

PROJECT FOUR: MILESTONE 3 – COVER PAGE

Team Number: Tues-26

Please list full names and MacID's of all *present* Team Members.

Full Name:	MacID:
Ahmed Mohamed	mohaa97
Jackson Lippert	lippertj
Andrew Krynski	krynskia
Borna Sadeghi	sadegb1

MILESTONE 3.1 – REFINED CONCEPT: INITIAL PROTOTYPE

Team Number:

Tues-26

1. Copy-and-paste picture(s) of each team member's refined concept (initial prototype) on the following pages (1 team member per page)
 - Be sure to clearly indicate who each refined concept belongs to
2. Include details on how concept was refined (what feedback was incorporated, what features are different than previous concept exploration, etc.)

We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:

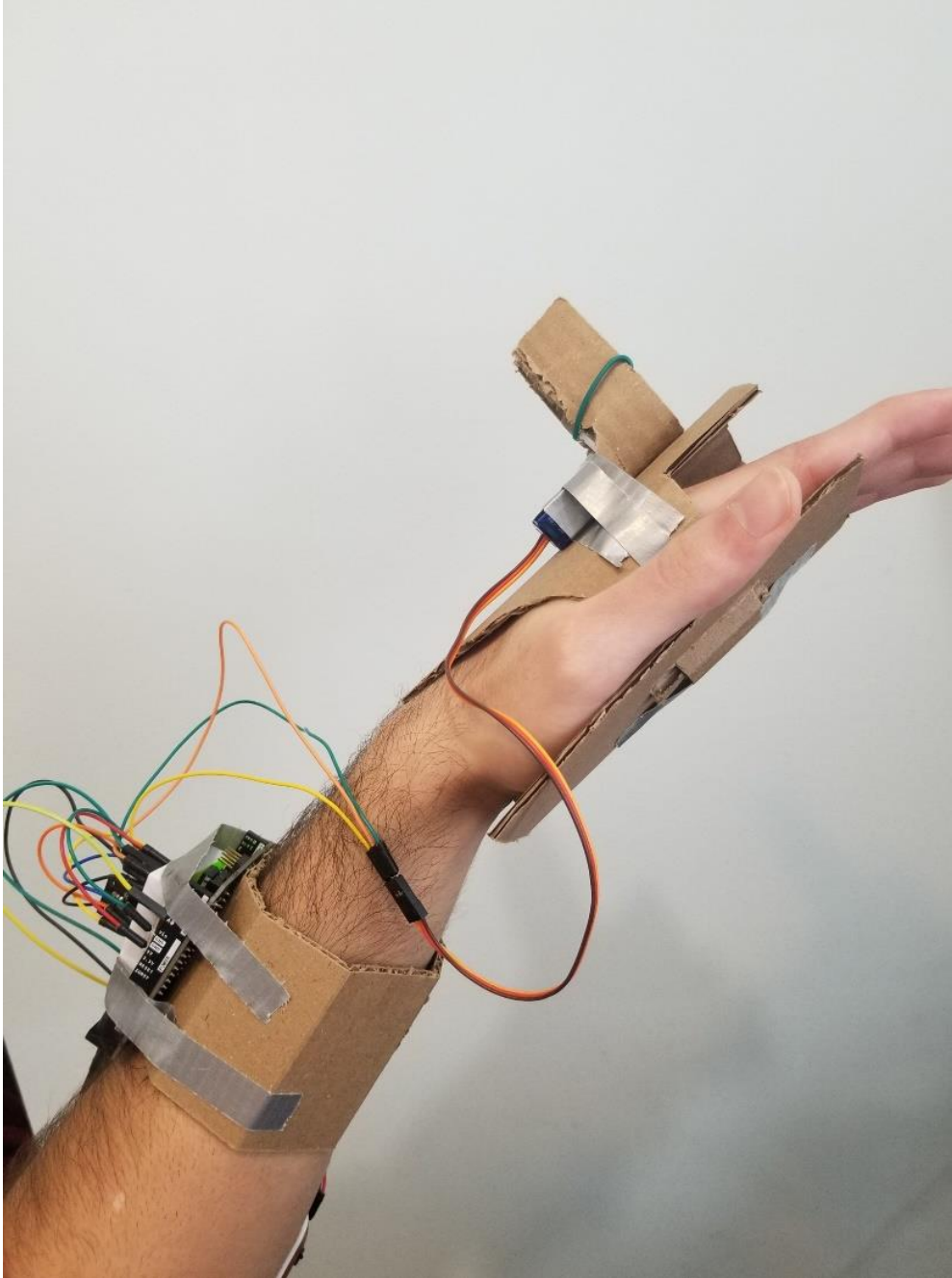
- Each team member needs to submit picture(s) of their refined concept with the **Milestone Three Individual Worksheets** document so that it can be *graded*
- Compiling your individual work into this **Milestone Three Team Worksheets** document allows you to readily access your team member's work
 - This will be especially helpful when completing the rest of the milestone

