PROJECT TWO: MILESTONE 2 – COVER PAGE

Team Number: Thurs-12

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

Full Name:	MacID:
Couper Smith	smitc25
Eric Hitsman	hitsmane
Yuvraj Sandhu	sandhuy
Chengyao Liu	liuc169

MILESTONE 2 (STAGE 1) – REFINED CONCEPT SKETCHES (MODELLING SUB-TEAM)

Team Number: Thurs-12

You should have already completed this task individually prior to Design Studio 8.

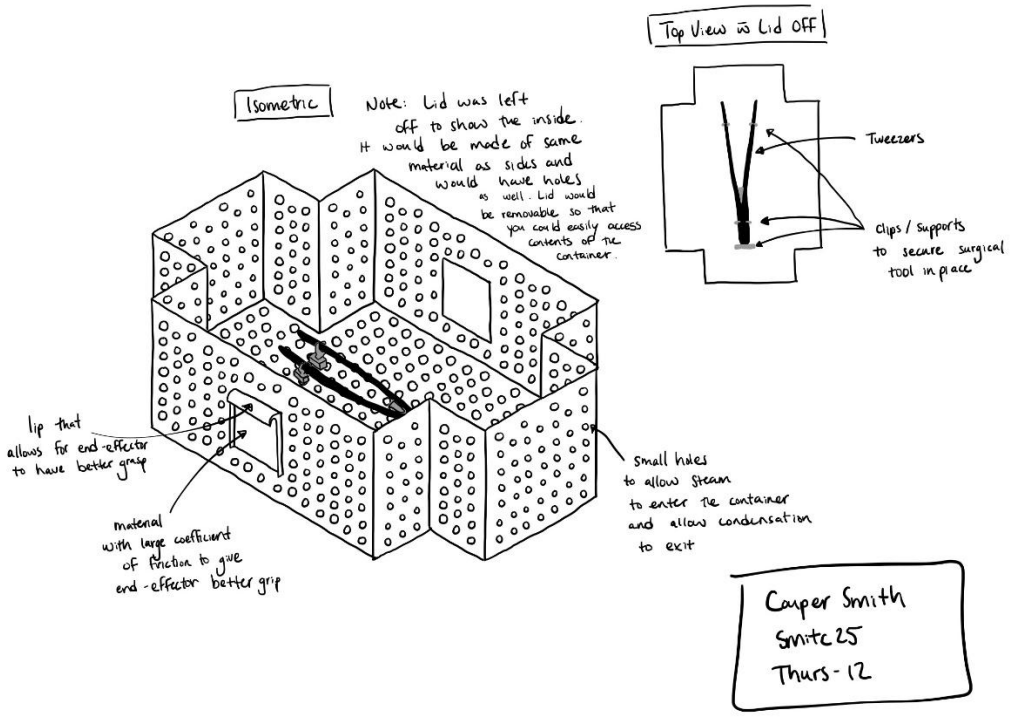
1. Copy-and-paste each sub-team member's refined sketch on the following pages (1 sketch per page)
   → Be sure to indicate each team member's Name and MacID

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 refined concept sketches with the **Milestone Two Individual Worksheets** document so that it can be ***graded***
- Compiling your individual work into this **Milestone Two Team Worksheets** document allows you to readily access your team member's work
  - This will be especially helpful when completing ***Stage 3*** of the milestone

