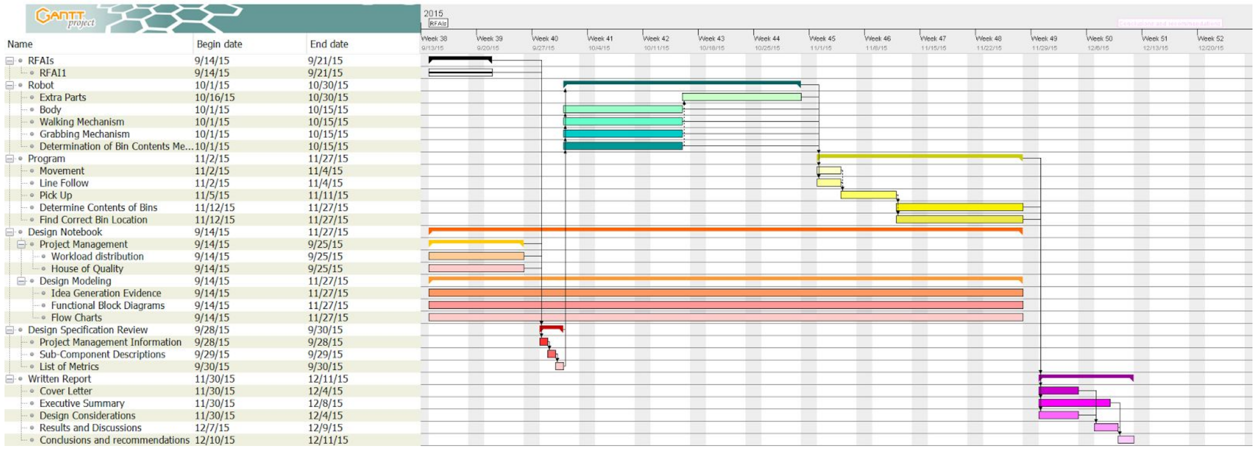
Team 59 Design Notebook

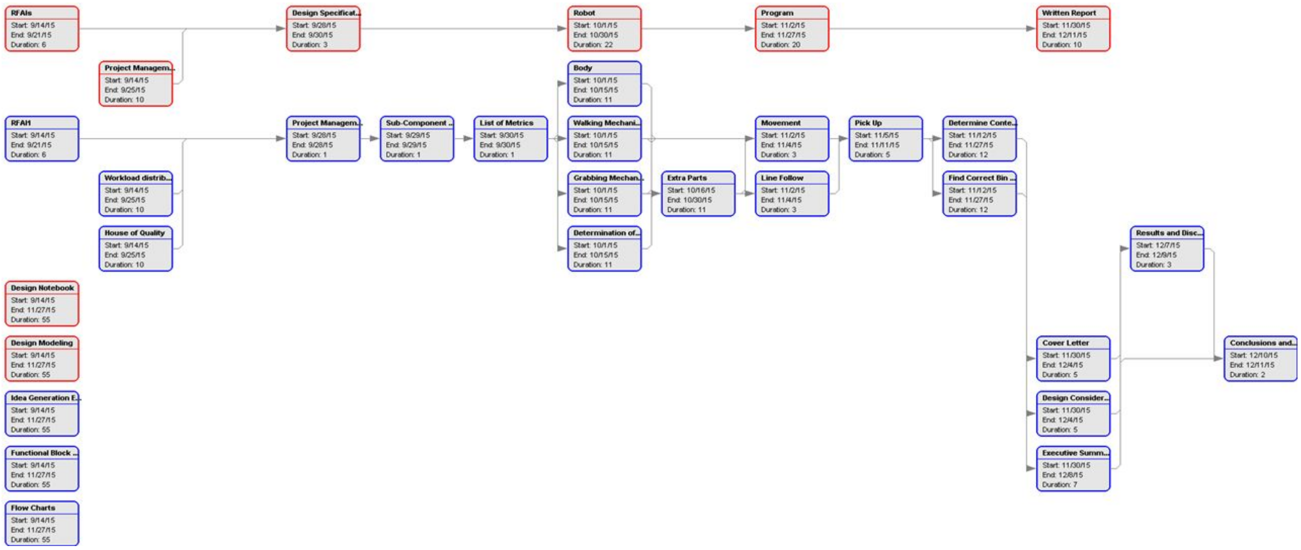
Kathryn Atherton
Ryan Hellyer
Natalie Zimmermann

