PROJECT FOUR: MILESTONE 3 – COVER PAGE

Team Number: Thurs-18

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

Full Name:	MacID:
Chengyao Liu	liuc169
Jianhao Wei	weij50
Sarah Youssef	yousss6
Vaisnavi Shanthamoorthy	shanthav

MILESTONE 3.1 – REFINED CONCEPT: INITIAL PROTOTYPE

Team Number: Thurs-18

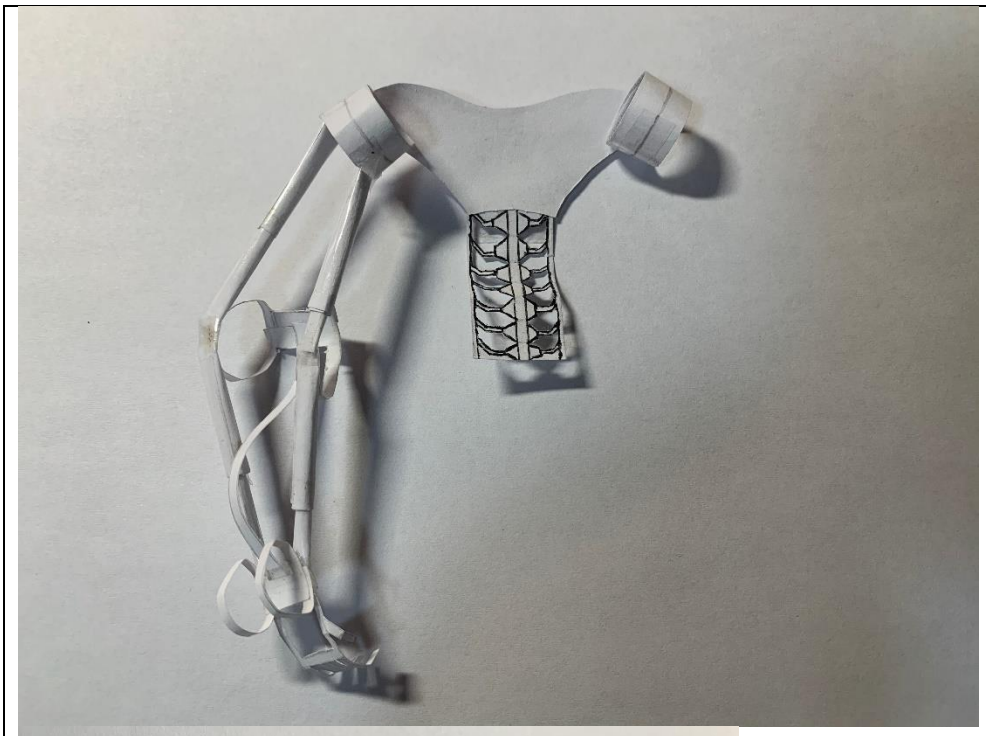
1. Copy-and-paste picture(s) of each team member's refined concept (initial prototype) on the following pages (1 team member per page)
   → Be sure to clearly indicate who each refined concept belongs to
2. Include details on how concept was refined (what feedback was incorporated, what features are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

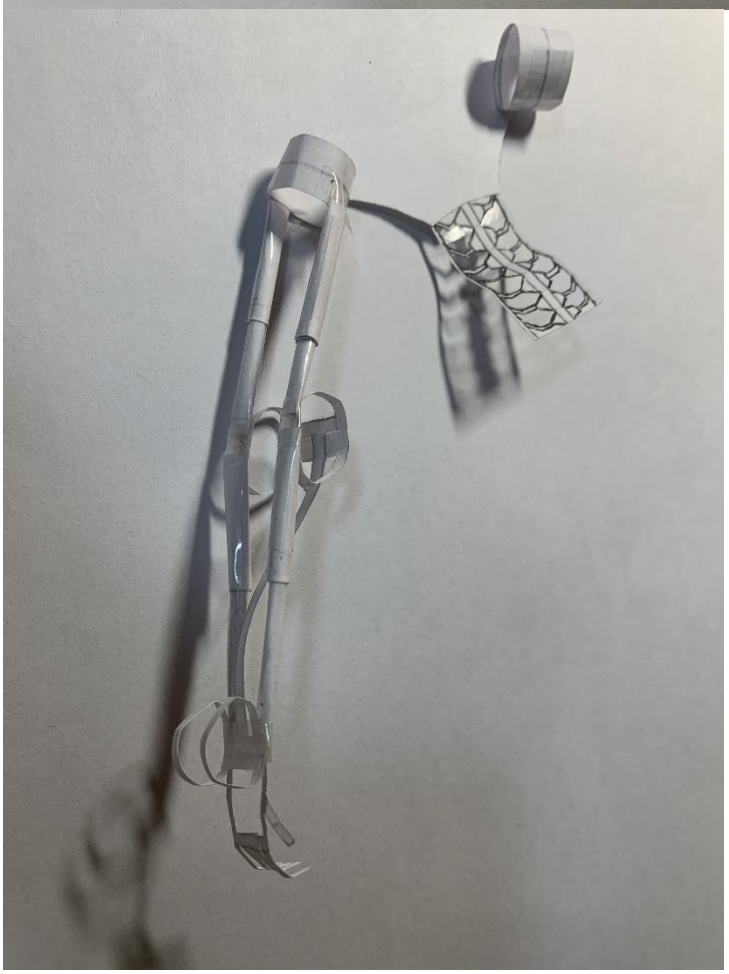
We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:

- 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: Thurs-18

Name: Chengyao Liu	MacID: liuc169





Concept Name: *Dynamic Arm Brace*

Name: Chengyao Liu	MacID: liuc169

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 client mentioned that the arm can't bear too much weight, and the fingers tremble when painting, which can't achieve the ideal expectation. Therefore, I want to make a device to help the client bear the weight of the arm muscle, and at the same time, it can play a stable effect. At joints of this mechanical arm are equipped with transmission devices. When she wants to move her arm, the devices can give assessment by providing force. So in this way it can low down the pressure on her arm muscle and pain. If she wants stability, like drawing a straight line, she just needs to lock the joints. And these can be controlled by the touch screen on the forearm. The idea of being an external mechanical device comes from the movie: Iron Man.

