Open-Source 3D Printed Foot Prosthesis

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Team 18F04
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Project Description

- **Team goal:**
  - Our team goal is to create a prosthesis leg for below-knee amputees that easy to install and remove, inexpensive, and reachable.

- **Sponsor**
  - Northern Arizona University

Background & Benchmarking

Harmony P4

figure: 1

The Triton Harmony

figure: 2

Customer Requirements vs Engineering Requirements

- Below Knee
- Holds up to 200 lb adult male
- Must be printed from 3D printer
- Weights 7 lb at most
- Limited filament materials
- Fits different height sizes
- Comfortable
- Safety

Engineering requirements

- Below Knee
- Prosthetic leg must holds up to 200lb
- Can be printed in any 3D printer
- Must weight at most 7lb
- Limited filament materials (ABS, HIPS, Carbon Fiber)
- Fits different height ranges from 5’-0”till 6’-5”
- Affordable
- Easy to transport
- Resistant to weather
- Free age uses from 13 and higher
- Does not damage the person leg
- Comfortable to wear and use

House of Quality

Table: 1

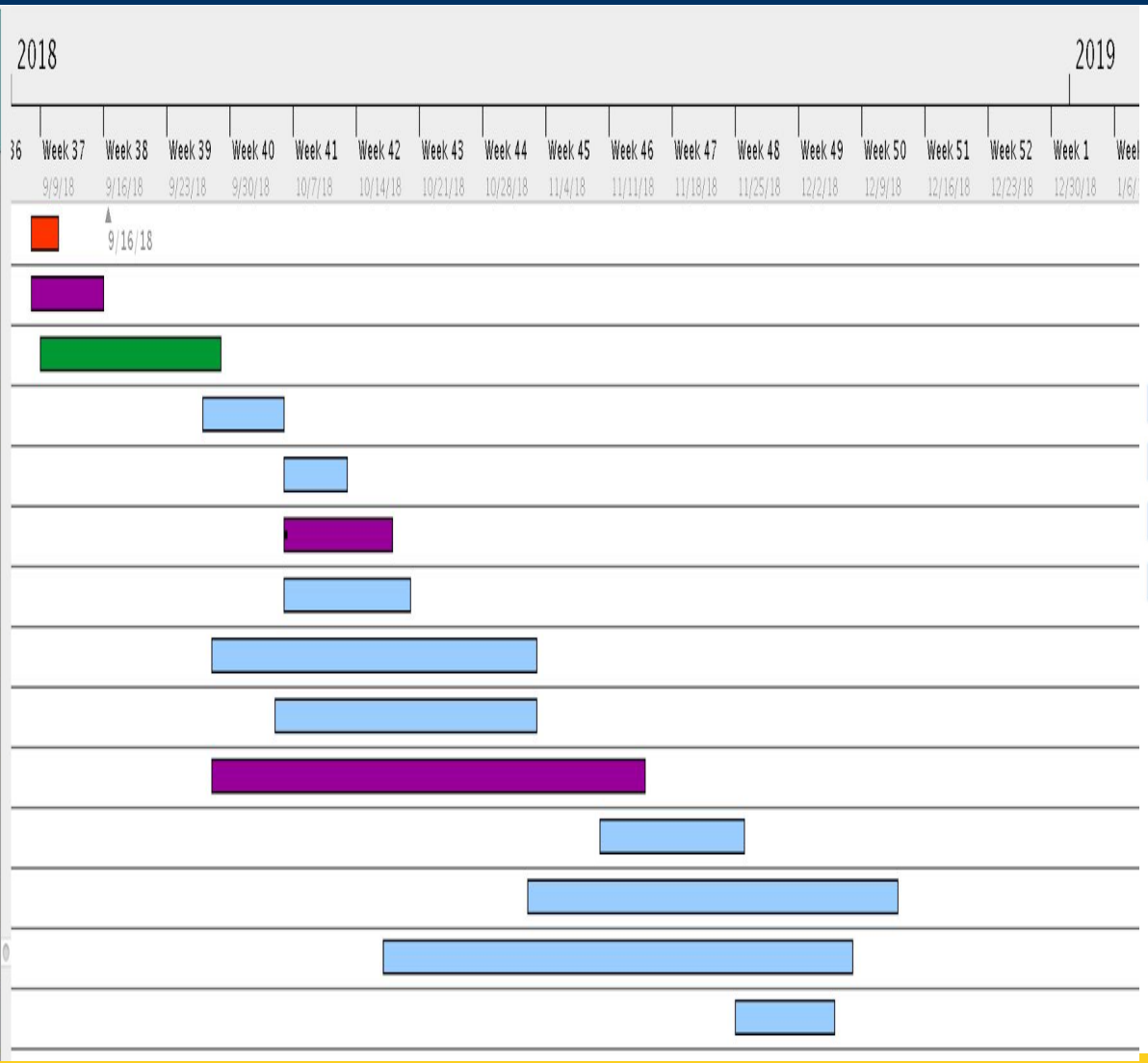
House of Quality (HoQ)

