.5 inches.
CR2: When pedal is pressed lid of the garbage can opens	SR2: The trash can shall have an actuated spring top lid mechanically designed with a foot pedal of 5lbs of force pressure.	DR2: The top lid shall be designed to actuate by a pedal with a force of 5lbs.
CR3: When pedal released the lid closes	SR3: The lid shall be mechanically designed with a return spring to return the lid to the closed position in 4 +/- 1 seconds.	DR3: The top lid shall be designed to return to the closed position in 4 +/- 1 seconds.
CR4: Easily dispose of garbage	SR4: The trash can shall have a compartment with liner lock bag wire to secure trash bag from slipping and assist in removal.	DR4: The inner housing shall be designed with bag guide wires and bag lift handle guides.
CR5: Affordable	SR5: The cost of the trash can shall not exceed $50.	DR5: The trash can shall be designed at a manufactured retail price of $50 or less.
CR6: Fashionable	SR6: The trash can shall be ferritic stainless steel.	DR6: The trash can shall be designed with ferritic stainless steel material.
CR7: Minimal Odor	SR7: The trash can shall have a compartment for a removable and washable air filter.	DR7: A filter compartment shall be designed into the top lid with a removable, reusable, and washable filter.
CR8: Compact	SR8: The trash can shall have a consistent surface, rounded corners with an oval shape.	DR8: The trash can shall be designed with an even, consistent surface, rounded corners and an oval shaped body.
CR9: Can fit trash bag inside	SR9: The trash can shall be able to accept a 13 gallon trash bag.	DR9: The internal bag compartment shall be designed with a volume capable of accepting a 13 gallon trash bag.
CR10: The trashcan should be lightweight	SR10: The trash can shall have an empty weight of 15 lbs.	DR10: The trash can shall be designed with a final assembled empty weight of 15 lbs.
CR11: Indicate when trash can is full	SR11: The trash can shall indicate that it needs to be emptied when the trash level reaches 1 inch from the top of the can.	DR11: The trash can shall be designed with a measuring system that measures the amount of trash from the bottom of the can to the top along with an indicator light on the lid that shines red when trash level is 1 inch from the top of the can.
CR12: Increase visibility when disposing trash at night time	SR12: The trash can shall have a nightlight that is 0.5 Watts, 2700k color, and 15 Lumens that activates when the lid is opened in an area that has a light level below 100 lux.	DR12: The trash can shall be designed to include a nightlight (0.5 W, 2700k, 15 Lumens) as well as a light sensor that detects the surrounding light level and activates the nightlight when the lid is opened in an area with a light level below 100 lux.

Requirements Allocation Sheet				
No.	Requirement	Verification Requirement	Method	Department
SR1	The trash can shall be dimensioned 14.9 inches x 17.2 inches x 25.5 inches.	VR1: It shall be verified when the trash can is assembled that it measures 14.9 inches x 17.2 inches x 25.5 inches.	Demonstration	Manufacturing, design
SR2	The trash can shall have an actuated spring top lid mechanically designed with a foot pedal of 5lbs of force pressure.	VR2: It shall be verified by test that the top lid actuates when 5lbs of force pressure is applied to the foot pedal.	Test	Manufacturing, design
SR3	The lid shall be mechanically designed with a return spring to return the lid to the closed position in 4 +/- 1 seconds.	VR3: It shall be verified when the trash can is assembled and by test that there is a return spring that is mechanically designed and returns the lid to the closed position in 4 +/- 1 seconds after removing force pressure from the foot pedal.	Test	Manufacturing, design
SR4	The trash can shall have a compartment with liner lock bag wire to secure trash bag from slipping and assist in removal.	VR4: It shall be verified when the trash can is assembled and by demonstration that there is a compartment with a liner lock bag that secures the trash bag from slipping and assists in removal of the trash bag.	Demonstration	Manufacturing, design
SR5	The cost of the trash can shall not exceed $50.	VR5: It shall be verified when the trash can is assembled that the cost for manufacturing shall be less than $50.	Demonstration	Manufacturing, design
SR6	The trash can shall be ferritic stainless steel.	VR6: It shall be verified when the trash can is assembled that the trash can is made of ferritic stainless steel.	Inspection	Quality, design, manufacturing
SR7	The trash can shall have a compartment for a removable and washable air filter.	VR7: It shall be verified when the trash can is assembled that there is a compartment for a removable and washable air filter.	Inspection	Manufacturing, design, quality

