PROJECT TWO: MILESTONE 1 – COVER PAGE

Team Number: Mon-42

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

Full Name:	MacID:
Housam Alamour	alamourh
Eniolaoluwa Adebayo	adebaye
Matthew Zhang	zhanm75
Mohammad Muntazar Bhurwani	bhurwanm

MILESTONE 1 (STAGE 1) – PRE-PROJECT ASSIGNMENT

Team Number: Mon-42

You should have already completed this task individually prior to Design Studio 7.

1. Copy-and-paste each team member's list of surgical instrumentives, constraints and functions on the following pages (1 team member per page)
    a. Be sure to indicate each team member's Name and MacID

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 their list of surgical instrumentives, constraints and functions with the **Milestone One Individual Worksheets** document so that it can be ***graded***
- Compiling your individual work into this **Milestone One Team Worksheets** document allows you to readily access your team member's work
    - This will be especially helpful when completing ***Stage 2*** of the milestone

Name: Housam Alamour MacID: alamourh

Objectives

- Should be accurate in how it picks up surgical instruments
- Should be precise (able to precisely pick up small and weirdly shaped surgical instruments)
- Should have a secure grip
- Be easy to clean/sterilize
- Arm should be water resistant (eg. Place scalpel in alcohol for sterilization)

Constraints

- Should not break or yield under the load of the surgical instrument
- Should be durable enough to complete the task
- The arm should not drop the surgical instruments when picking them up or moving
- Must have the power to move the surgical instruments to another position

Functions

- Be able to move the arm in 3-d space to the surgical instrument

- Be able to control the arm movement using muscle sensors (method: where are muscle sensors placed?)
- Be able to read the muscle sensor input and translate it to the arm
- The arm must be able to securely pick up surgical instruments
- The arm must be able to move the surgical instruments
- The arm must be able to release the surgical instruments
- Container must hold surgical instrument

Team Number: Mon-42

Name: Eniolaoluwa Adebayo	MacID: adebaye

Objectives

- Should be easy to use
- Should not be time-consuming
- Should hold surgical equipment
- Should transfer container

Constraints

- Lighter than 10kg
- Sanitary
- Smaller than $1m^3$

Functions

- Able to hold surgical tools
- Able to lift weights up to 8kg
- Able to fit in autoclave

Team Number: Mon-42

Name: Matthew Zhang	MacID: zhanm75

Objectives

- Arm should have a good grip
- Arm should be accurate in its ability to pick up container
- Arm should be accurate in its ability to put down container
- Container should be lightweight

Constraints

- *Arm must be durable so it does not break*
- *Arm must have the power to lift container*
- *Arm should not drop the container during lift*
- *Container must fit in autoclave*

Functions

- Arm is able to lift container
- Be able to move arm
- able to control arm movement
- Sterilization of surgical instrument in container

Team Number: Mon-42

Name: Mohammad Muntazar Bhurwani	MacID: bhurwanm

Objectives

- Should be precise to be able to pick small instruments
- Should have a secure grip to ensure safe transfer of instrument
- Easy to use

Constraints

- Must be able to withstand weight of the instrument
- Must have appropriate dimensions to hold the instrument

Functions

- Arm should pick up and move the container
- Container should be able to hold the instrument safely

MILESTONE 1 (STAGE 2) – LIST OF SURGICAL INSTRUMENTIVES, CONSTRAINTS, AND FUNCTIONS

Team Number: Mon-42

1. As a team, create a final a list of Objectives, constraints, and functions in the table below.
   → Use your individual *Pre-Project Assignment* to build your team's final list

   → The exact number you should have depends on what information you have gathered from the Project Pack.

Objectives	Constraints	Functions
Arm should be accurate in how it picks up the container	Arm and container is durable so it doesn't break	Arm can hold the container
Arm should have a secure grip	Arm must have power to lift the container	Container able to contain surgical instruments
Container should be easily transported with the arm	Container shouldn't be too big	Arm is able to securely pick-up container
Arm should be easy to use, control	The arm should not drop the surgical instrument when picking them up or moving	Arm is able to move the container
Container should be lightweight	Container must be able to fit in autoclave	Arm is able to release the container

2. What is the primary function of the entire system?

Arm is able to move and transfer container

3. What are the secondary functions?

Arm is able to pick up container
Arm is able to release container
Container is able to contain tools (surgical)
Arm is able to securely grip container
Sterilization of surgical instrument in container

MILESTONE 1 (STAGE 3) – MORPHOLOGICAL ANALYSIS

Team Number: Mon-42

1. Identify multiple means to perform the secondary functions that your team came up with during Stage 1 of this milestone. One sub-function (pick up) is already listed for you. The other two sub-functions are for your team to choose.
   → Make sure that every mean for the "pick up" sub-function assumes that the end effector of the robot arm is a gripper. The means for your other sub-functions do not need to follow this assumption.