Team Number: Thurs-12

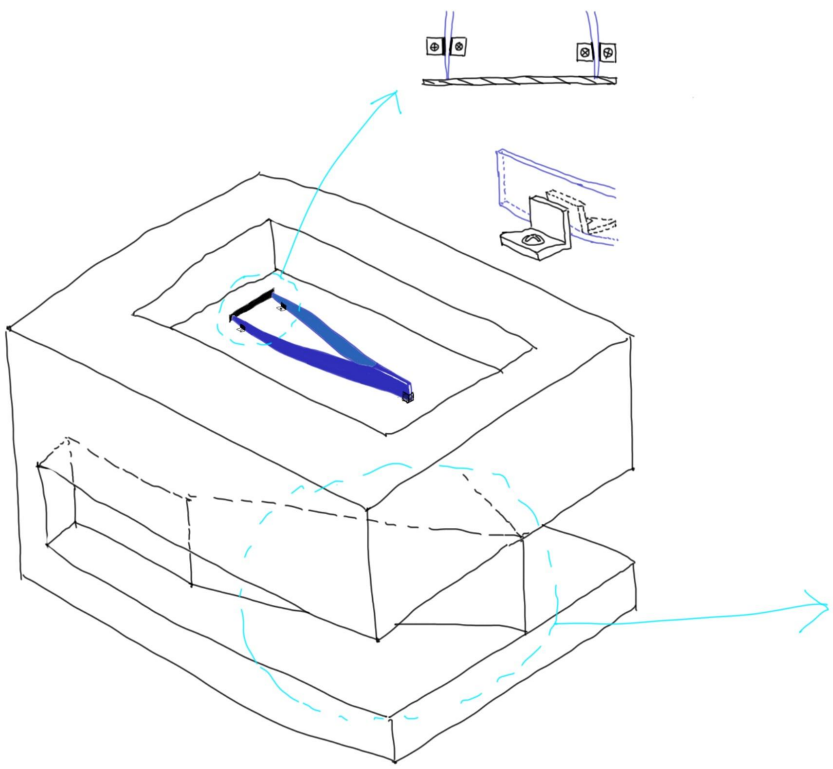
Name: Couper Smith	MacID: smitc25



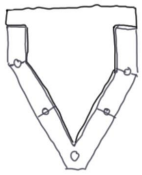
Team Number: Thurs-12

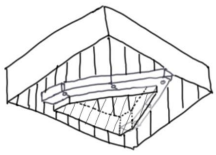
Name: Chengyao Liu	MacID: liuc169

Chengyao Liu
liuc169
Thurs – 12



The shape of this part is able to fit the shape of the clip, and at the same time there is a flat surface on it, which enables the shelf to hold the container, thus making a double-stable effect.





*If you are in a sub-team of 3, please copy and paste the above on a new page

MILESTONE 2 (STAGE 2) – COMPUTER PROGRAM WORKFLOW (COMPUTATION SUB-TEAM)

Team Number: Thurs-12

You should have already completed this task individually prior to Design Studio 8.