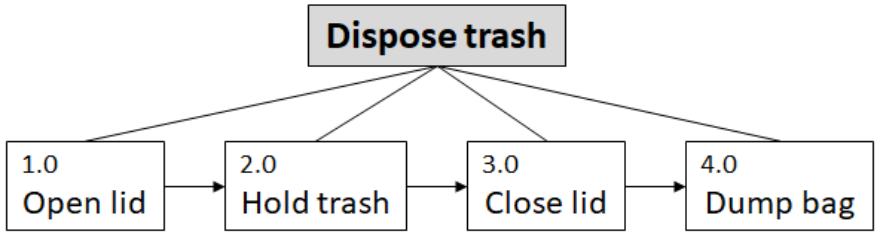
SR8	The trash can shall have a consistent surface, rounded corners with an oval shape.	VR8: It shall be verified when the trash can is assembled that it has an even, consistent surface with rounded corners and is an oval shape.	Inspection	Quality, design, manufacturing
SR9	The trash can shall be able to accept a 13 gallon trash bag.	VR9: It shall be verified by demonstration that a 13 gallon trash bag can fit inside the assembled trash can.	Demonstration	Manufacturing, design
SR10	The trash can shall have an empty weight of 15 lbs.	VR10: It shall be verified by demonstration when the trash can is assembled that the empty weight is 15 lbs.	Demonstration	Manufacturing, design
SR11	The trash can shall indicate that it needs to be emptied when the trash level reaches 1 inch from the top of the can.	VR11: It shall be verified by test that the trash can indicates it is ready to be emptied when the trash level reaches 1 inch from the top of the can.	Test	Manufacturing, design
SR12	The trash can shall have a nightlight that is 0.5 Watts, 2700k color, and 15 Lumens that activates when the lid is opened in an area with a light level below 100 lux.	VR12: It shall be verified by test that the trash can includes a nightlight that activates when the lid is open in an area that has a light level below 100 lux.	Test	Manufacturing, design

Requirements Traceability Matrix

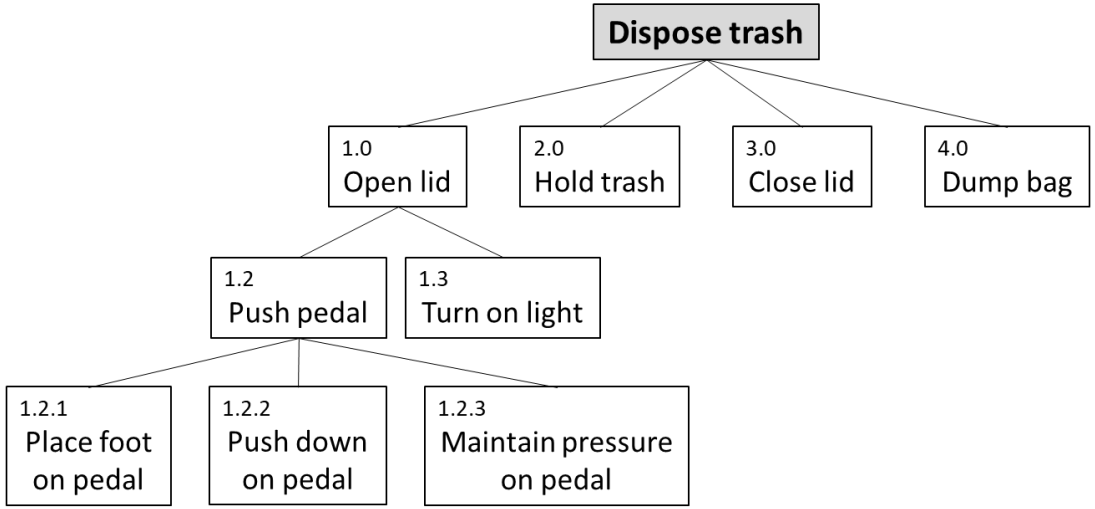
Customer Requirement	System Requirement	Design Requirement
CR1	SR1	DR1
CR2	SR2	DR2
CR3	SR3	DR3
CR4	SR4	DR4
CR5	SR5	DR5
CR6	SR6	DR6
CR7	SR7	DR7
CR8	SR8	DR8
CR9	SR9	DR9
CR10	SR10	DR10
CR11	SR11	DR11
CR12	SR12	DR12

