# PROJECT TWO: MILESTONE 1 – COVER PAGE

## Team Number: | Tues-28

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

| Full Name: | MacID: |
|---|---|
| Julian Cecchini | cecchinj |
| Luke West | westl5 |
| Luigi Quattrociocchi | quattrl |
| Hetash Rattu | rattuh |
| | |

Team Number:   | Tues-28

You should have already completed this task individually <u>prior</u> to Design Studio 7.

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

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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 objectives, 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
    o   This will be especially helpful when completing *Stage 2* of the milestone

| Name: Julian Cecchini | MacID: cecchinj |
|---|---|

Objectives:
- Identifiable by colour and size
- High durability, does not deform easily
- Heat resistant for possible steam sterilization
- Tool's weight is balanced well around grip

Constraints:
- Thicker than 4mm
- Minimum of 80mm in width
- Maximum of 170mm in width
- Scaled down design does not exceed 350g in mass
- No excessively complex parts which would cause print replication time to exceed 2 hours; simple

Function:
- Can contain surgical tools
- Allows surgical tools to be sterilized
- Can be held by effector grip
- Secures tools during travel

| Name: Luke West | MacID: westl5 |
|---|---|

*Objectives*
- Container should be lightweight, to be able to be held by the robot
- Container should be rigid, to be able to hold its shape
- Container should be temperature resistant, to withstand steam
- Container: unreactive with cleaning chemicals

*Constraints*
- Container: base must fit within the autoclave
- Container: All features must be greater than 4mm in size
- Container must fit securely in between the gripper of the robot (not too big or too small)
- Container: Mass cannot exceed 350 grams

*Functions*
- Container must hold tools securely
- Container must allow sterilization of tools through use of steam
- Container must be able to be held by the robotic arm

| Name: Luigi Quattrociocchi | MacID: quattrl |
|---|---|

*Objectives*
- Should be resistant to high temperatures
- Should be lightweight
- Should be chemically inert

*Constraints*
- Must not exceed 350 grams
- Must have all features exceeding 4mm
- Must fit in autoclave

*Functions*
- Be able to securely house tools
- Be able to be picked up by arm
- Be able to allow sterilization of contents

| Name: Hetash Rattu | MacID: rattuh |
|---|---|

*Objectives (should be…)*

- Hold medical Instruments
- Allows fluid to be stored
- Allows fluid to leave

*Constraints*

- 4mm is the smallest dimension
- Must be bigger than the instruments
- Must have opening so arm can add the medical instruments

*Functions (What is does)*

- House fluids
- Accepting equipment
- Transfer Equipment

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

# MILESTONE 1 (STAGE 2) – LIST OF OBJECTIVES, CONSTRAINTS, AND FUNCTIONS

Team Number: | Tues-28

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 |
|---|---|---|
| Should be resistant to high temperatures | All features must be greater than 4mm | Tools should be able to be placed and extracted from the container |
| Should have a distinct colour | Scaled down weight does not exceed 350 g | Be able to securely house tools |
| Should be chemically inert | Complexity of parts if minimum; print time of replication cannot exceed 2 hours | Be able to able to be picked up by the robot arm |
| Should be lightweight | Max 170 mm min 80 mm | Must allow sterilization of tools by steam |
| Should be rigid and hold its shape | Base must fit within the autoclave | Base must be able to remain inside its respective autoclave |
| | Caters towards effector grip | |

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

| Must allow sterilization of tools by steam |
|---|

3. What are the secondary functions?

| Tools should be able to be placed and extracted from the container |
|---|
| Be able to securely house tools |
| Be able to able to be picked up by the robot arm |
| |

Team Number:  Tues-28

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 | Grooves on side | Lip around upper edge | Fork-lift style holes for fingers | Squeezable part | Rough surface | Rectangular prisms sticking out for effector fingers |
| House tools | Snap in component for tool | Tools loose in container | Magnets | Adhesive of sorts (like a tape) | Padding on inside | Flaps |
| Place/Extract | Hinged lid | Removable lid | Angled tube where it could be grabbed | Spring mechanism (think AAA batteries) | Suction cups within | Sliding out drawer |