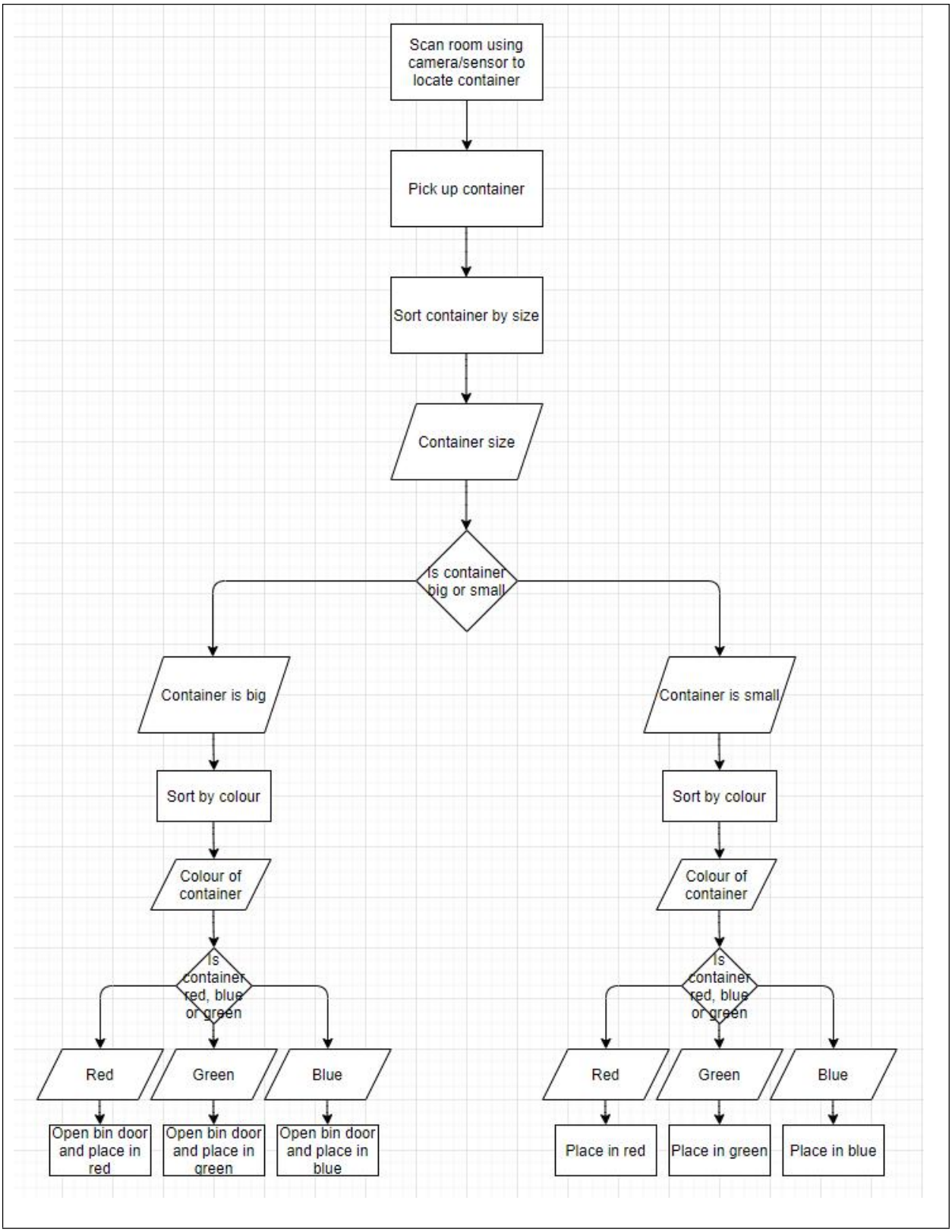
1. Copy-and-paste each team member's storyboard or flowchart sketches on the following pages (1 team member per page)
   → Be sure to indicate each team member's Name and MacID

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 storyboard/flowchart with the **Milestone Two Individual Worksheets** document so that it can be ***graded***
- Compiling your individual work into this **Milestone Two Team Worksheets** document allows you to readily access your team member's work
  - This will be especially helpful when completing ***Stage 4*** of the milestone