Class Exercise #2

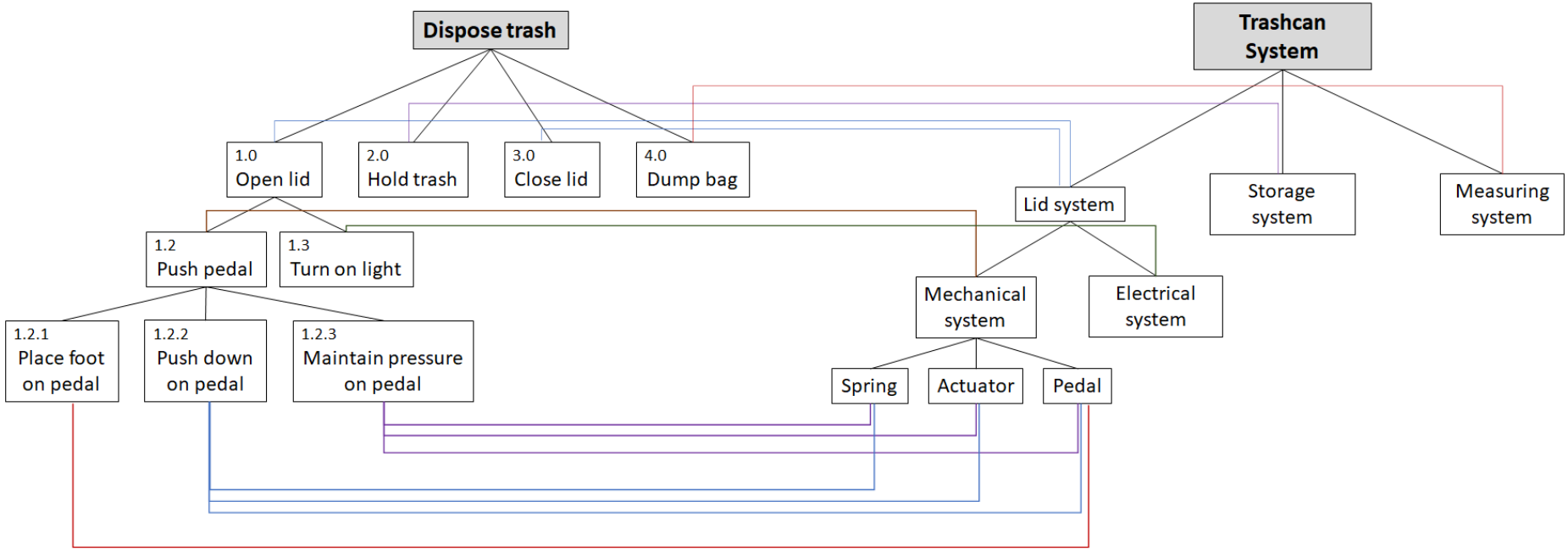
Develop FFBD



Develop Functional Architecture

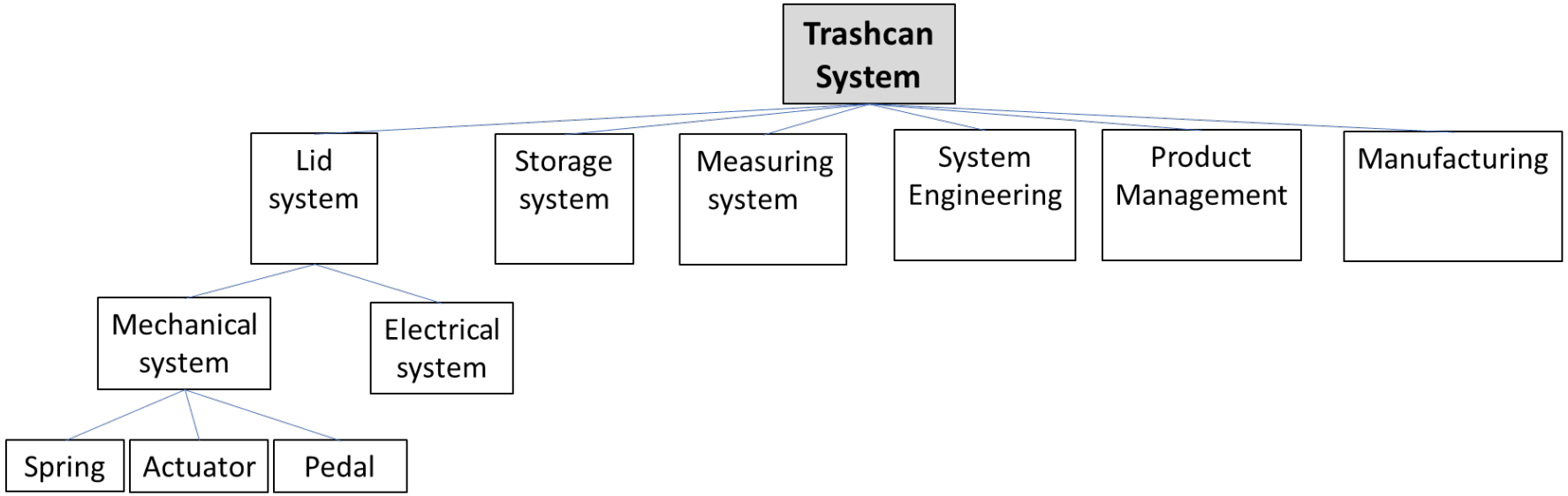


Form system architecture via functional allocation from functional architecture



Class Exercise #3

Develop WBS



Class Exercise #4

Develop IMP/IMS, Master Schedule

ID	PE	SA	AC	Task	Description	Start	Finish
1	1				Authority to Proceed	Mon 3/23/2020	Wed 3/25/2020
2	1	1			Contract Signed	Mon 3/23/2020	Wed 3/25/2020
3	1	2			Budget Received	Mon 3/23/2020	Wed 3/25/2020
4	2				Completion of Trash Can Design	Wed 3/25/2020	Mon 5/15/2020
5	2	1			Systems Requirement Review	Wed 3/25/2020	Fri 4/10/2020
6	2	1	1		Requirements Analysis Completed	Wed 3/25/2020	Fri 3/27/2020
7	2	1	1	1	General Requirements and Certification Requirements	Mon 3/30/2020	Wed 4/1/2020
8	2	1	1	2	Structural Design Requirements	Wed 4/1/2020	Fri 4/3/2020
9	2	1	2		Requirements Database Completed	Mon 4/6/2020	Fri 4/10/2020
10	2	1	2	1	General Requirements and Certification Requirements	Mon 4/6/2020	Wed 4/8/2020
11	2	1	2	3	Structural Design Requirements	Wed 4/8/2020	Fri 4/10/2020
12	2	2			Systems Design Review	Mon 4/13/2020	Fri 4/24/2020
13	2	2	1		Completion of Mechanical System Conceptual Design	Mon 4/13/2020	Fri 4/17/2020
14	2	2	1	1	Trade Studies Completed	Mon 4/13/2020	Wed 4/15/2020
15	2	2	1	2	Design Concept Chosen	Wed 4/15/2020	Fri 4/17/2020
16	2	2	2		Completion of Electrical System Conceptual Design	Mon 4/20/2020	Fri 4/24/2020
17	2	2	2	1	Trade Studies Completed	Mon 4/20/2020	Wed 4/22/2020
18	2	2	2	2	Design Concept Chosen	Wed 4/22/2020	Fri 4/24/2020
19	3				Completion of Verification	Mon 4/27/2020	Fri 5/8/2020
20	3	1			Completion of Verification Plan	Mon 4/27/2020	Fri 5/1/2020
21	3	1	1		Verification Requirements Completed	Mon 4/27/2020	Wed 4/29/2020
22	3	1	2		Verification Plan Completed	Wed 4/29/2020	Fri 5/1/2020
23	3	2			Test Readiness Review	Mon 5/4/2020	Fri 5/8/2020
24	3	2	1		Test Procedures Completed	Mon 5/4/2020	Wed 5/7/2020