# MILESTONE 1 (STAGE 4) – CONCEPT SKETCHES

<div align="right">

Team Number: | Tues-28

</div>

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
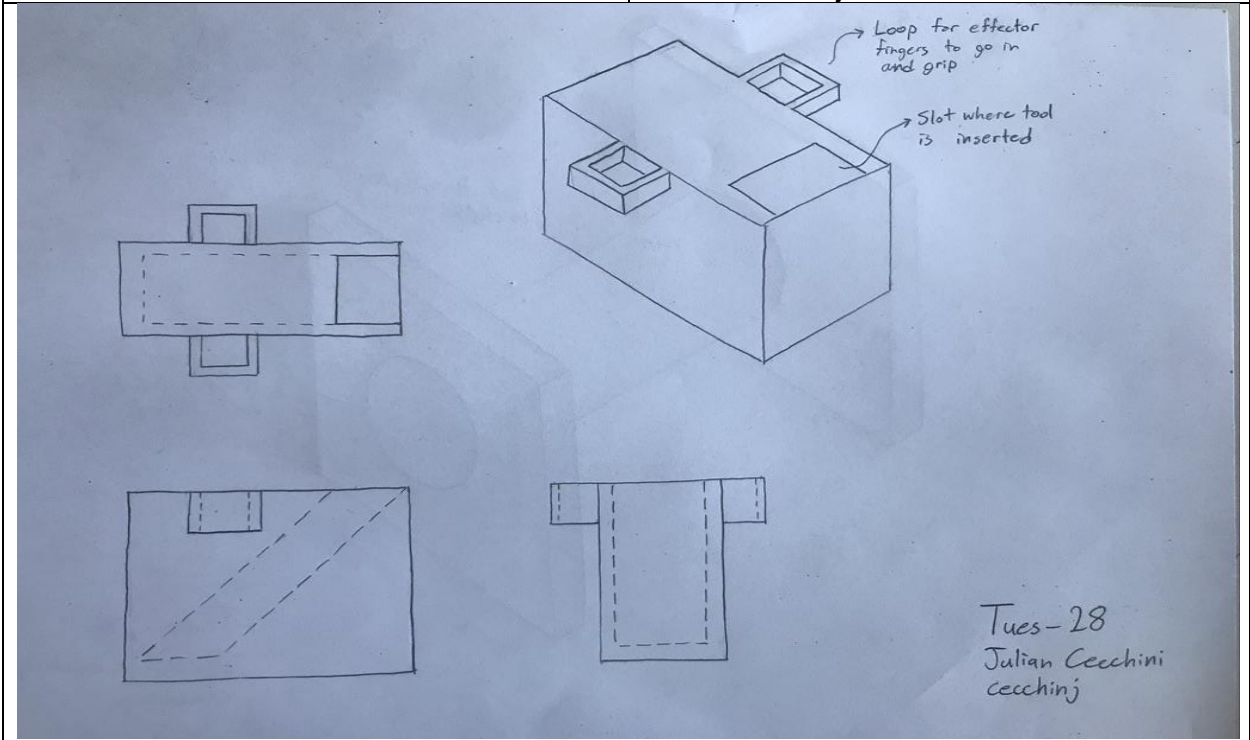
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We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:
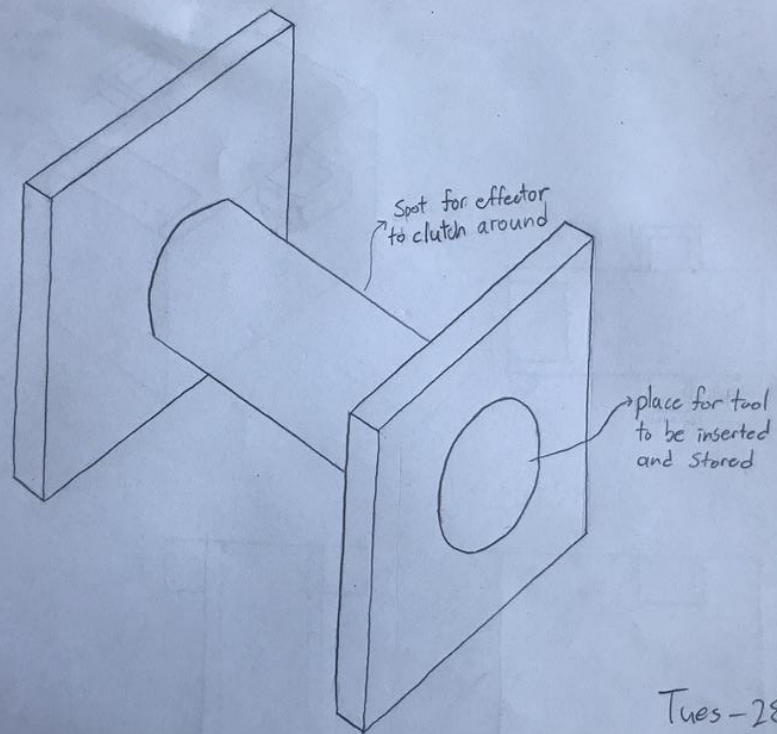- Each team member needs to submit their sketch with the **Milestone One Individual Worksheets** document so that it can be *graded*
- Compiling your individual work into this **Milestone One Team Worksheets** document allows you to readily access your team member's work