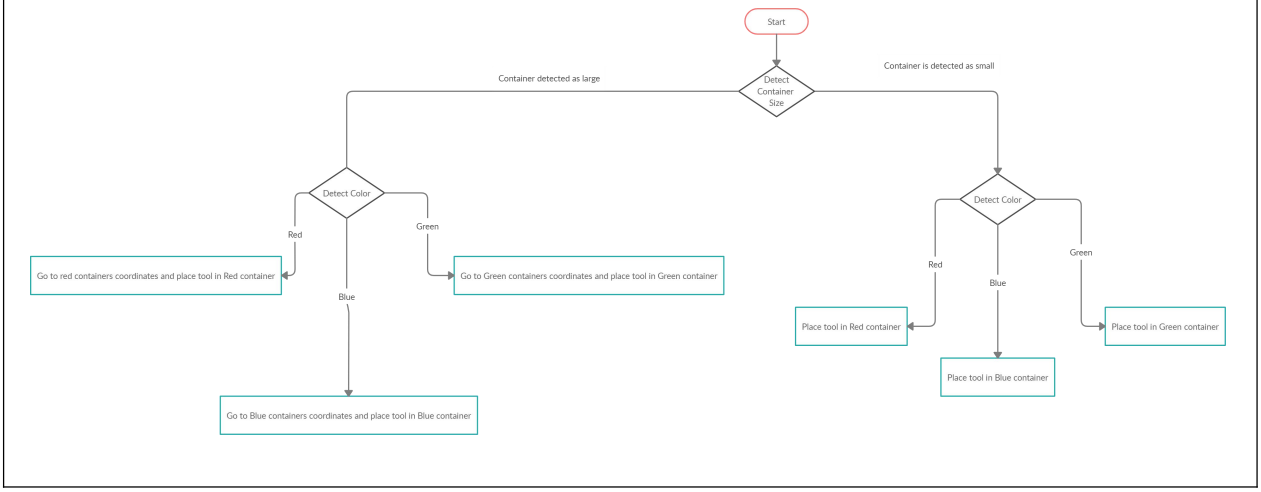
Team Number: Thurs-12

Name: Eric Hitsman	MacID:hitsmane


Scan room using camera/sensor to locate container
Pick up container
Sort container by size
Container size
Is container big or small
Container is big
Container is small
Sort by colour
Sort by colour
Colour of container
Colour of container
Is container red, blue or green
Is container red, blue or green
Red
Green
Blue
Red
Green
Blue
Open bin door and place in red
Open bin door and place in green
Open bin door and place in blue
Place in red
Place in green
Place in blue

Team Number: Thurs-12

Name: Yuvraj Sandhu	MacID: Sandhuy



*If you are in a sub-team of 3, please copy and paste the above on a new page

MILESTONE 2 (STAGE 3A) – LOW-FIDELITY PROTOTYPE (MODELLING SUB-TEAM)

Team Number: Thurs-12

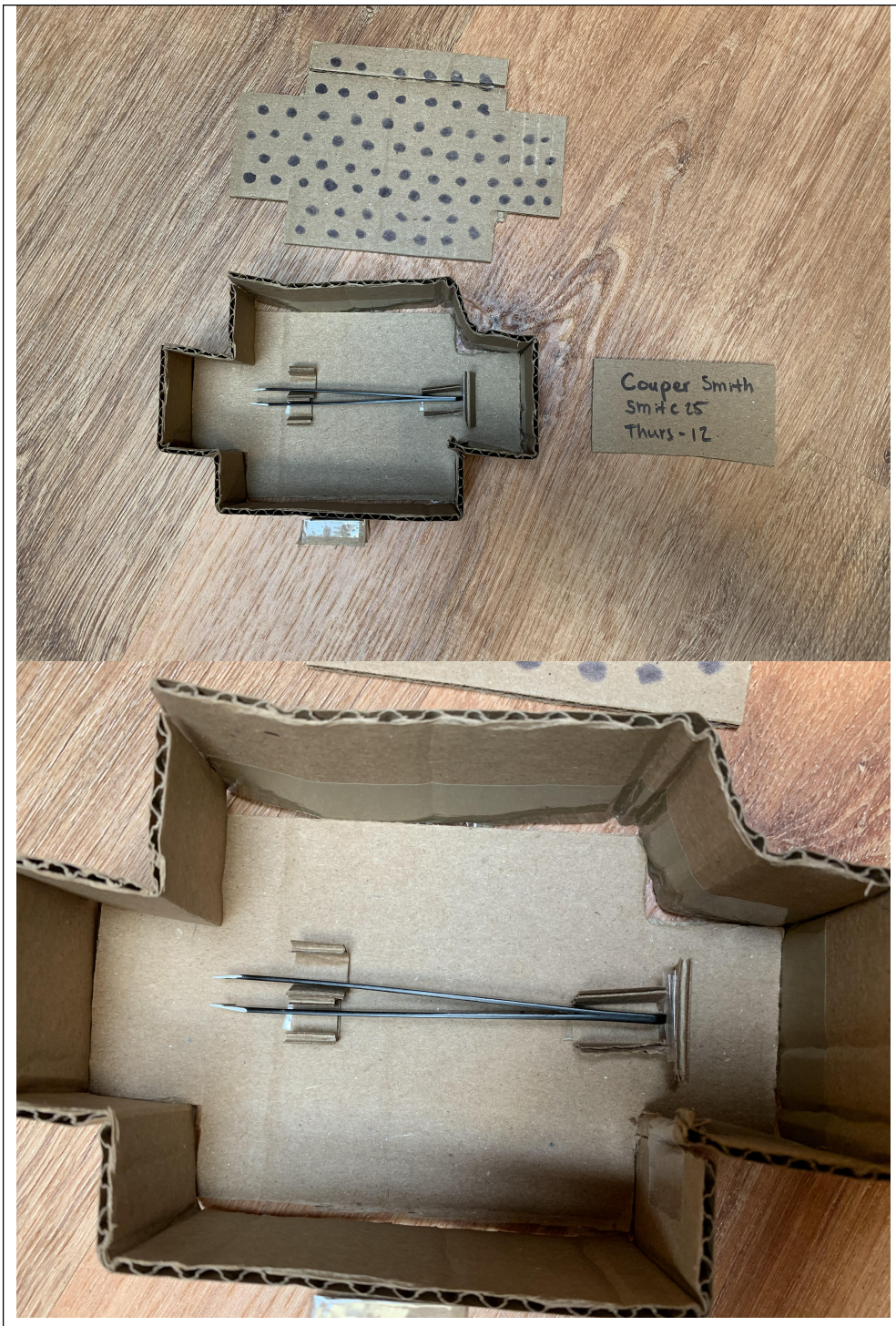
Complete this worksheet during design studio 8 after creating the low-fidelity prototypes.