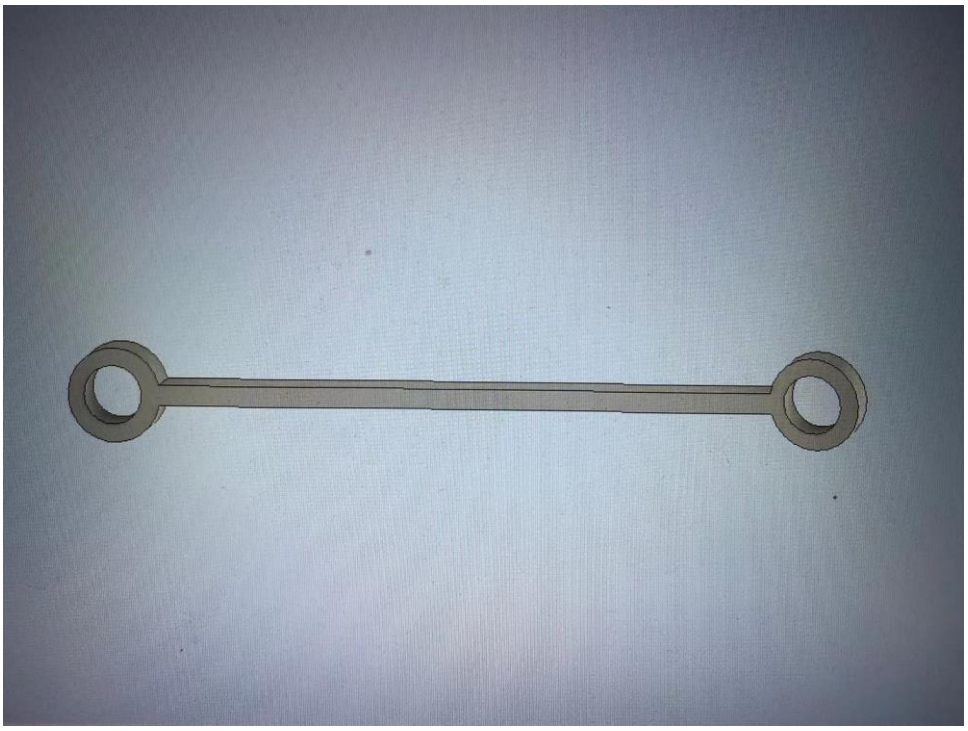
In the interview, the only feedback I received was to try to make something that could be made. My design is too complex, mechanical transmission structure and electronic control equipment is difficult to complete in real life, so the design is difficult to achieve.