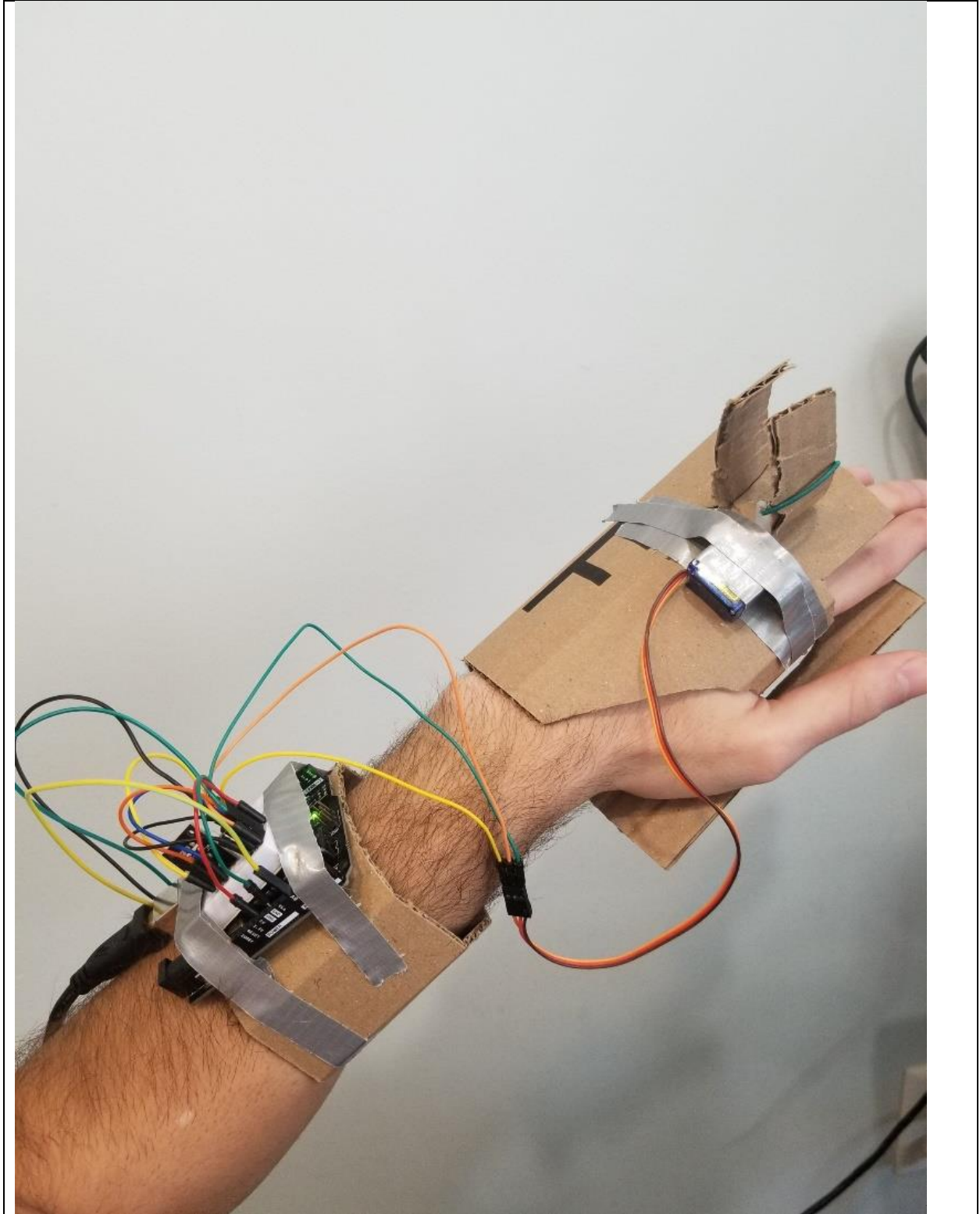
Team Number: Tues-26

Name: Borna Sadeghi

MacID: sadegb1

Insert picture(s) of your refined concept (initial prototype) below.