25	3	2	2		Test Preparation Completed	Wed 5/7/2020	Fri 5/8/2020

Program Risk Summary Worksheet

Risk Title Manufacture Malfunction **Risk No.** 1 Date: 4/5/2020

Owner John Doe

Description of Risk

Trash can light does not turn on due to improper electrical system construction

Source of Risk

Manufacturing workers received incorrect instructions for electrical system construction.

Consequence if Risk is Realized

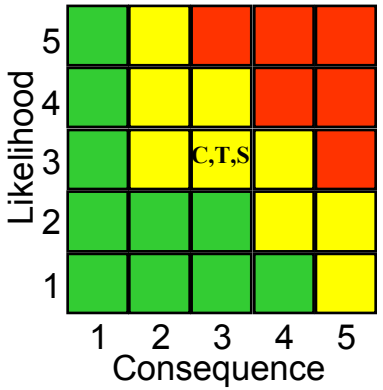
Delays in assembly/production of trash can. Increased cost due to replacement of electrical system.

Risk Consequence:

T - Technical

S - Schedule

C - Cost



Risk Reduction Plan

Action/Event	Date			Success Criteria	Risk Level if Successful	Owner
	Scheduled	Actual	Mitigation Option			

Program Risk Summary Worksheet

Risk Title Foot Pedal return spring Failure at testing **Risk No.** 2 Date: 4-4-2020

Owner Lawrenz Esguerra

Description of Risk During assembly and testing, return spring for trash can foot pedal designed to close the trash can lid failed causing a failed acceptance test.

Source of Risk Spring was not properly selected for the required design force.

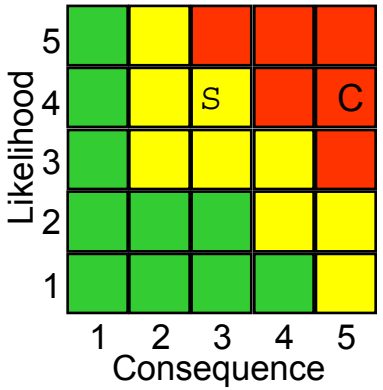
Consequence if Risk is Realized Delays in delvery of the product and an increase of cost due to re-design of the spring mechanism and order exchange of current spring supply.

Risk Consequence:

T - Technical

S - Schedule

C - Cost



Risk Reduction Plan

Action/Event	Date			Success Criteria	Risk Level if Successful	Owner
	Scheduled	Actual	Mitigation Option			

Program Risk Summary Worksheet

Risk Title Production and Manpower Shortage **Risk No.** 3 **Date:** 4-4-2020

Owner Kassem Hammoud

Description of Risk Potential production and manpower shortage due to social distancing and stay at home orders to stop the spread of pandemic virus.

Source of Risk Worldwide spread of the virus causing a pandemic

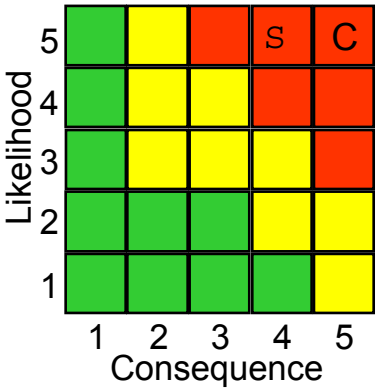
Consequence if Risk is Realized Delays in development, production, and delivery of product.