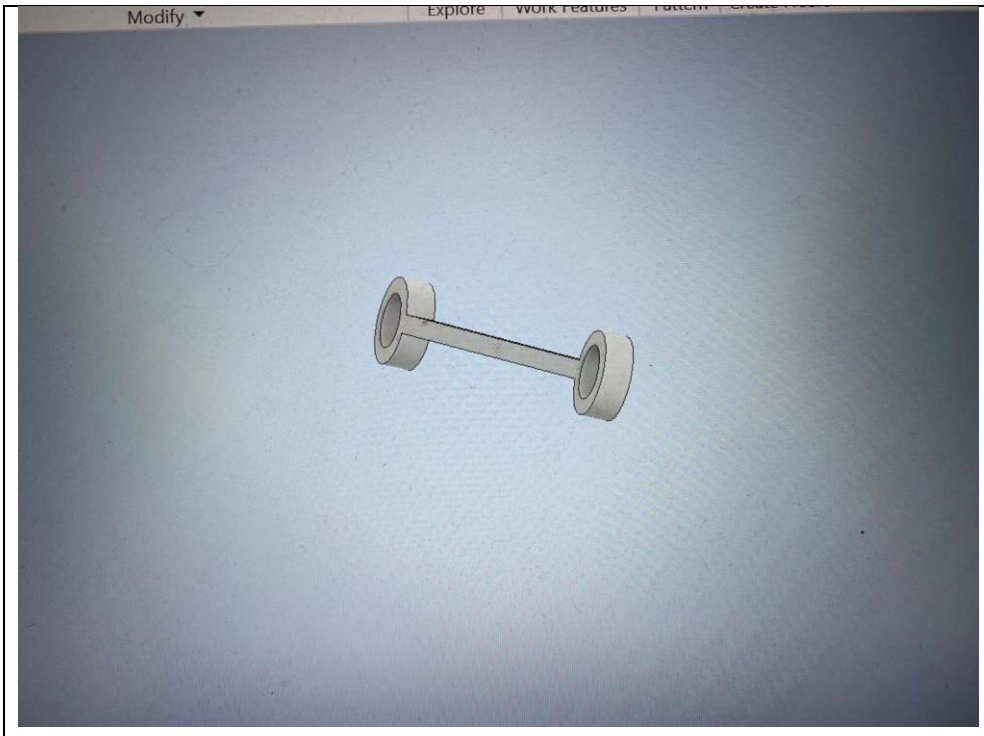
Team Number: Thurs-18

Name: Jianhao Wei	MacID: weij50

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

Concept Name: Forearm lifter

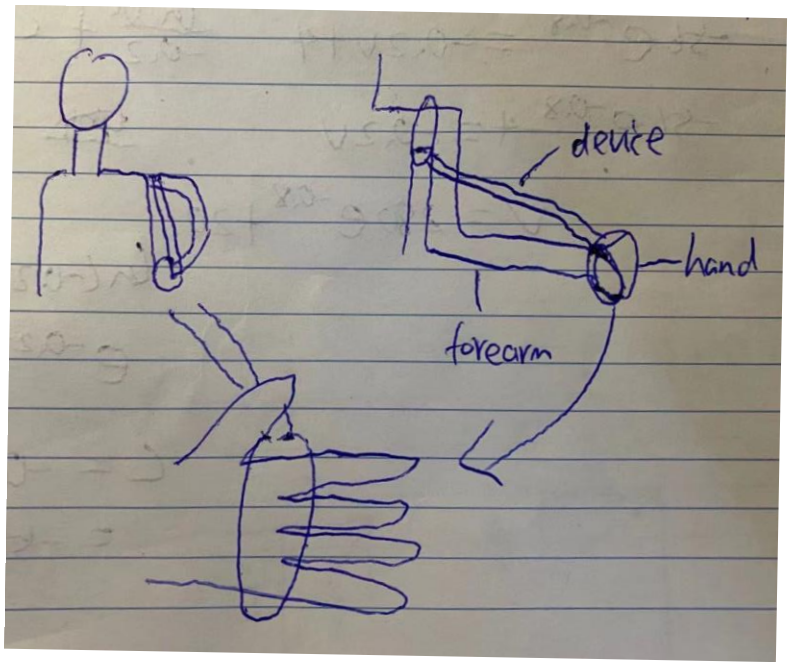



Modify
Explore

Name: Jianhao Wei	MacID weij50

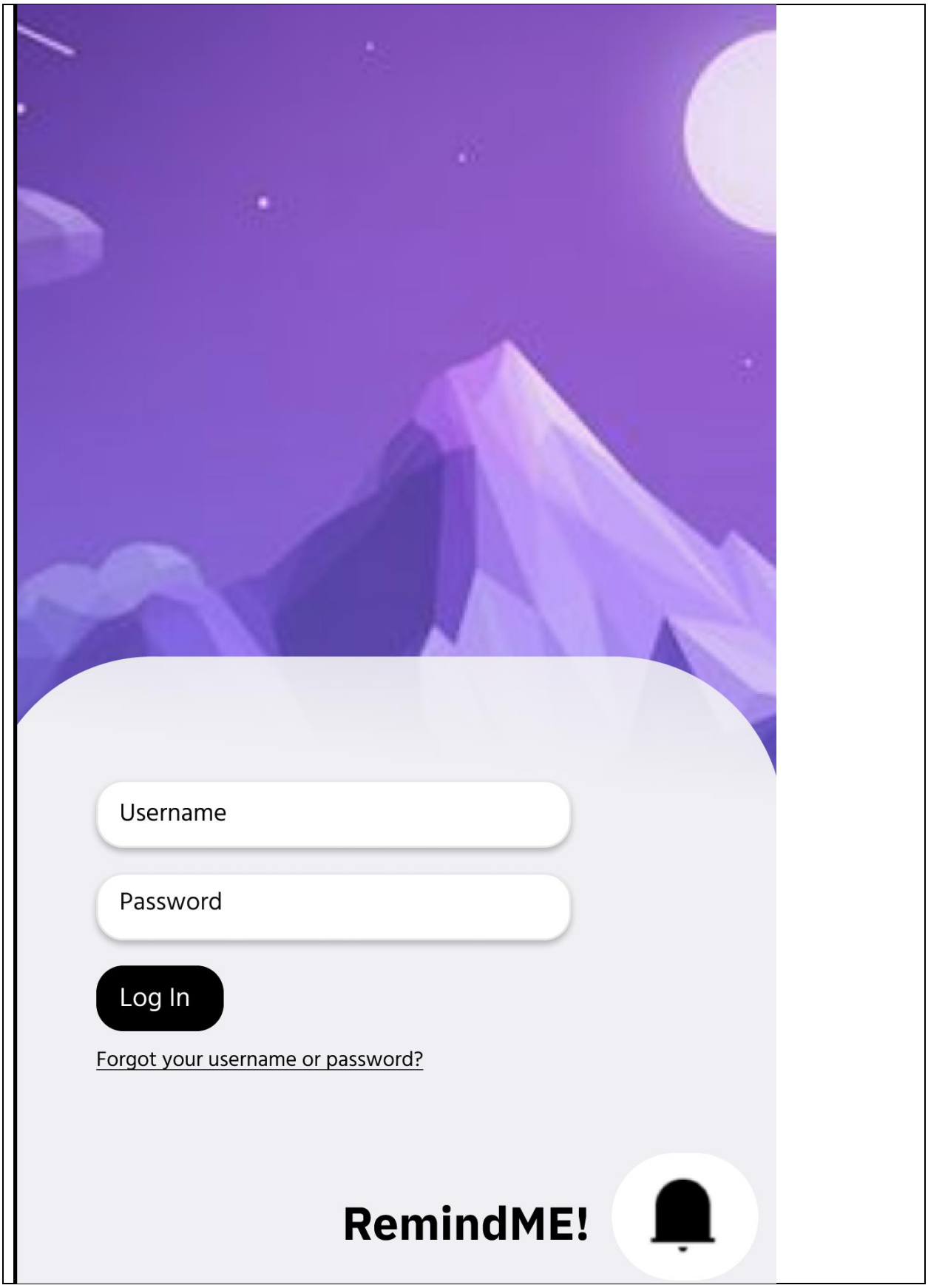
Include details on your thought process and how the concept was refined below, with notes on relevant feedback that was incorporated ***(max. 200 words).***

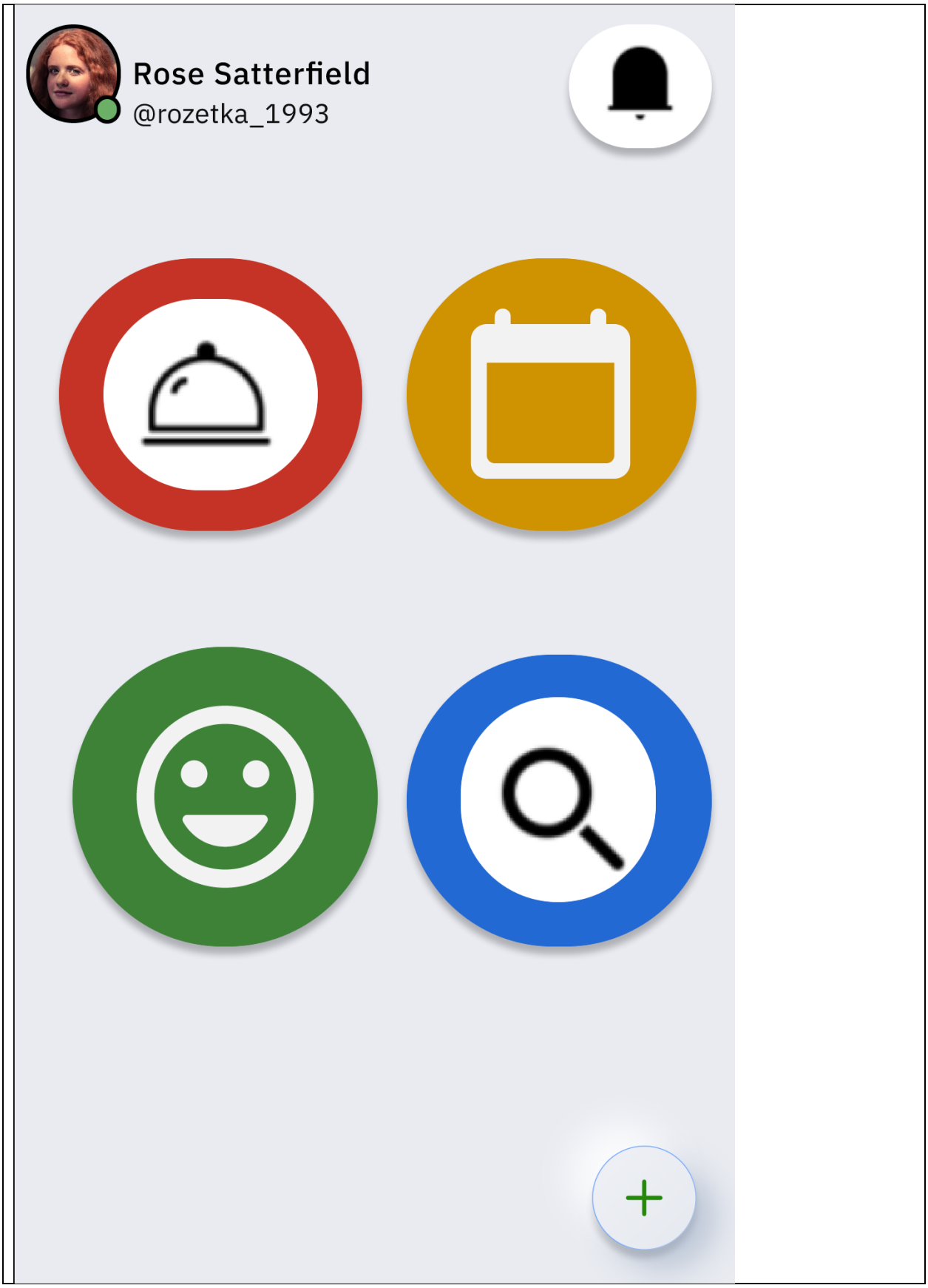
Since Alanna have excess pain to lift her arm to paint, I design a device to help her reduced the stress on her arm. This device is entirely made of stretchy elastic, so it can apply force base on the position of Alenna's arm. One side of the device can be wearing on her hand, and the other side of the device can be wearing on her shoulder. Once she wears this device, the device formed a triangle and support her arms. So it can release the stress on the muscle of her arms to reduce the pain. The making of this device requires dimensions of her arms. (See picture for details about how it works)