Function	**Means**					
Pick up	Cup Handle (side of container)	Bucket handle (top of container)	Magnet	Hook	Clasping extension	
Sterilize tools in container	Holes	Drawer	Net	Cap		
Contains surgical instruments	Bag	Can	Bucket	Bowl	Cup	Box

MILESTONE 1 (STAGE 4) – CONCEPT SKETCHES

Team Number: Mon-42

Complete this worksheet *after* having completed stage 3 as a team ***and*** after having ***individually*** created your concept sketches.

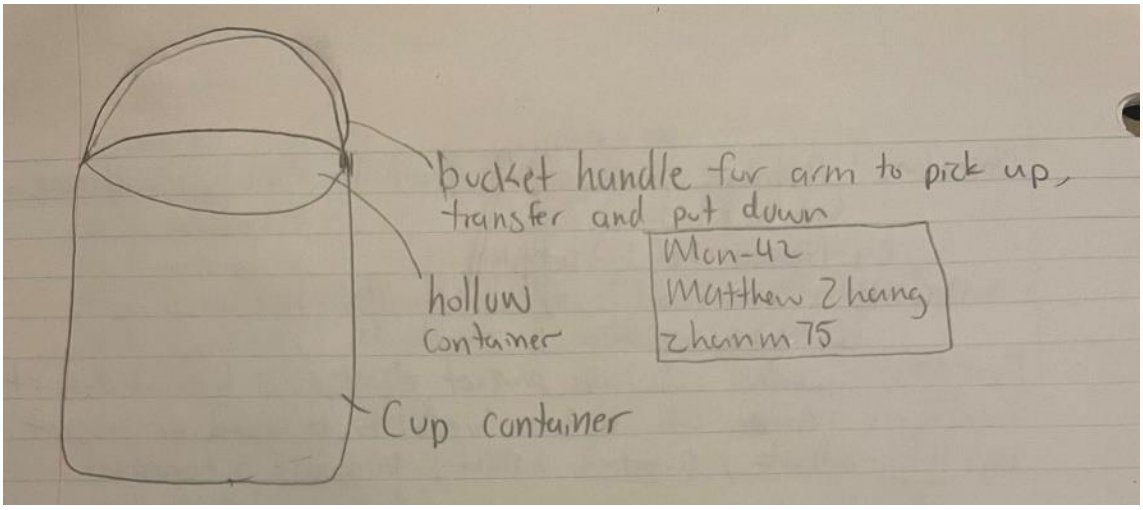
1. Each team member should copy-and-paste the photo of their individual concept sketches in the space indicated on the following pages
   → The photo's should be the same one your included in the **Milestone One Individual Worksheets** document
   → Be sure to include your **Team Number** on each page
   → Be sure each team member's **Name** and **MacID** are included with each sketch