Risk Consequence:

T - Technical

S - Schedule

C - Cost



Risk Reduction Plan

Action/Event	Date			Success Criteria	Risk Level if Successful	Owner
	Scheduled	Actual	Mitigation Option			
Advise management of impact if resources are not re-directed	4-4-2020	4-4-2020	Transfer	Management advised of impact to schedules	High	Hanna Mac
Development work from home and alternative work/shift schedules for continued operation and lower impact	4-8-2020	4-8-2020	Control	Alternate work schedules and shifts created for work teams and departments	Medium	Cindy Su
Out source impacted difference of manufacturing capacity to approved supplier to continue manufacturing run.	4-30-2020	4-30-2020	Control	Suppliers have been selected and have begain production	Medium	Lawrenz Esguerra
Assessment of production and cost impacts of delivery	5-20-2020	5-20-2020	Control	Out sourcing the Impacted capacity allowed schedule and cost to be on time with no slips and overruns	Low	Kassem Hammoud

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Class Exercises #6-9

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Cindy Pham, Cindy Su

Due Date: 5/16/2020

Class Exercise #6: Trade Study for Trash Can Foot Pedal Redesign			
Risk - Incorrect spring used for design limiting lid travel			
	Scoring Criteria		
Evaluation Criteria	**5**	**3**	**1**
1. The trash can shall be manufactured to 14.9 inches (Length) x 17.2 inches (Width) x 25.5 inches (Height).	Trash can size is 14.9 inches x 17.2 inches x 25.5 inches (Volume=6535.1 inches^3). Exact dimension required for a score of 5. If dimensions do not meet scoring criteria for 5, 3, or 1, score = 0.	Trash can size is 16.2 inches x 17.2 inches x 23.5 inches (Volume=6535.1 inches^3). Exact dimension required for a score of 3. If dimensions do not meet scoring criteria for 5, 3, or 1, score = 0.	Trash can size is 19.2 inches x 17.0 inches x 20.0 inches (Volume=6535.1 inches^3). Exact dimension required for a score of 1. If dimensions do not meet scoring criteria for 5, 3, or 1, score = 0.
2. The top lid shall be designed to actuate by a pedal with a force of 5lbs.	Top lid actuates by pedal with force of 5lbs.	Top lid actuates: 5 lbs < pedal force =< 6 lbs	Top lid actuates: 6 lbs < pedal force =< 7 lbs
3. The top lid shall be designed to return to the closed position in 4 +/- 1 seconds.	Top lid returns to closed position in 4 seconds.	Top lid returns to closed position in 3 seconds =< time < 4 seconds.	Top lid returns to closed position in 4 seconds < time =< 5 seconds.
4. The inner housing shall be designed with bag guide wires and bag lift handle guides.	Inner housing is designed with bag guide wires and bag lift handle guides.	Inner housing is designed with either only bag guide wires or only bag lift handle guides.	Inner housing is designed with only bag guide wires.
5. The trash can shall be designed at a manufactured retail price of $50 or less.	Trash can price = $40	Price: $40 < trash can price =< $45	Price: $45 < trash can price =< $50
6. The trash can shall be designed with ferritic stainless steel material.	Trash can is designed with ferritic stainless steel material.	Trash can is designed with ferritic steel material.	Trash can is not designed with ferritic stainless steel nor ferritic steel material.
7. A filter compartment shall be designed into the top lid with a removable, reusable, and washable filter.	Filter compartment is designed into top lid with removable, reusable, and washable filter.	Filter compartment is designed into top lid with removable and washable filter.	Filter compartment is designed into top lid with reusable filter.
8. The trash can shall be designed with an even, consistent surface, rounded corners and an oval shaped body.	Trash can is designed with even, consistent surface, rounded corners, and oval shaped body.	Trash can is designed with rounded corners and oval shaped body.	Trash can is designed with even consistent surface.

9. The internal bag compartment shall be designed with a volume capable of accepting a 13 gallon trash bag.	Internal bag compartment has volume that can accept 13 gallon trash bag	Internal bag compartment can accept: 12 gallon =< trash bag size < 13 gallon	Internal bag compartment can accept: 11 gallon =< trash bag size < 12 gallon
10. The trash can shall be designed with a final assembled empty weight of 15 lbs.	Trash can has empty weight of 11 lbs.	Trash can has empty weight: 11 lbs < empty weight =< 13 lbs	Trash can has empty weight: 13 lbs < empty weight =< 15 lbs
11. The trash can shall be designed with a measuring system that measures the amount of trash from the bottom of the can to the top along with an indicator light on the lid that shines red when trash level is 1 inch from the top of the can.	Trash can design has indicator light that shines red when trash level is 1 inch from top of the can.	Indicator light shines: 1 inch from top < trash level =< 1.5 inches from top	Indicator light shines: 1.5 inches from top < trash level =< 2.0 inches
12. The trash can shall be designed to include a nightlight (0.5 W, 2700k, 15 Lumens) as well as a light sensor that detects the surrounding light level and activates the nightlight when the lid is opened in an area with a light level below 100 lux.	Trash can has nightlight (0.5 W, 2700k, 15 lumens) with light sensor that detects surrounding light and activates when lid is opened in area with light level < 100 lux	Trash can light sensor activates when lid is opened in area with: 100 lux < light level =< 150 lux	Trash can light sensor activates when lid is opened in area with: 150 lux < light level =< 200 lux
13. Implementation risk	Low	Medium	High
Option #1	**Replace the spring with correct coefficient**		
Option #2	**Shorten design of foot lever**		
Option #3	**Install shims to reduce travel**		