Name: Borna Sadeghi

MacID: sadegb1

Include details on your thought process and how the concept was refined below, with notes on relevant feedback that was incorporated (max. 200 words).

The main purpose of this design is to give the client an easy alternative to holding a small item with her hand. She reported that a pen grip can be painful for her, so this small universal robotic claw near the fingers is intended to help with that, allowing her to keep her hand open while holding on to a small object. Currently, the gripping mechanism is controlled by a muscle sensor, but this is only for the prototype as I wanted to learn how to use the sensor since it seems like it could potentially be useful for our project. I added an IR sensor as a backup to control the claw with a remote in case the muscle sensor didn't work.

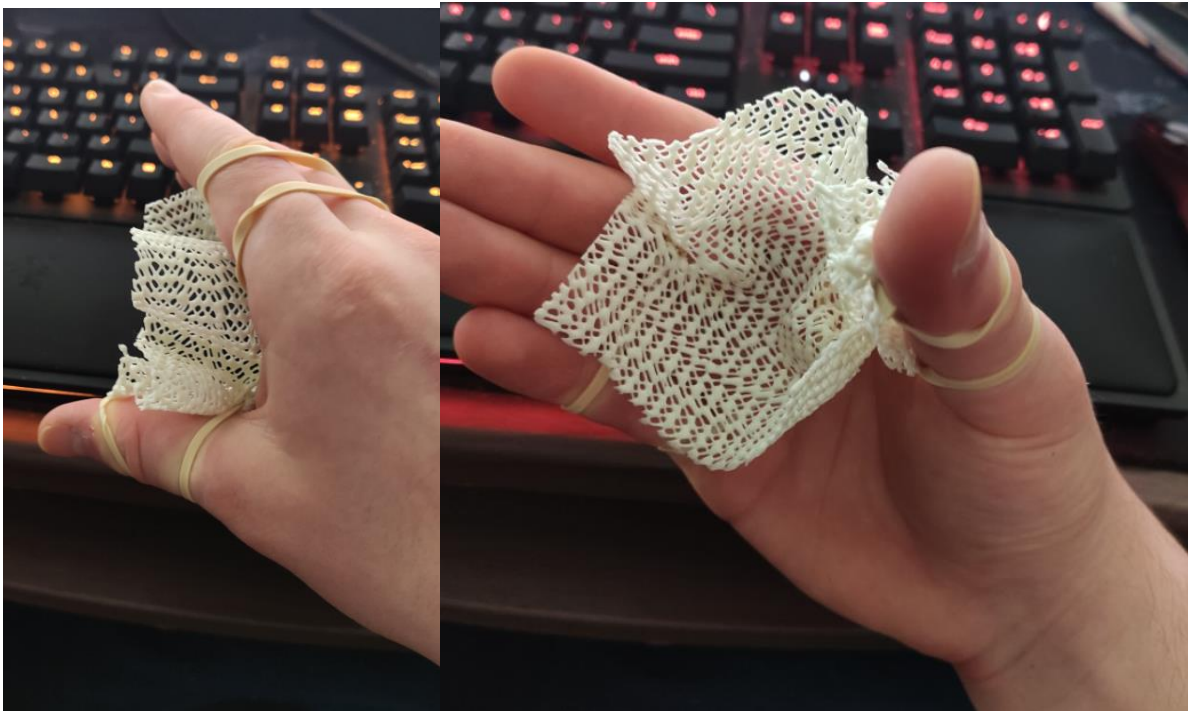
Bosco tips from Bosco

- Position of the gripper is a bit unnatural for someone using a pen/paintbrush
- Muscle sensor/IR sensor with remote may not be the easiest way for the client to use this
- Perhaps could incorporate a fin-ray gripper to allow for gripping almost all small objects
- Could try changing the gear ratio to allow for more torque in the servo and ultimately the gripper
- Doesn't support the arm (which is the main issue she's having)