1. Take multiple photos of your low-fidelity prototypes
   → Include an index card (or similar) next to the prototype, clearly indicating your Team Number, Name and MacID on *each* sketch
2. Insert your photo(s) as a Picture (Insert > Picture > This Device)
3. **Do not include more than *two* prototype photo's per page**

Make sure to include photos of each team member's prototype

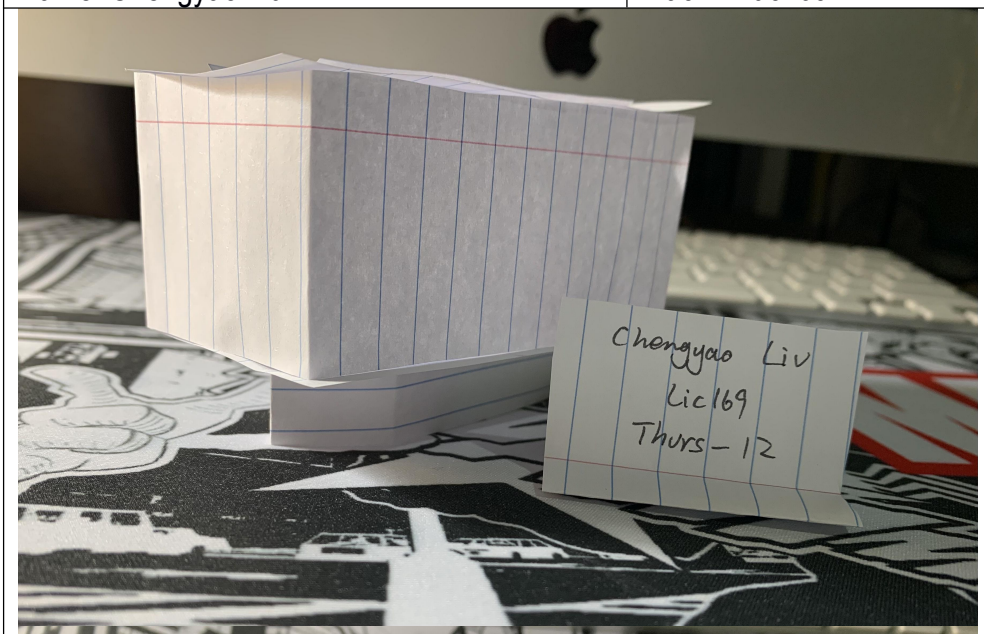
Team Number: Thurs-12

Name: Couper Smith	MacID: smitc25


Couper Smith
Smith 25
Thurs - 12

Team Number: Thurs-12

Name: Chengyao Liu	MacID: liuc169



*If you are in a sub-team of 3, please copy and paste the above on a new page

MILESTONE 2 (STAGE 3B) – LOW-FIDELITY PROTOTYPE OBSERVATIONS (MODELLING SUB-TEAM)