Trade Study for Trash Can Foot Pedal Redesign							
Risk - Incorrect spring used for design limiting lid travel							
			Opt #1		**Opt#2**		**Opt #3**
Evaluation Criteria	Wt	RS	WS	RS	WS	RS	WS
1. The trash can shall be manufactured to 14.9 inches x 17.2 inches x 25.5 inches.	2	2	4	5	10	4	8
2. The top lid shall be designed to actuate by a pedal with a force of 5lbs.	5	4	20	5	25	3	15
3. The top lid shall be designed to return to the closed position in 4 +/- 1 seconds.	3	3	9	1	3	2	6
4. The inner housing shall be designed with bag guide wires and bag lift handle guides.	1	1	1	2	2	1	1
5. The trash can shall be designed at a manufactured retail price of $50 or less.	2	2	4	4	8	3	6
6. The trash can shall be designed with ferritic stainless steel material.	4	3	12	3	12	2	8
7. A filter compartment shall be designed into the top lid with a removable, reusable, and washable filter.	3	5	15	1	3	5	15
8. The trash can shall be designed with an even, consistent surface, rounded corners and an oval shaped body.	1	5	5	2	2	3	3
9. The internal bag compartment shall be designed with a volume capable of accepting a 13 gallon trash bag.	3	1	3	3	9	1	3
10. The trash can shall be designed with a final assembled empty weight of 15 lbs.	2	2	4	2	4	2	4
11. The trash can shall be designed with a measuring system that measures the amount of trash from the bottom of the can to the top along with an indicator light on the lid that shines red when trash level is 1 inch from the top of the can.	3	4	12	4	12	4	12
12. The trash can shall be designed to include a nightlight (0.5 W, 2700k, 15 Lumens) as well as a light sensor that detects the surrounding light level and activates the nightlight when the lid is opened in an area with a light level below 100 lux.	5	3	15	3	15	3	15
13. Implementation risk	5	1	5	1	5	3	15
Total:	170		104		105		96
Normalization			61%		62%		56%