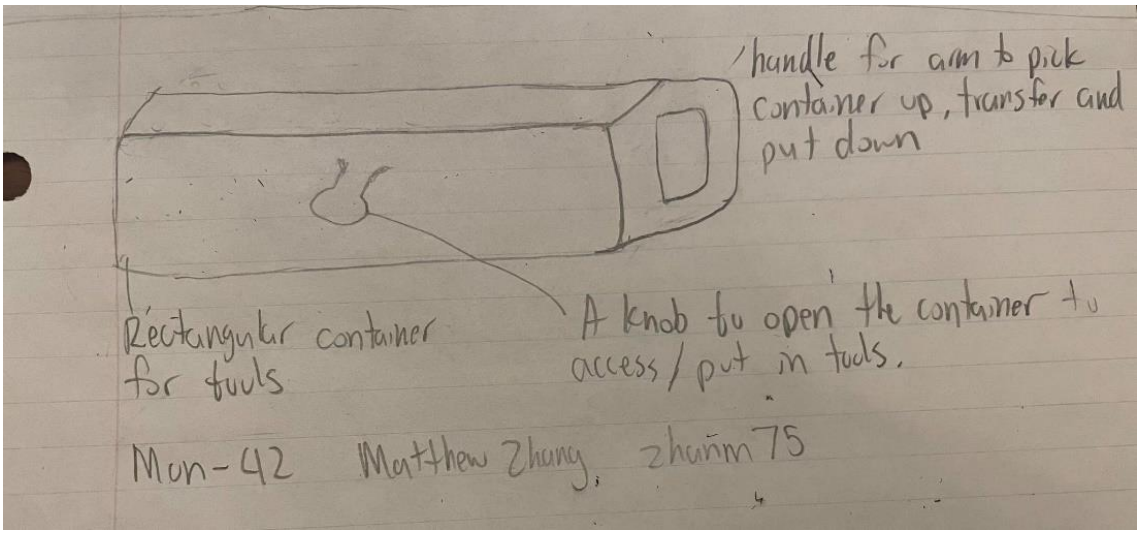
We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:

- Each team member needs to submit their sketch with the **Milestone One Individual Worksheets** document so that it can be ***graded***
- Compiling your individual work into this **Milestone One Team Worksheets** document allows you to readily access your team member's work