Team Number: Tues-26

Name: Andrew Krynski


MacID: krynskia



ENGINEER 1P13 – Project Four: *Power in Community*

Name: Andrew Krynski	MacID: krynskia
<p>Design 1: The idea was to create a way for the client to reduce stress on her forearm while painting. This design allows the client to be supported at any place along her canvas using a 2-axis system. This is possible by using castors on the support to move over the art and using a sliding system within as the second axis. This will hopefully relieve the client's pain while painting, as well as improving the time she is able to paint for. From the feedback we have been recommended to use locking castors.</p> <p>Design 2: The idea behind this design was to create a way for the client to hold on to her tools longer without causing strain on her forearms and hand. The design uses a grip pad attached to an elastic system to hold the client's hand closed on implements she is holding. This cannot only be used for her painting implements, but also for other items in day-to-day life. From the feedback we have been recommended to use softer materials.</p>	

Team Number: Tues-26

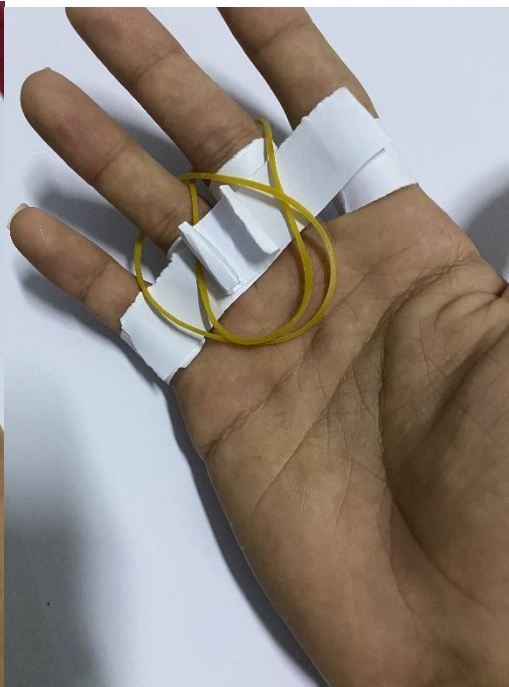
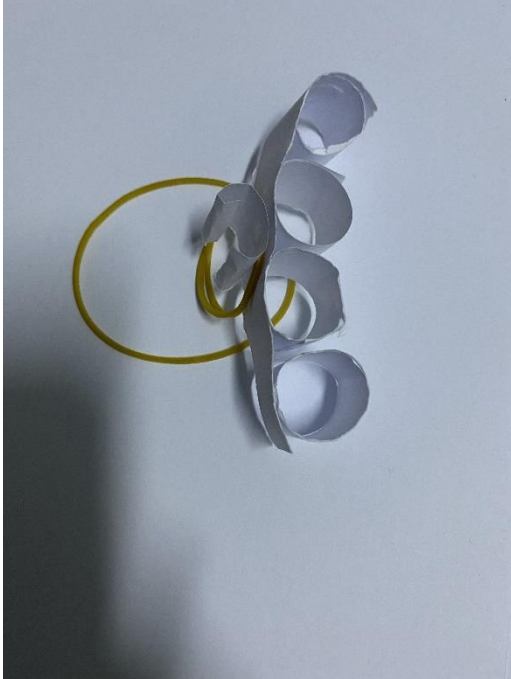
Name: Jackson Lippert	MacID lippertj
<i>Insert picture(s) of your refined concept (initial prototype) below.</i>	
	

Name: Jackson Lippert	MacID lippertj
<i>Include details on your thought process and how the concept was refined below, with notes on relevant feedback that was incorporated (max. 200 words).</i>	
<p>This design was a modification to Andrew’s original idea, which incorporated things that I thought may be useful. Firstly, the design will allow the client to paint without having to keep her hand supported so she will not smudge the paint. This will prove to be very useful for the client because it will lessen muscle fatigue and pain. I made the design using a caster wheel as the mobile component, which will allow the support to ride overtop of the canvas. The other side will be fixed in place and have only a rotational degree of freedom. That part will be clamped to whatever work surface our client is working on, providing a stable place for the device to rotate about. The arm rest will slide around inside of a track and also be able to turn, which allows the client to have full range of motion over the page.</p>	