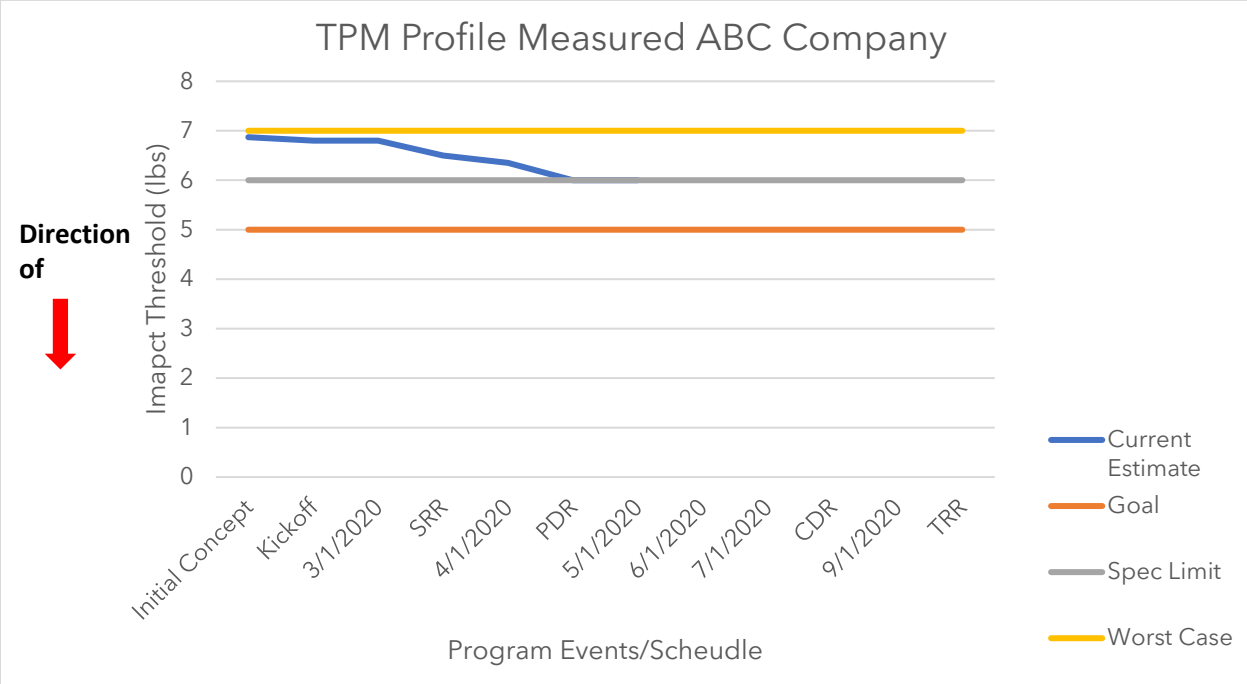
Class Exercise #7

Identify the TPM Parameters

1. Volume/Area
    i.) Product dimensions: 14.9 inches x 17.2 inches x 25.5 inches
    ii.) Has volume that can accept 13 gallon trash bag
2. Weight
    i.) Weighs 11 pounds when empty
3. Reliability/Maintainability
    i.) Reliability of Trashcan
        1) Lasts no less than 10 years
        2) Pedal can handle up to 20lbs of force
        3) Made of ferritic stainless steel
        4) Lid raises and lowers after pressure is put on the pedal
    ii.) Maintainability of trashcan
        1) Filter compartment is designed into top lid with removable, reusable, and washable filter.
        2) Inner housing is designed with bag guide wires and bag lift handle guides.
        3) Surface of the trashcan makes it easy to clean off various components
4. Response
    i.) Top lid actuates by pedal with force of 5lbs.
    ii.) Indicator light that shines red when trash level is 1 inch from top of the can.
    iii.) Nightlight (0.5 W, 2700k, 15 lumens) with light sensor that detects surrounding light and activates when lid is opened in area with light level < 100 lux
5. Survivability Measures
    i.) Pedal withstand over 200,000 steps
    ii.) Indicator light last 2 year before replacement is needed
    iii.) Night light lasts 1 year before replacement is needed
6. Processing Time
    i.) Order processing time is about 2 months
7. Cost
    i.) Pricing: Will cost customer $45
8. Schedule
    i.) Plan schedule to:
        1) Design components
        2) Manufacture components
        3) Assemble components for prototyping
        4) Test prototype
        5) Release product to customers

Develop information sheet and TPM profile for one TPM Parameter: Response

1. Description
    i.) The response of the trash can is related to its secondary function--although its primary function is to dispose of trash, the responses are helpful in making the processes easier for the user.
2. Requirements
    i.) Objective (Goals):
        a) Lid actuates with 5 lbs of force pressure on the pedal
            1. Determined by analysis of having group member step and apply 5 lbs force pressure on pedal
    ii.) Threshold:
        a) Specification level: 6 lbs of force pressure
            1. Determined by analysis and measurement of average force pressure threshold of step-on trash can pedals.
3. Measurement Approach
    i.) SRR: Measured in design step
    ii.) PDR: Measured in design step.
    iii.) CDR: Predictions will be based on simulation and analysis
    iv.) TRR: Predictions will be based on simulation and analysis
    v.) Development Tests: Estimates are to be measured in development testing.
    vi.) Prototype Test: Estimates are based on analysis measured under established conditions
    vii.) Production: Estimates shall be based on prototype test analysis final report.
4. Concerns
    i.) This technical performance measure parameter is most affected by the durability and reliability of the materials used for the product. Additionally, the testing is crucial to informing
    ii.) Efforts to minimize these effects are as followed:
        1) Analysis and simulation of trash can design requirements
        2) Source material from reliable distributors
        3) Perform quality tests on the materials
5. Allocation Level
    i.) These functions are allocated to the third level



	Current Estimate	Goal	Spec Limit	Worst Case
Initial Concept	6.87	5	6	7
Kickoff	6.8	5	6	7
3/1/2020	6.8	5	6	7
SRR	6.5	5	6	7
4/1/2020	6.35	5	6	7
PDR	6	5	6	7
5/1/2020	6	5	6	7
6/1/2020		5	6	7
7/1/2020		5	6	7
CDR		5	6	7
9/1/2020		5	6	7
TRR		5	6	7

Class Exercise #8

N^2 Diagram

	Defined Interface								
	Incomplete Interface								
	Undefined Interface	Lid system	Storage system	Measuring system	Mechanical system	Electrical system	Pedal	Spring	Actuator
	Lid system			L/Mea	L/Mec	L/E	L/P	L/Sp	L/A
	Storage system			St/Mea		St/E			
	Measuring system	Mea/L	Mea/St			Mea/E			
	Mechanical system	Mec/L					Mec/P	Mec/Sp	Mec/A
	Electrical system	E/L	E/St	E/Mea					
	Pedal	P/L			P/Mec			P/Sp	P/A
	Spring	Sp/L			Sp/Mec		Sp/P		Sp/A
	Actuator	A/L			A/Mec		A/P	A/Sp	