Team Number: Thurs-12

As a team, document your observations for each low-fidelity prototype. Make sure to label your observations to indicate which prototype it belongs to. As a starting, consider the following: (note, this does not fully encompass all discussion points)

→ Advantages and disadvantages of each prototype
→ Extent to which each concept aligns (or does not align) with the List of Objectives, Constraints, and Functions you came up with for Milestone 1
→ Reliability of the design in picking up the surgical tool
→ Reliability of the design in securing the surgical tool
→ Extent to which it allows for tool sterilization

	Prototype 1 (Couper Smith, smitc25)
Advantages:	• *Use of handles allows for a more secure hold on the container during transport* • *Holes allow for effective sterilization (ie steam is easily able to penetrate the container and reach the surgical tool)* • *Clips inside the container keep the surgical tool in place* • *Lid can be removed to provide easy access* • *Lid acts as a backup so that if the tool does come loose during transport, it will not fall out of the container entirely*
Disadvantages:	• *Holes will weaken the frame making the overall design less durable* • *If the tool did come loose during transport, there is a lot of space for it to move around in and get damaged*

Objectives:	• *Easy to carry*
	  ○ *Handles*
	  ○ *Made of material with high coefficient of friction*
	• *Hold tools*
	  ○ *Clips*
	  ○ *Lid*
	• *Sturdy design*
	  ○ *Made of durable material that can survive drops*
	  ○ *Potentially weak because of the holes (ie need to*

	ensure that the holes are not having significant impacts on the overall sturdiness)
Constraints:	• *Length and width are less than 150mm* • *All features (including the holes) are larger than 4mm* • *Container meets the required footprint specifications*
Functions:	• *Allows sterilization to occur through the use of holes in the sides, top, and bottom* • *Clips securely hold the tool in place during transport*
Reliability:	• *Believe that the design should be reliable as it appears to meet all the objectives, constraints and functions, but will require more testing to ensure this is true (ie test to ensure that the container can consistently be picked up and transported, do some drop tests to see if container breaks or if the surgical tool comes loose, etc.)* • *If something becomes apparent after testing this, then the proper changes would be made to those areas*
Sterilization:	• *Holes in the container should allow for the steam to enter and sterilize the tool* • *Again, we should test to see how much steam is able to enter the container (if not enough is entering, this may mean adding more holes to the walls and lid is necessary)*
Areas to Improve:	• *Could make more efficient use of space and have multiple tools inside the container at once (this would make the sterilization process more efficient by saving time and energy)* • *Consider reducing the height of the container to reduce cost of materials and make the tools more secure (ie less space to bounce around in if the tools did get loose)*
Other Notes:	• *Check to see if the handles get in the way of the container fitting inside the autoclave (if this does happen consider making the handles more like indents in the container)*

MILESTONE 2 (STAGE 4A) – WORKFLOW PEER-REVIEW (COMPUTATION SUB-TEAM)

Team Number: Thurs-12

As a team, document your observations, specifically any similarities and differences between each team member's visual storyboard or flowchart in the table below.

Both flowcharts have:

- Sort container by size
- Sort container by colour
- Pick up container
- Place container in corresponding bin

Differences

- Place tool in container
- Movement directions
- Opening of doors

MILESTONE 2 (STAGE 4B) – PROGRAM PSEUDOCODE (COMPUTATION SUB-TEAM)

Team Number: Thurs-12

As a team, write out a pseudocode outlining the high-level workflow of your computer program in the space below.

Start

Initialize Claw motors

Scan room for container and autoclave bin locations

While there is a container on the pick-up platform

Go to Container XYZ coordinates

Identify container size and colour

If the color equals red, green, or blue go to the corresponding bin

If the container is large open the corresponding bin door

Start Pick up function

Move to corresponding autoclave bin that was determined in the identify size and colour step

Place the container in the autoclave bin

If the container is large, then it will be placed in the door and the door will be closed

If the container is small, it will be placed in the top slot

Start Go to Home function

Scan for new containers

End