Gantt Chart--Updated September 28, 2015



Workload Distribution--Updated September 29, 2015

Work Breakdown Structure--Updated September 28, 2015



Metrics of Robot Sub-Components--Updated September 28, 2015

Sub-Component	Feature/Function	Technical Need	Technical Requirement	Target Value
Chassis	Sturdy Compact	Weight supported Dimensions of chassis	Can support at least weight of heaviest bin Can fit in shipping container	Can support twice the weight of the heaviest bin Fits in shipping container with room to turn around
Locomotion Mechanism	Able to go over uneven terrain Move quickly from shredder hopper to final bin location	Height able to step over Speed	Can step over bump of 0.5 inches At least 0.3 feet per second	Can step over bump of 0.75 inches 0.6 feet per second
Grabbing Mechanism	Grasp bin	Dimensions able to grasp Weight able to lift Time to pick up	Maximum dimensions of bin Maximum weight of bin Less than 3 seconds	Maximum dimensions of bin Twice maximum weight of bin Less than 1 second
Bin Content Determination Mechanism	Able to autonomously determine contents of bin Quick in determination	Accuracy of determination Time	Correct 75% of time Less than 5 seconds	Correct 100% of time 1 second
Bin Storage	Stores without spilling contents of bin/tipping robot	Amount of spillage	Less than 20% of bin contents	0% of bin contents

House of Quality--Updated

[insert house of quality here]

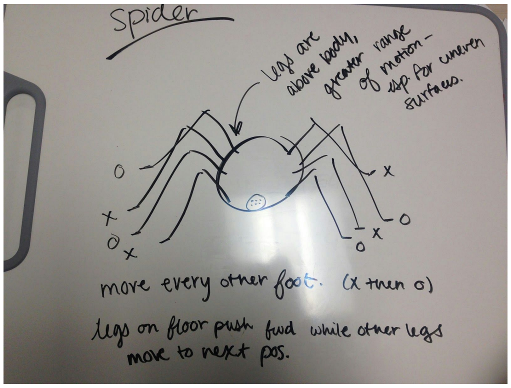
Functional Block Diagram--Updated

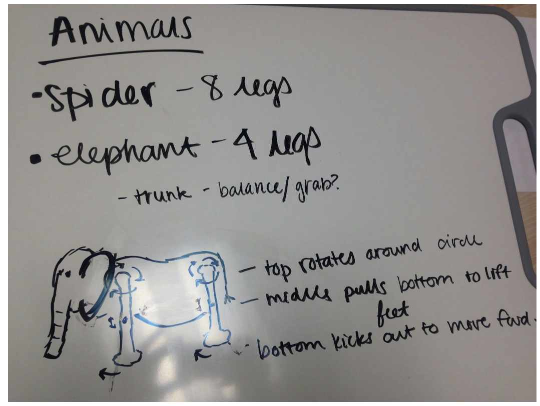
[insert fbd here]

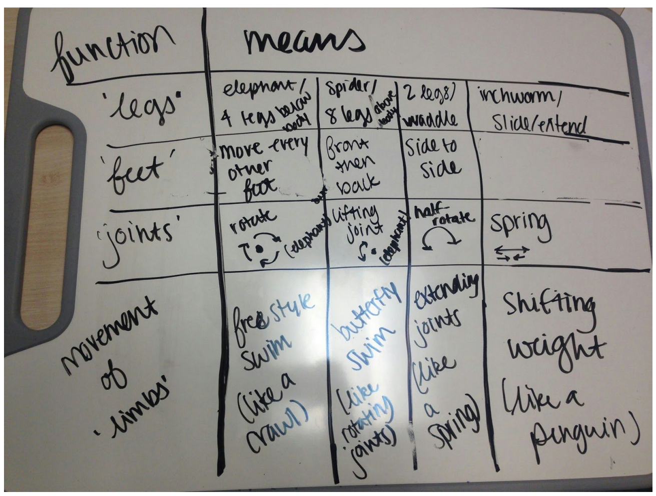
Flow Charts--Updated

[insert flow charts here]