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Name: Julian Cecchini | MacID: cecchinj



Loop for effector fingers to go in and grip

Slot where tool is inserted

Tues-28
Julian Cecchini
cecchinj

Spot for effector
to clutch around

place for tool
to be inserted
and stored

Tues – 28
Julian Cecchini
cecchinj

Name: Luigi Quattrociocchi          MacID: quattrl

removable lid
lifts upwards.
Has overhang for
ease of use.

cross sectional view

grooves
in side for
arm to grab.

where arm
grabs the box

Tues -28
Luigi Quattrociocchi
quattrl

wing-like overhang
for arm to grab
the underside of

handle to
pull out
housing

"pull out" drawer
slides out front

Tues -28
Luigi Quattrociocchi
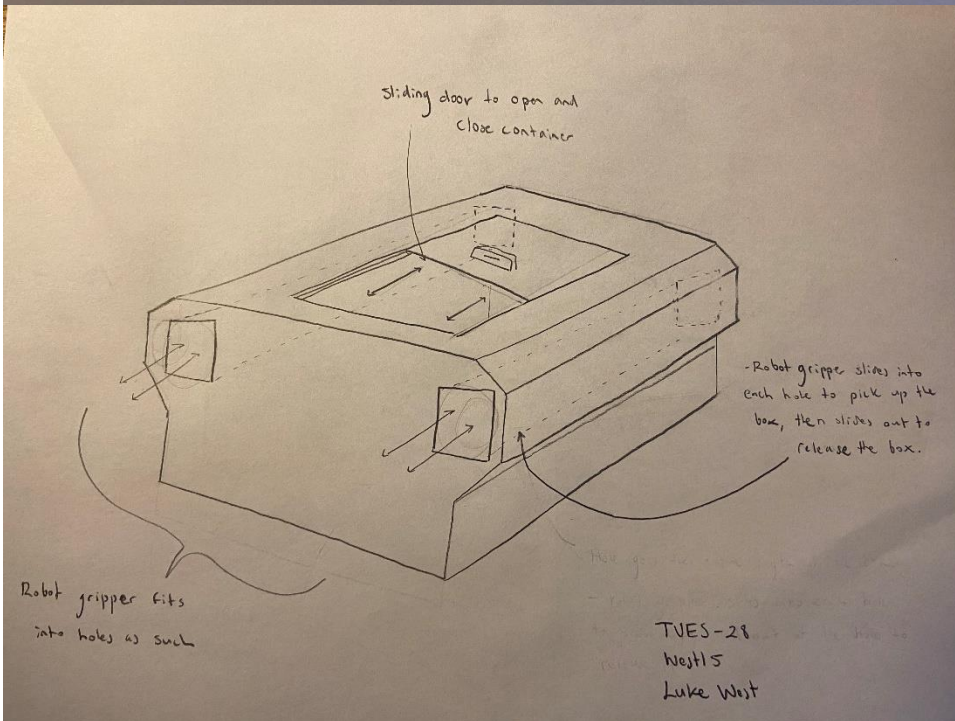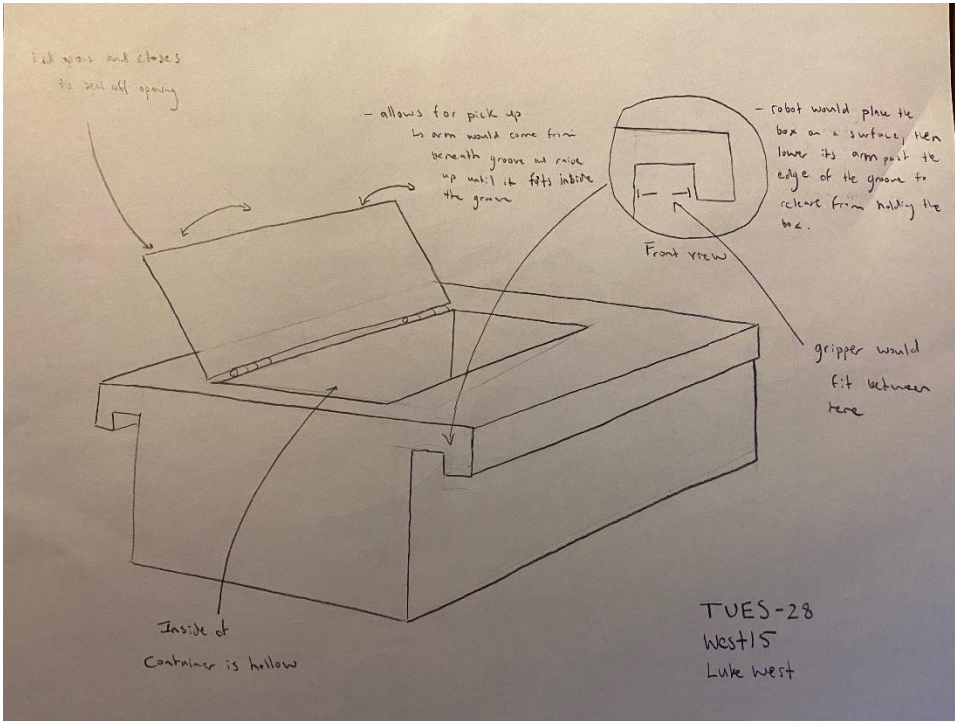quattrl
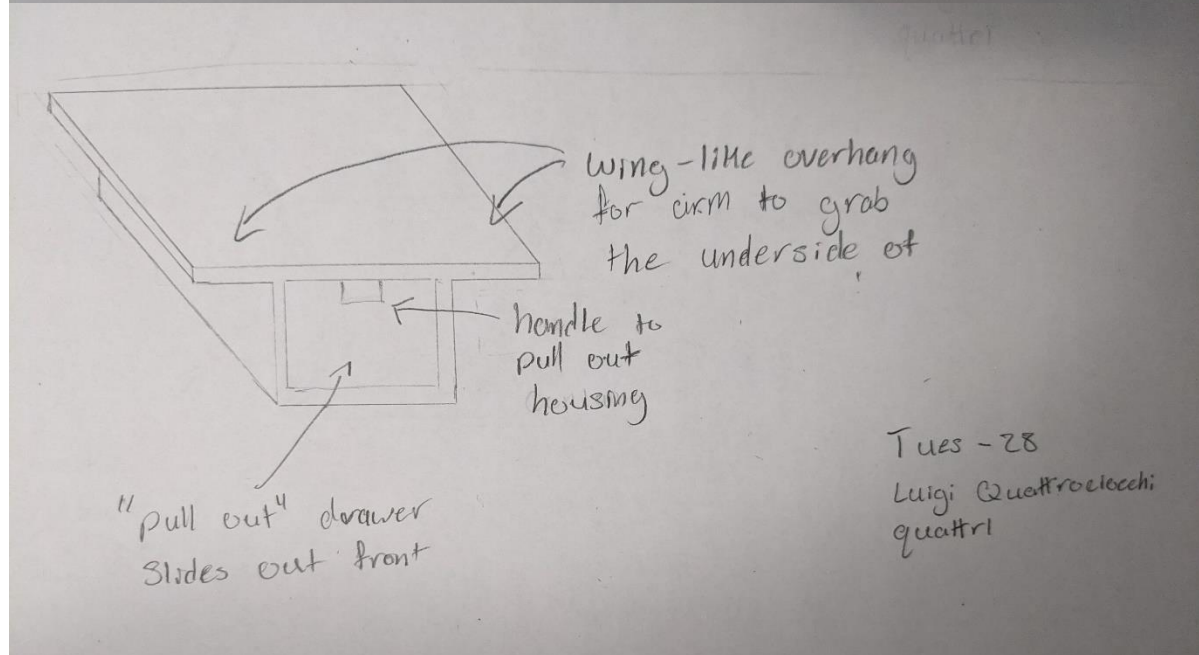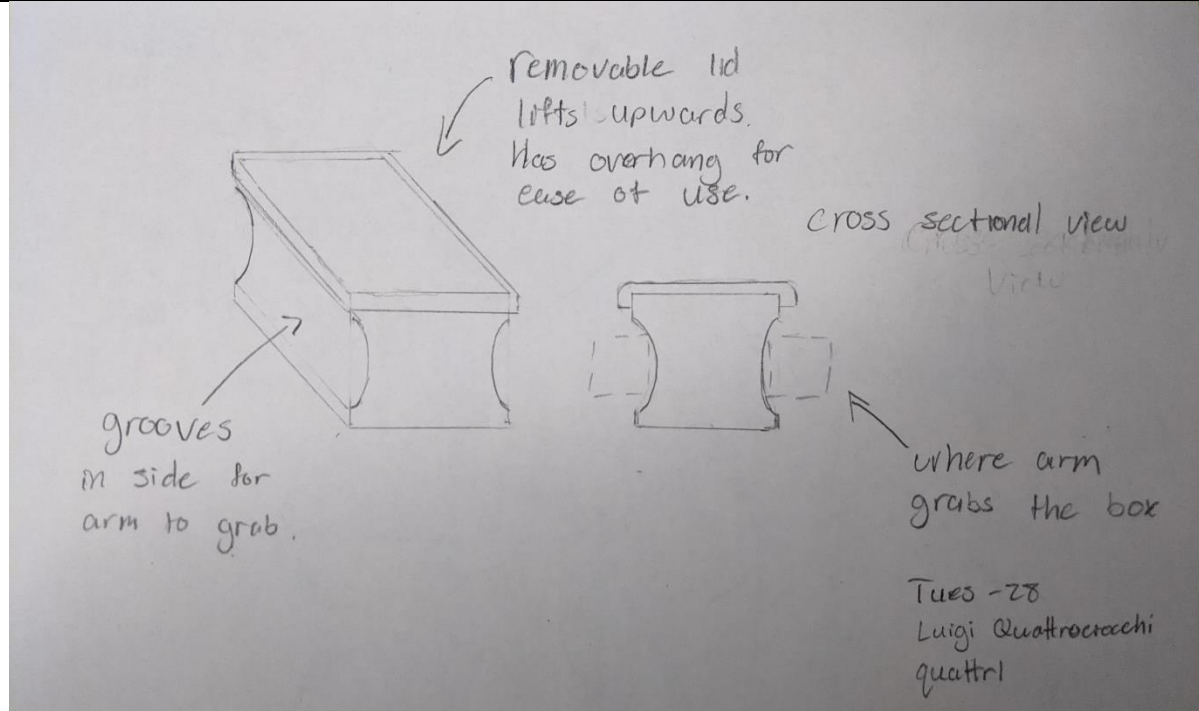
Name: Luke West | MacID: Westl5

*Insert screenshot(s) of your concept sketches below*



Lid opens and closes
to seal off opening

— allows for pick up
as arm would come from
beneath groove and raise
up until it fits inside
the groove

— robot would place the
box on a surface, then
lower its arm past the
edge of the groove to
release from holding the
box.

Front view

gripper would
fit between
here

Inside of
Container is hollow

TUES-28
Westl5
Luke West



Sliding door to open and
close container

-Robot gripper slides into
each hole to pick up the
box, then slides out to
release the box.

Robot gripper fits
into holes as such

TUES-28
Westl5
Luke West

Name: Hetash                                    MacID: Rattu

Bar so the
arm can hold
the container

Openings for
tools to be
placed

Tues-28
Hetash Rattu
rattuh

Handle to grab
Container

Large opening
to access tools

Removable
lid with
grip

Tues-28
Hetash Rattu
rattuh