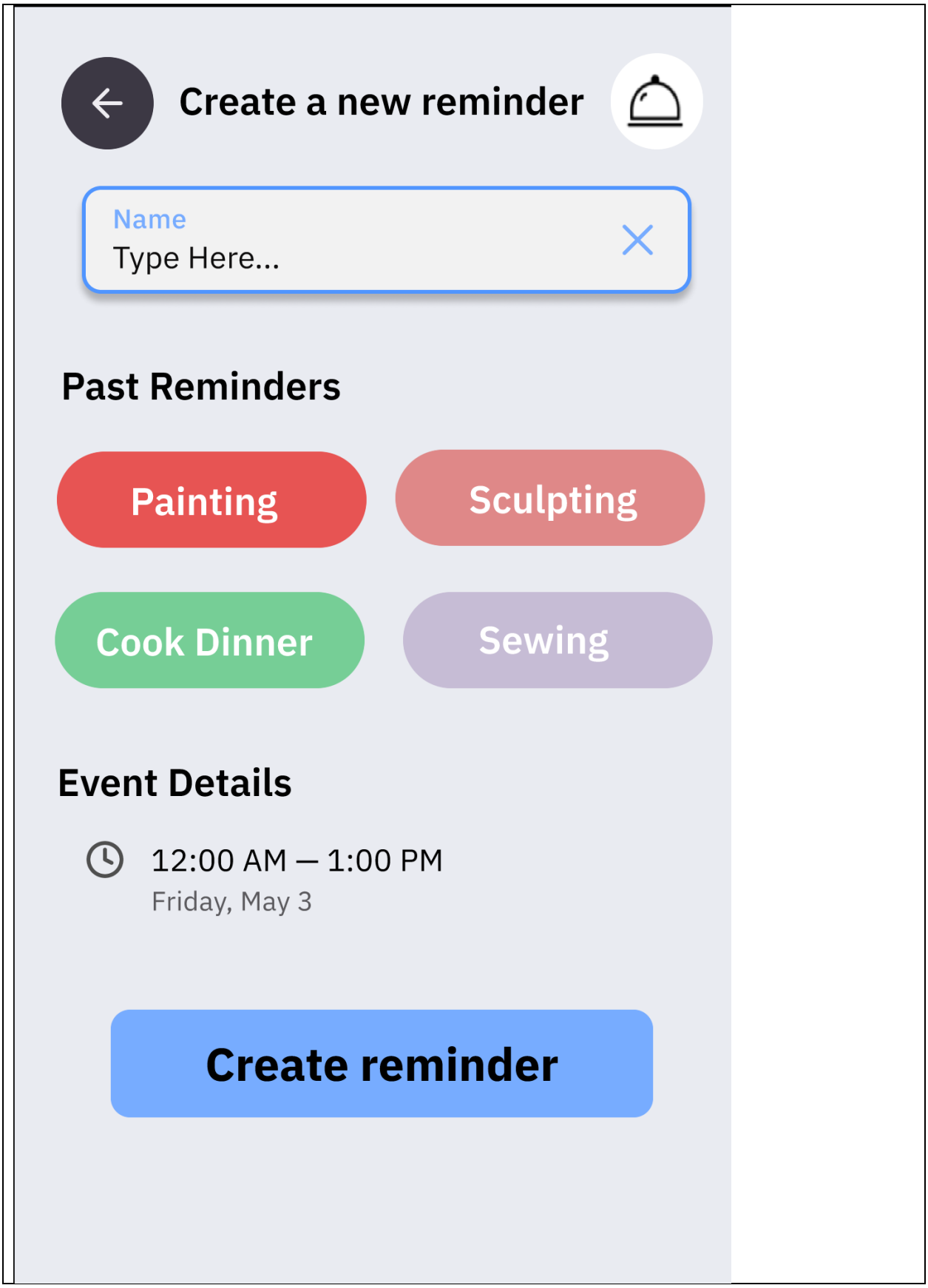


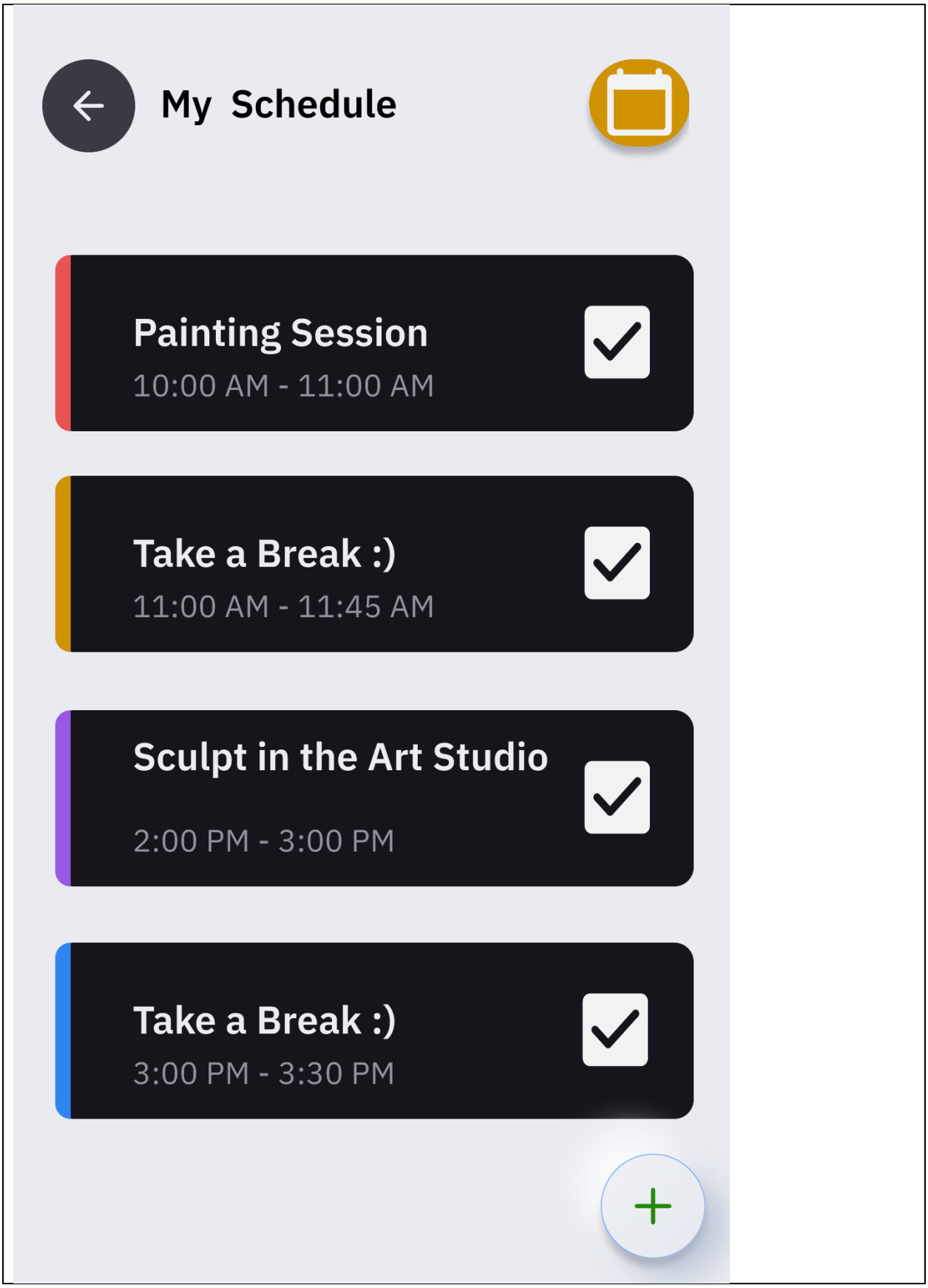
Team Number: Thurs-18

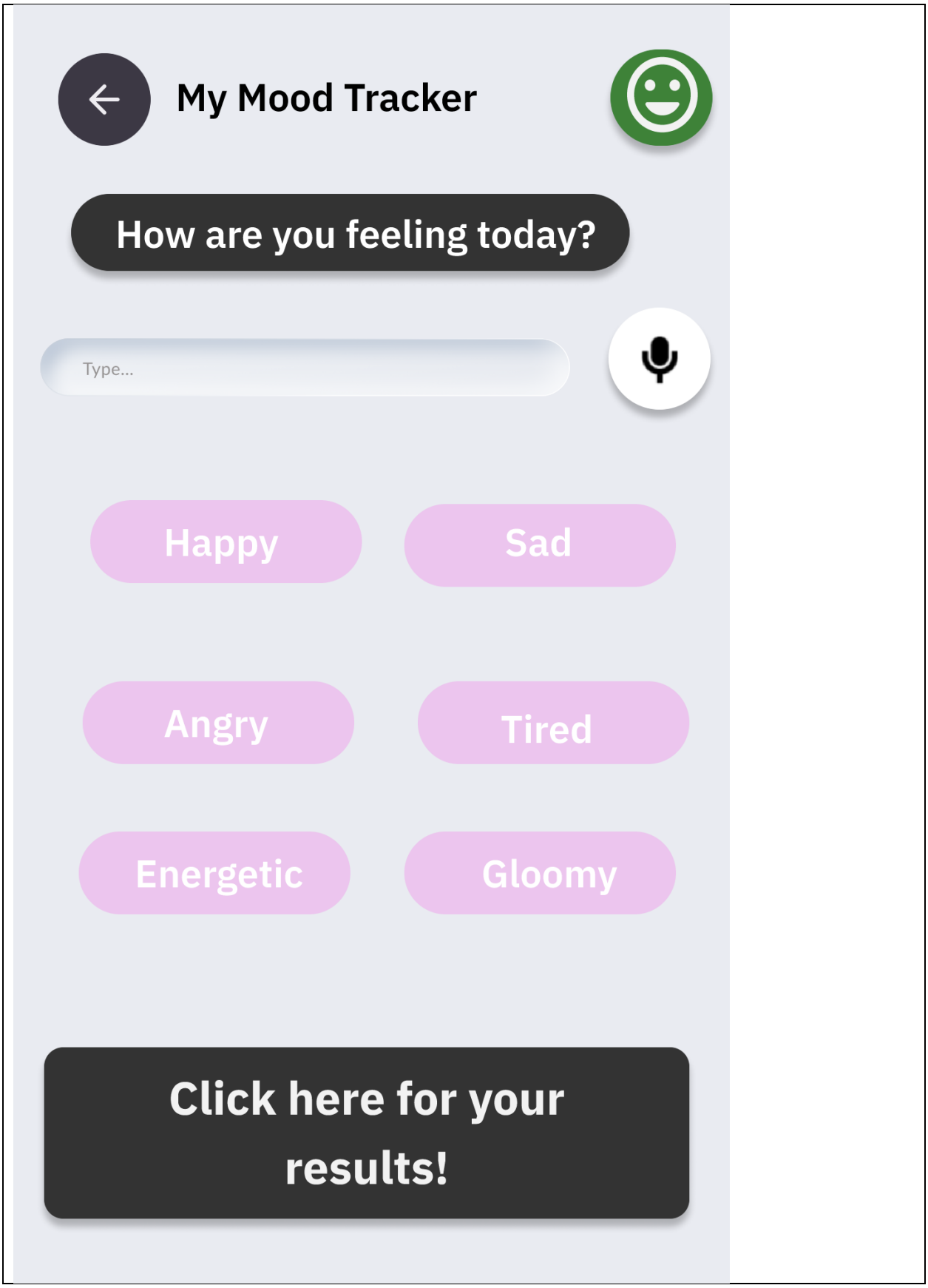
Name: Vaisnavi Shanthamoorthy	MacID: shanthav
Insert picture(s) of your refined concept (initial prototype) below. ***Concept Name: RemindME! App*** *Screenshots of my Figma prototype are included below**	