Team Number: Tues-26

Name: Ahmed Mohamed

MacID mohaa97



ENGINEER 1P13 – Project Four: *Power in Community*

Name: Ahmed Mohamed	MacID mohaa97
<p><i>Include details on your thought process and how the concept was refined below, with notes on relevant feedback that was incorporated (max. 200 words).</i></p> <p>The main purpose of the design is to ensure that the client will hold the tools she uses while drawing with ease, since she stated that it is extremely painful for her to hold the tools with a small grip such as a pen or a brush for a long period of time with comfort.</p> <p>The design has 5 support strands around the client fingers that is made of comfortable material to help keeping the concept in place. The grip pad is where the tool that will be used is going to be in place and the main purpose of the elastic bands is to keep the tool and the pad in place while constant movement when drawing or any other daily life task.</p>	

*If you are in a team of 5, please copy and paste the above on a new page.

MILESTONE 3.2 – DECISION MATRIX

- As a team, use a decision matrix to aid you in choosing two concepts to proceed with.
→ Your concept titles should be descriptive (i.e., “Pencil with Hook” instead of “Design A”)

	Ease of use	Quality of life improvement	Cost effective	Reliability	Flexibility (useable for more than one task)	Design and manufacturing simplicity
Ease of use	N/A	0	0	1	0	0
Quality of life improvement	1	N/A	0	1	0	0
Cost Effective	1	1	N/A	1	1	1
Reliability	0	0	0	N/A	0	0
Flexibility (useable for more than one task)	1	1	0	1	N/A	1
Design and manufacturing simplicity	1	1	0	1	0	N/A
Total	4	3	0	5	1	2

ENGINEER 1P13 – Project Four: *Power in Community*

	Weight	Muscle sensor gripper	Arm support with casters	Elastic glove grip
Reliability	5	1	3	2
Ease of use	4	1	2	3
Quality of life improvement	3	3	1	2
Design and manufacturing simplicity	2	1	3	2
Flexibility (useable for more than one task)	1	2	1	3
Total		22	33	35

2. The numbers you associate with your criteria (objectives and constraints) will probably be an estimation at this point, so **your top two concepts may not always end up being the top two scoring from the decision matrix**. You should provide justification for your team's thought process in choosing the top two concepts. This should include, but is not limited to, explaining:
- Your choice of decision matrix tool
 - Your rationale behind your choice of criteria
 - Why you prioritized criteria the way that you did (if ranking and/or weighing them)
 - What metrics you used to decide your scoring of concepts within the criteria

	<i>Insert your team's top two concepts below.</i>
Concept 1:	<i>Elastic glove grip</i>
Concept 2:	<i>Arm support with casters</i>

Include your team's justification below.

- We chose to use a weighted decision matrix because it allowed us to give priority to certain criteria which we view as more important.
- The criteria we chose directly reflected the important points that must be addressed with this project.
- We used two matrices; one to determine the weights of the criteria, and one to determine the best product according to the criteria. We evaluated each criterion against the others to rank its importance, which is why we ended up with the weighting that we did.
- We discussed various possibilities and challenges that each design might face and inferred whether one design was better at a certain thing than another. Using the weights that we calculated in the first matrix, we ranked each design in order of best to worst, which gave quantitative data on which is the best.

The elastic glove grip is a simple and elegant design which scored the highest on our weighted decision matrix. However, when considering the scope of this project, we found that the arm support with casters is superior because it solves a specific problem that our client was facing. For this reason, we are most likely going to pursue the arm support with casters for a final design, but we may integrate a version of the elastic glove grip into the design.

MILESTONE 3.3 – DESIGN REVIEW

Team Number: Tues-26

Include your feedback from both your peers and the science students below.

Name: Jackson Lippert	MacID: lippertj
<i>Include feedback from peers in this row.</i>	
<ul style="list-style-type: none">• <i>Only one caster wheel on the mobile side may present a problem with the design tipping over and breaking.</i>	
<i>Include feedback from science students in this row.</i>	
<ul style="list-style-type: none">• <i>Dripping paint on either design might impact performance.</i>• <i>Stability of support with casters on floor may need refining.</i>• <i>Take materials into consideration to make cleaning and stability easy.</i>	