Customer Requirement	Weight	1.Below Knee	2.Prosthetic leg must hold up 0-200lb	3.Can be printed in any 3D printer	4.Must weight from 0-7lb.	5.Limited filament materials (ABS, HIPS, Carbon Fiber)	6.Fits different height ranges from 5'-0"till 6'-5" persons height	7.Affordable	8.Easy to transport	9.Resistant to weather	10.Free ages use from 13 and higher	11.Does not damage the person leg	12.Comfortable to wear and use
1. Below Knee	9	9	6		6		3				3	9	9
2.Holds up to 200 lb adult male	9		9		9							3	3
3.Must be printed from 3D printer	9	3		9	3	9	9		6				3
4.Weight 7 lb at most	9		9	6	9	6	3		6			6	6
5.Limited filament materials	5		6	9	3	9		6		9			3
6.Fits different heights sizes	7	6	3	6	9	6	9		3		3		9
7.Easy to carry	1			3	9	6			9				
8.Adjustable to all weathers	1			6	3	6				9		6	
9.Comfortable	6	3	6		3	6	6	3	9				9
10.Safety	9				9	3				9	6	6	9
11.Free ages use	3						3	6	3		9	6	3
12.low cost	9		3	6	3	9		9					
Absolute Technical Importance (ATI)		168	330	285	441	378	243	147	201	135	102	240	411
Relative Technical Importance (RTI)		9	4	5	1	3	6	10	8	11	12	7	2

Schedule

Table: 2

Name	Begin date	End date
Project Team Charter	9/8/18	9/10/18
Presentation 1 - Background	9/8/18	9/15/18
Website Check 1	9/9/18	9/28/18
Peer Evaluation 1	9/27/18	10/5/18
Analytical Analyses 1 Team Memo	10/6/18	10/12/18
Presentation 2 - Concept Gen and ...	10/6/18	10/17/18
Preliminary Report	10/6/18	10/19/18
Website check 2	9/28/18	11/2/18
Peer Evaluation 2	10/5/18	11/2/18
Final Presentation	9/28/18	11/14/18
Final Proposal Report	11/10/18	11/25/18
Website Check 3	11/2/18	12/12/18
Final CAD Package and BOM	10/17/18	12/7/18
Final Prototypes Summary	11/25/18	12/5/18



Budget

Established by considering :

1. CNs
2. Searching for similar projects.
3. Places where we can find 3D printer (Labor and renting a 3D printer).
4. The cost of the materials.

References

- “Harmony below-knee vacuum prosthesis,” ottobock. [Online]. Available: https://www.ottobockus.com/prosthetics/lower-limb-prosthetics/solution-overview/harmony-below-knee-vacuum-system/.
- “Below-knee prosthesis with: Triton Harmony,” ottobock. [Online]. Available: https://www.ottobock.co.uk/prosthetics/lower-limb-prosthetics/prosthetic-product-systems/harmony_below_knee_vacuum_system/


Any
Questions