Pedal-Lid Interface

Functional	Physical
The pedal shall be pressed by foot to engage the top lid	Trash can shall have a mechanical foot pedal to interface with the trash can top lid
When the foot pedal is pressed, the spring shall be compressed and activate the actuator to open the trash can top lid	The foot pedal shall interface with the spring and actuator
When the foot pedal is released, the spring's return force shall return the actuator lever and close the lid.	Spring force shall interface with the trash can top lid

Interface Scope Sheet

Narrative Description of Interface

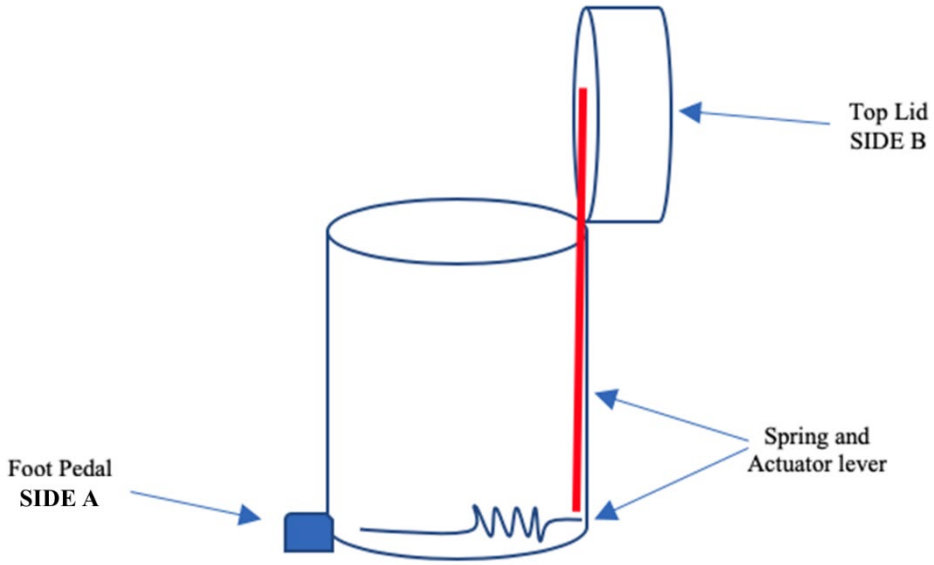
Pedal

The pedal engages the top lid through the spring and actuator. When the foot pedal is pressed, the spring becomes compressed and activates the actuator. The actuator will then open the top lid. When the foot pedal is released, the spring return force returns to the actuator level, causing the top lid to close.

Lid

The lid shall be opened and closed through the spring-actuator interface that is activated by pressing and releasing the pedal.

Sketch of Interface



Class Exercise #9

Verification Requirement Matrix

Requirements	Verification Requirements	Method
1.0. Trash can dimensions. The trash can shall be dimensioned 14.9 inches x 17.2 inches x 25.5 inches	VR1.0 Dimensions: It shall be verified when the trash can is assembled that it measures 14.9 inches x 17.2 inches x 25.5 inches	V1.0 Inspection test
2.0. Pedal force pressure The trash can shall have an actuated spring top lid mechanically designed with a foot pedal of 5lbs of force pressure	VR2.0 Actuate with force pressure: It shall be verified by test that the top lid actuates when 5lbs of force pressure is applied to the foot pedal with a force test sensor. VR2.1 Actuate with foot step: It shall be verified by demonstration that the top lid actuates when team member steps and maintains force pressure on foot pedal.	V2.0 Quality test V2.1 Demonstration
3.0. Lid close time. The lid shall be mechanically designed with a return spring to return the lid to the closed position in 4 +/- 1 seconds.	VR3.0 Lid close time: It shall be verified by test that the top lid returns to the closed position in 4 +/- 1 seconds after removing force pressure from the foot pedal with a timer. VR3.1 Quick lid close: It shall be verified by demonstration that the top lid quickly returns to the closed position after team member removes foot from foot pedal.	V3.0 Quality test V3.1 Demonstration

Verification Compliance Matrix

Item ID	Description	Method	Verification Requirements	Level	VTN
Q12	Pedal force pressure test	Qual. Test	VR2.0 Actuate with force pressure	System	012
Q13	Lid close time test	Qual. Test	VR3.0 Lid close time	System	013
T11	Trash can dimensions	Inspection test	VR1.0 Dimensions	Item	X41
D12	Team pedal demonstration	Demonstration	VR2.1 Actuate with foot step	Item	X42
D13	Lid close time demonstration	Demonstration	VR3.1 Quick lid close	Item	X43

Verification Task Tracking Matrix

		Principal	Test	Status Tracking			Documents	
VTN	Task Title	Engineer	Engineer	Plan	Task	Rpt	Plan#	Rpt#
012	Pedal force pressure test	Bui	Blay	1	2	3		
013	Lid close time test	MacNew	Hammoud	1	3	0		
X41	Trash can dimensions	Esquerra	Su	2	3	3		
X42	Team pedal demonstration	Pham	Doe	3	2	2		
X43	Lid close time demonstration	Smith	Williams	2	1	1		