Team Number: Mon-42

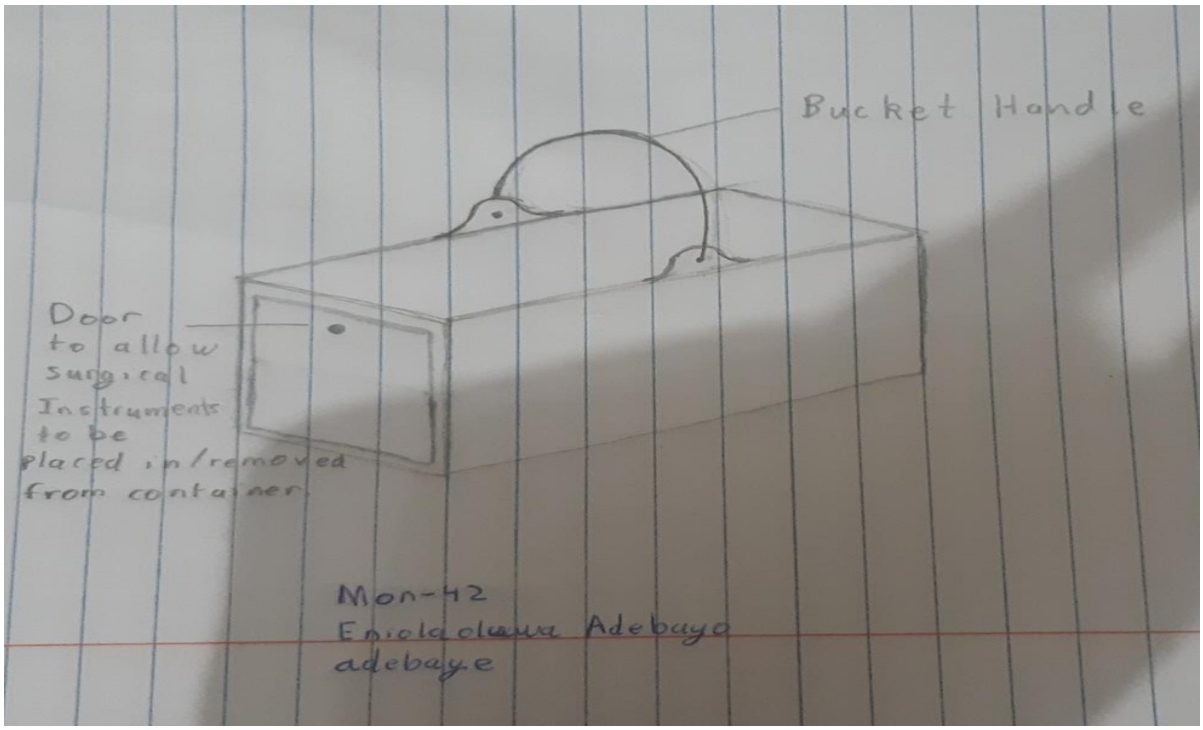
Name: Matthew Zhang	MacID: zhanm75

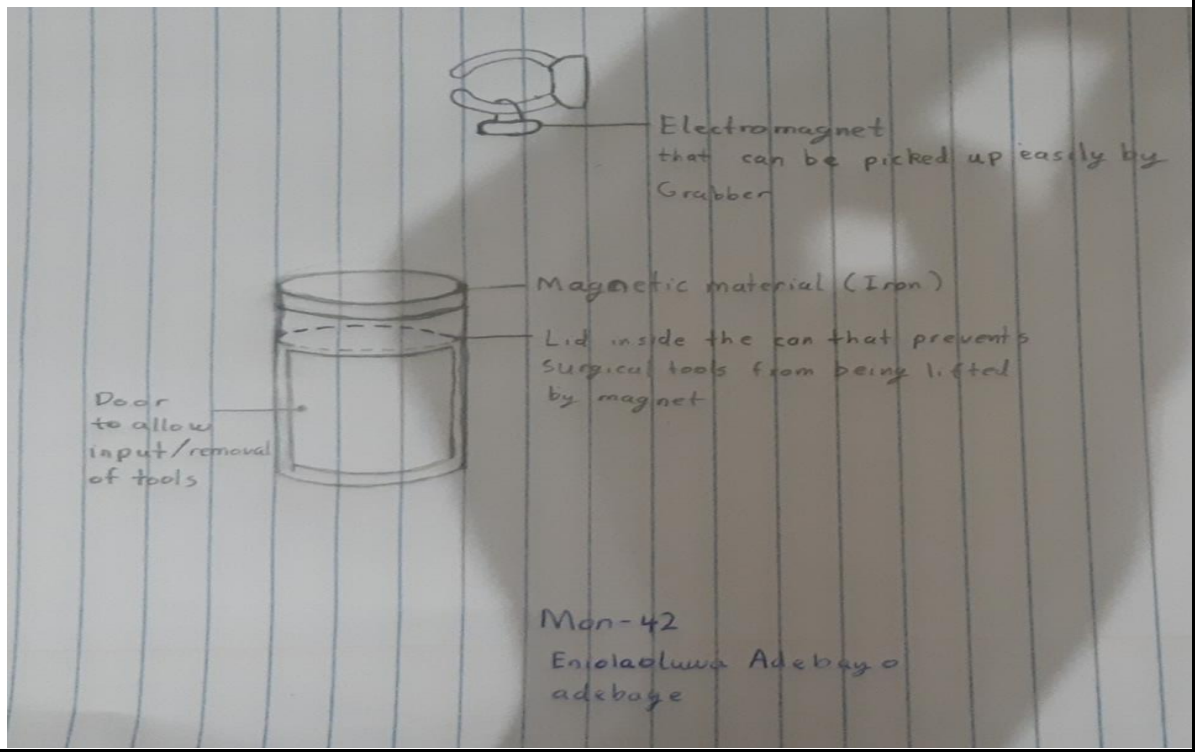




Team Number: Mon-42

Name: Eniolaoluwa Adebayo	MacID: adebaye



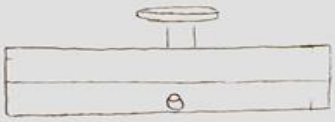


Team Number: Mon-42

Name: Mohammad Muntazar Bhurwani	MacID: bhurwanm

DESIGN STUDIO

The vertically raised circular extension serves as a mean for the robotic arms to clasp onto the container. It is centrally placed to allow equal distribution of mass.

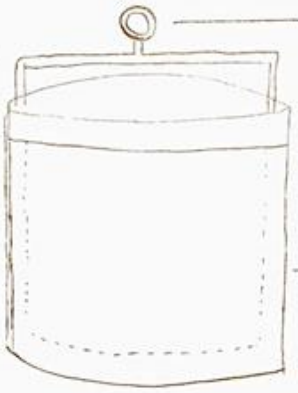


The bottom half of the container is hollow, to fit the instrument. Drawer like opening style.

MON-42
MOHAMMAD MUNTAZAR BHURWANI
bhurwanm

DESIGN STUDIO

MON-42
MOHAMMAD MUNTAZAR BHURWANI
bhurwanm



Hook attached to a beam on a lid. Central distribution of mass to allow easy grip for robotic arm

Removable lid to access container and place instrument

Placeholder for instrument bordered by thick walls.

Team Number: Mon-42

Name: Housam Alamour	MacID: alamourh