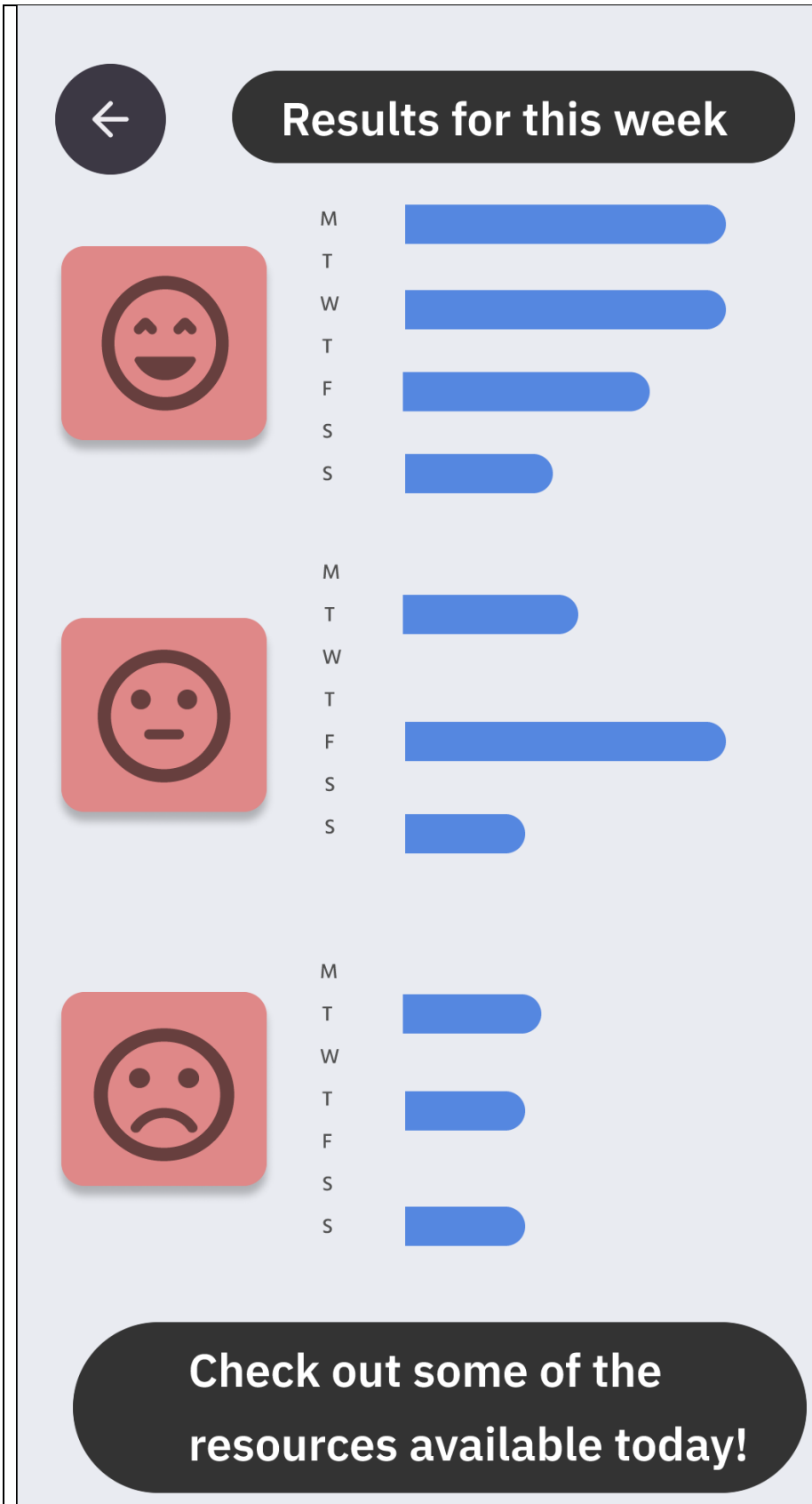

Username
Password
Log In
Forgot your username or password?
RemindME!


Rose Satterfield
@rozetka_1993


Create a new reminder
Name
Type Here...
Past Reminders
Painting
Sculpting
Cook Dinner
Sewing
Event Details
12:00 AM — 1:00 PM
Friday, May 3
Create reminder


My Schedule
Painting Session
10:00 AM - 11:00 AM
Take a Break :)
11:00 AM - 11:45 AM
Sculpt in the Art Studio
2:00 PM - 3:00 PM
Take a Break :)
3:00 PM - 3:30 PM


My Mood Tracker
How are you feeling today?
Type...
Happy
Sad
Angry
Tired
Energetic
Gloomy
Click here for your results!