Evidence of Research/Ideas-- Updated October 2, 2015

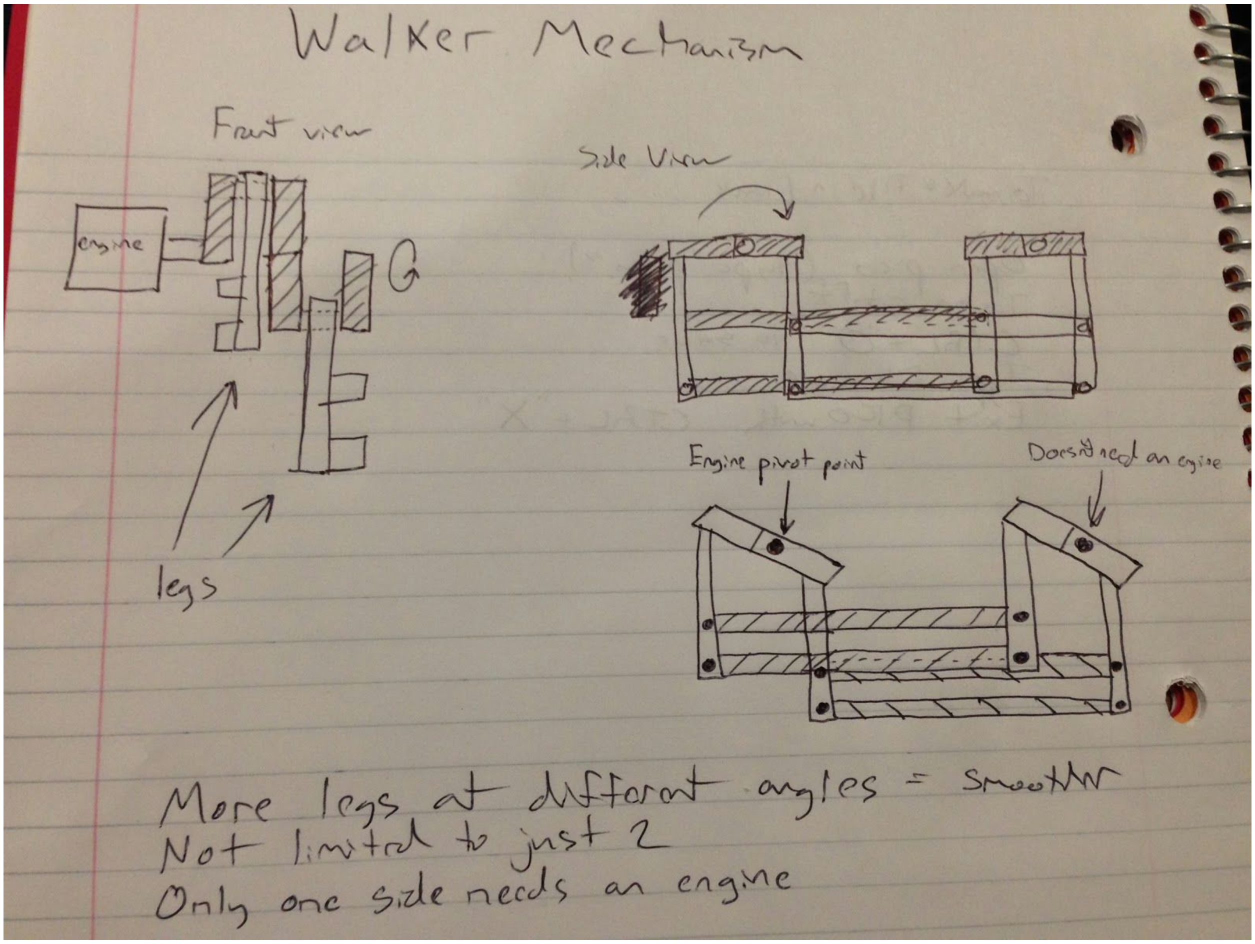




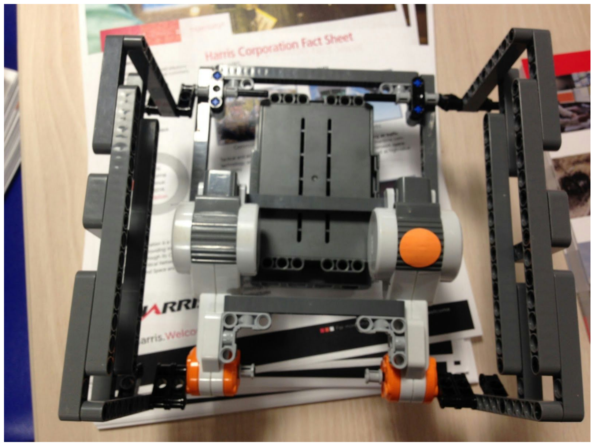


Validations--Updated September 29, 2015

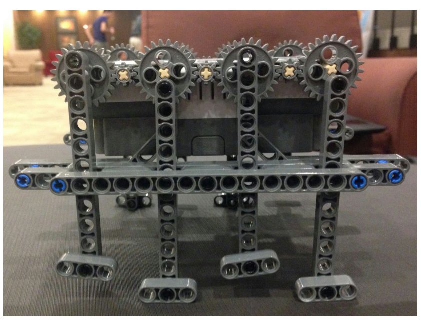
Prototype 1:

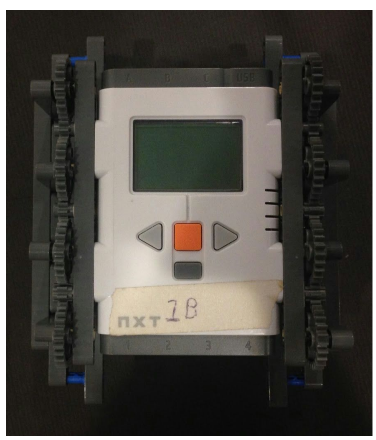


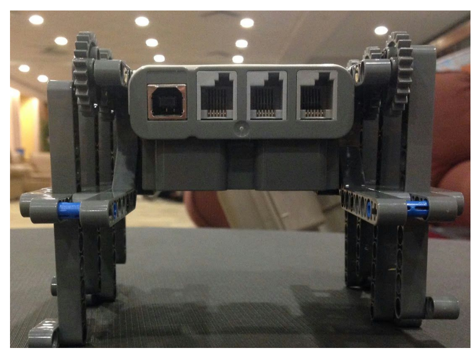
The idea behind this mechanism was that the horizontal bars would move in a circular pattern while retaining their orientation in order to create a walking motion. At least 2 legs would be used on each side so that one set would be pushing the robot forward while the other would be reseting and moving forward. The legs would alternate pushing and resetting as the robot moved forward. Unfortunately, this design did not work because the horizontal bars did not retain their orientation, so the front of the bars rotated in a circular motion while the back of the bars were stationary. This would not have moved the robot. Another problem was that adding additional legs offset from the other ones would make the robot extremely wide. Additionally, the mechanism was fragile and used too many resources..



Prototype 2:
[insert reasoning behind design]
[insert design validation/qualitative analysis here]







Meeting Minutes

Team Meeting 1: September 15, 2015

- parts counted by team members
- part totals entered into excel document
- team began work on robot prototype
- Electronic Signatures:
    - Kathryn Atherton
    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 2: September 16, 2015

- part spot check done by team members
- re-count done by team
- new part totals entered into excel document
- Electronic Signatures:
    - Kathryn Atherton
    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 3: September 20, 2015

- RFAI created and submitted by team
- Electronic Signatures:
    - Kathryn Atherton
    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 4: September 21, 2015

- Ryan Hellyer unavailable
- Rest of team attended recount
- Team obtained replenish of parts
- Electronic Signatures:
    - Kathryn Atherton
    - Natalie Zimmermann

Team Meeting 5: September 27, 2015

- Team finalized Gantt Chart
- Team began work on Resources Chart, PERT Chart
- Team organized project into tasks, designated R. Hellyer as robot project manager
- Team designated sub-components of Robot
- Team began to create metrics for sub-components
- Electronic Signatures:
    - Kathryn Atherton

    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 6: September 28, 2015

- Team finished description of all the sub-components of the roboter, with explanation of different functions and features
- Team made a metrics table, analyzing the sub-components, their needs, the technical needs and requirements and the target values to achieve.
- Initiated discussion on the workload distribution, pending to be completed in the next days
- Electronic Signatures:
    - Kathryn Atherton
    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 7: September 29, 2015

- Experimented with the robot walker mechanism
- Completed workload distribution:
    - Ryan Hellyer as Robot Project Manager
    - Kathryn Atherton as Code Project Manager
    - Natalie Zimmermann as Design Notebook Project Manager
- Finished Design Specification Review
- Electronic Signatures:
    - Kathryn Atherton
    - Ryan Hellyer
    - Natalie Zimmermann

Team Meeting 8: October 1, 2015

    - Team completed Request for Additional Information 2
    - Electronic Signatures:
        - Kathryn Atherton
        - Ryan Hellyer
        - Natalie Zimmermann

Team Meeting 9: October 2, 2015

- Ryan Hellyer unable to attend (excused absence)
- Team reverse-engineered animals--a spider and an elephant--to evaluate how they achieve mobility. Team then used this evaluation to identify critical factors associated with mobility.
- Team used brainstorming methods--more reverse-engineering of nature (penguins and inch worms)-- to develop a range of ideas for the mobility of the PMR.
- Team created a morph chart for the mobility of the PMR.
- Electronic Signatures:
    - Kathryn Atherton
    - Natalie Zimmermann