Results for this week
M
T
W
T
F
S
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M
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W
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F
S
S
M
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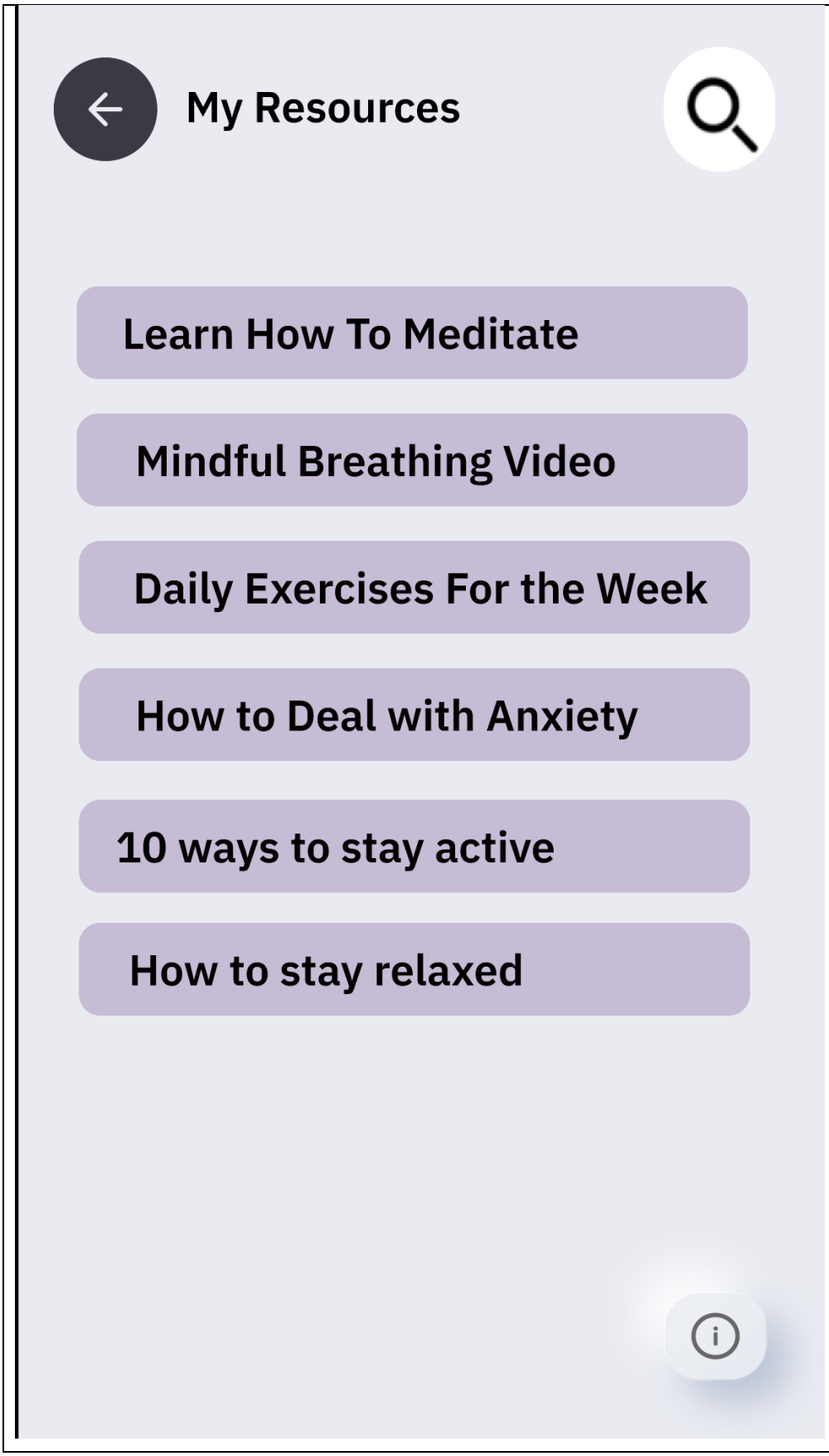
S
Check out some of the resources available today!


My Resources
Learn How To Meditate
Mindful Breathing Video
Daily Exercises For the Week
How to Deal with Anxiety
10 ways to stay active
How to stay relaxed

Name: Vaisnavi Shnathamoorthy	MacID: shanthav

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

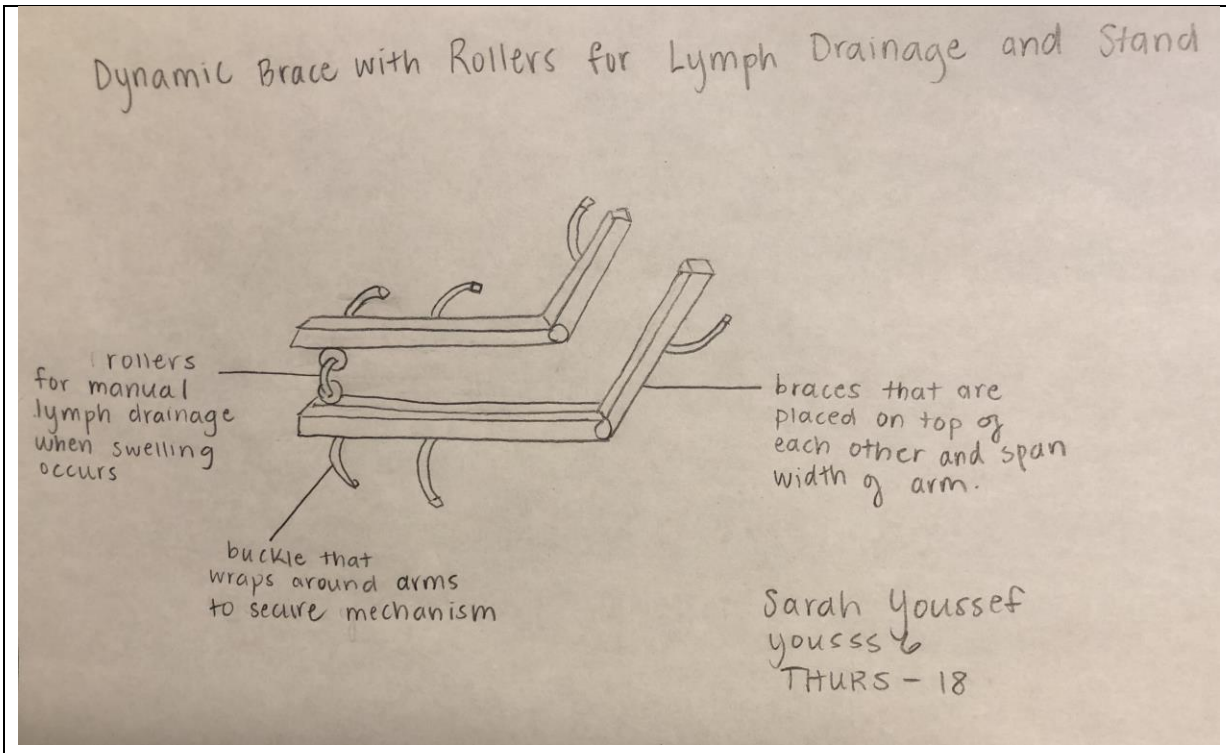
Our group wanted to initially tackle this design with both a physical and software approach. For the software approach, after doing a lot of research on the roadblocks the client has dealt with, she mentioned a lot of periods of unpredictable pain as well overworking her body leading to numerous flares. Thus, I thought we could develop a web app that could allow Alanna to take part in her daily activities whilst not risking overworking her body. This mobile app, RemindME!, offers numerous resources as well as simply manages her schedule in a manner where automated reminder breaks are inserted at appropriate times to ensure the user is not overworking their body. Additionally, I decided to add a mood tracker aspect that provides results based off the week so the client will be able to have a check in point with themselves of how they are feeling. In addition to other concepts I have refined, the resources section suggests activities, articles, or videos based upon the user's mood for the week, so if they are feeling tired most of the week, one of the sources suggested could possibly be 10 ways to stay active, etc.

Team Number: Thurs-18

Name: Sarah Youssef	MacID: yousss6

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

Concept Name: *Manual Lymph Drainage Arm Brace*



Name: Sarah Youssef	MacID: yousss6

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 concept was initially developed as a solution for the client's unpredictable lymphedema flares, as it provided a way for the lymphedema flares to be managed by the client whenever she felt she needed it. The idea of the prototype was to manage the pain through manual lymph drainage and using rollers to apply the pressure required to drain the nodes. The mechanism was designed to be simple, adjustable and easy to fix, as the client has mentioned many times that her children have access to all her equipment and is therefore prone to damage. If the mechanism were not easy to replace / fix, it would be exhausting and expensive for the client to constantly fix it. Alanna has also mentioned that she is not able to move heavy objects around, so the design needed to be easily portable and lightweight, which was included in the design so that it could be easily moved around and would not strain her body, even if the client is in pain. The buckles around the arm brace also allow it to be adjustable for the client, so that if there are any changes in her body, the device can be easily adjusted and there would be no need for more expensive equipment.

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

MILESTONE 3.2 – DECISION MATRIX

Team Number: Thurs-18

1. 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")

Include your team's Decision Matrix below.

Weighting for Criteria

	Lightweight	*Cheap to produce / manufacture*	*Durable*	*Aesthetically Pleasing*	*Adjustable*	*Bears Load off Arm*	***Score***
Lightweight	*1*	*1*	*1*	*0*	*0*	*0*	***3***
Cheap to produce / manufacture	*0*	*1*	*0*	*1*	*0*	*0*	***2***
Durable	*0*	*1*	*1*	*1*	*0*	*1*	***4***
Aesthetically Pleasing	*1*	*0*	*0*	*1*	*0*	*0*	***2***
Adjustable	*1*	*1*	*1*	*1*	*1*	*0*	***5***
Bears load off arm	*1*	*1*	*0*	*1*	*1*	*1*	***5***

Weighted Decision Matrix

	Weight	*Manual Lymph Drainage Arm Brace*		*RemindMe! App*		*Forearm Lifter*		*Dynamic Arm Brace*	
		Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating
Lightweight	3	5	**15**	3	**9**	4	**15**	1	**3**
Cheap to produce / manufacture	2	4	**8**	3	**6**	5	**10**	2	**4**
Durable	4	2	**8**	2	**8**	3	**12**	3	**12**
Aesthetically Pleasing	2	3	**6**	5	**10**	1	**2**	1	**2**
Adjustable	5	4	**20**	1	**5**	2	**10**	4	**20**
Bears load off arm	5	1	**5**	1	**5**	4	**20**	5	**25**
TOTAL			**62**		**43**		**69**		**66**

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

	Insert your team's top two concepts below.
Concept 1:	*Manual Lymph Drainage Arm Brace*
Concept 2:	Dynamic Arm Brace

Include your team's justification below.

The use of this decision matrix tool aided us in a manner where we were able to view the concepts from a different viewpoint, the client's viewpoint. It allowed us to be able to put ourselves in the client's shoes to be able to think about what the client would want in this design. It allowed us to eliminate obvious designs that would not work and highlighted designs that we initially did not think of ever being one of our top designs.

The criteria that were used to evaluate each design were based heavily on the objectives defined in previous milestones as these objectives would be the best to define if the mechanisms were efficient enough for the client's situation or not. Some criteria were based off specific requests of the client (ie. Visually appealing) so these were included as criteria as well. There were also influences in the criteria defined based on what the client has said about products that already exist (what she likes and dislikes about them).

We decided to utilize the weighing rating method in our decision matrix. This was mainly because we wanted to isolate the best design based upon their weighted ratings as this would allow us to view how much of each objective was weighed separately and would ultimately aid us in choosing the design based upon the objectives, we believed would ideally help the client in terms of having a higher rating for a certain weighed objective compared to another. The metrics we used to score our various concepts in terms of these criteria were solely based off the client's needs, and whether the client would benefit from this concept in terms of this specific objective was the question we were answering as going through each of the criteria.

Though the manual lymph drainage (MLD) arm brace is not one of the top two scores, this option seemed to be a rational design solution to the problem specified. The lymph drainage arm brace is also a logical approach when considering the client's situation with load bearing, as something excessively large or heavy may be difficult to move around. An easily portable and simple structure like the MLD arm brace could also be easily moved away from children who might break it, and its simple design will make it harder to break irrevocably. It also has a high enough rating for each criterion that it is a viable approach to the problem solution.

Through the dynamic arm brace, it satisfied a variety of our objectives and in turn led to being one of our top candidates for our design. Some of the objectives it stood out it in terms of our decision matrix, were that it aids in bearing load off the arm as well it is easily adjustable for the client. Thus, making it a clear candidate to be a potential final design as it tackled numerous of our objectives which made it clear to choose it as one of our top designs.

Although not included in our top concepts, we also hope to include the RemindME! App approach as we hope to involve a software aspect into our final design where it will relate to our physical design so that they are interconnected in a manner to further aid the client. All in all, the decision matrix tool aided us in isolating our top potential concepts in terms of our higher prioritized objectives and made this entire design process a lot simpler and clearer.

MILESTONE 3.3 – DESIGN REVIEW

Team Number: Thurs-18

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

Include feedback from peers in this row. • *Ensure that material is lightweight --> choose one that is adaptable for this case.* • *Interesting concept with the roller idea aspect for the manual lymph drainage arm brace concept*

Include feedback from science students in this row.
• *Mentioned that if we were to go with an arm brace, the client mentioned in a client session that all the arm braces present in the market are solely black --> potentially make it visually appealing to the client and offer different colours.*
• *Ensure that all of aspects of your design are something you can build if we were to be in person.*
  ○ *Think about the practicality of your designs.*
• *Possibly come up with an idea to combine both the brace and rollers concept.*
• *Ensure that the brace is not tightly fit and that since it is designed specifically towards the client, that if the client were to lose or gain weight, it should be adaptable in that sense.*
  ○ *We have buckles but we could potentially think of another solution for this.*
• *We suggested using cotton lining for our manual lymph drainage arm brace concept --> they said that would that be a great idea.*
• *Ensure that for your concept, it is easy to remove around the arm so that the client will not struggle with that aspect of it.*