

PROJECT TWO: MILESTONE 2 – COVER PAGE

Team Number: Mon-04

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

Full Name:	MacID:
Longpan Zhou	zhoul83
Nicholas Fabugais-Inaba	fabugain
Mark Benn	bennm1
Josh Blanchard	blancj4

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

Team Number: Mon-04

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

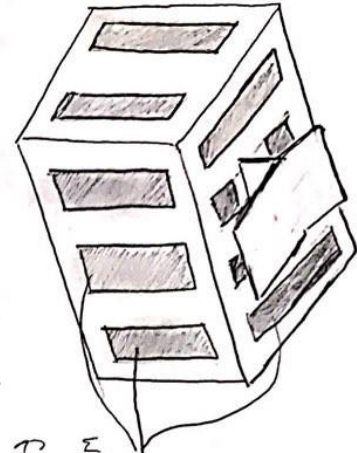
1. Copy-and-paste each sub-team member's refined sketch on the following pages (1 sketch per page)
→ Be sure to indicate each team member's Name and MacID

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

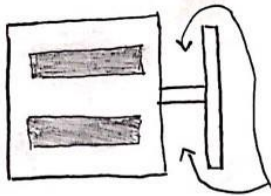
Name: Josh Blanchard

MacID: blancj4

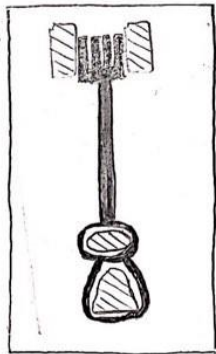


slots in
walls for steam
for sterilization

Front



Gripped fingers
slide into slots
and grip on
center block



▨ indicates raised
area to sit within
holes of retractor
and stabilize
head to secure
tool
■ retractor
footprint

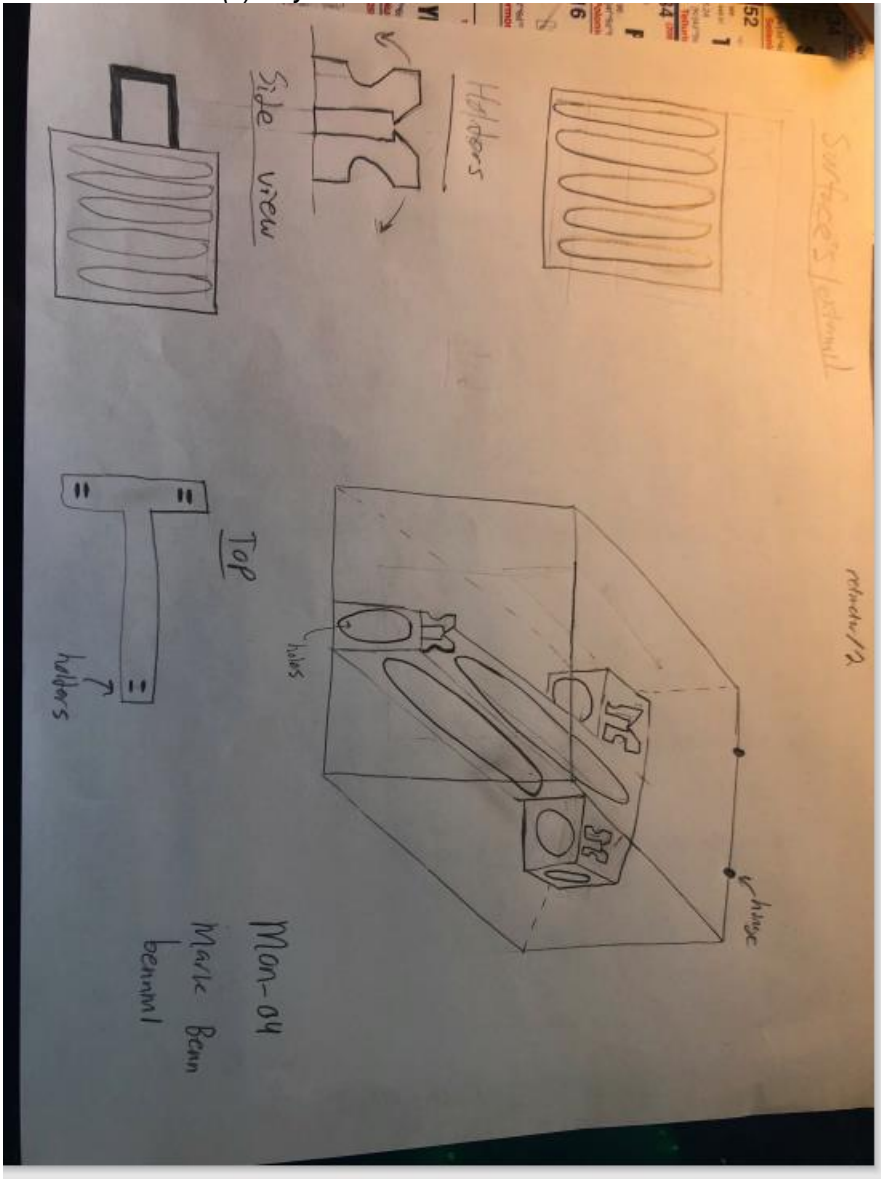
Josh Blanchard
blancj4 / Mon-04
2020-11-07

Team Number: Mon-04

Name: Mark Benn

MacID: bennm1

Insert screenshot(s) of your refined sketches below



*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: Mon-04

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

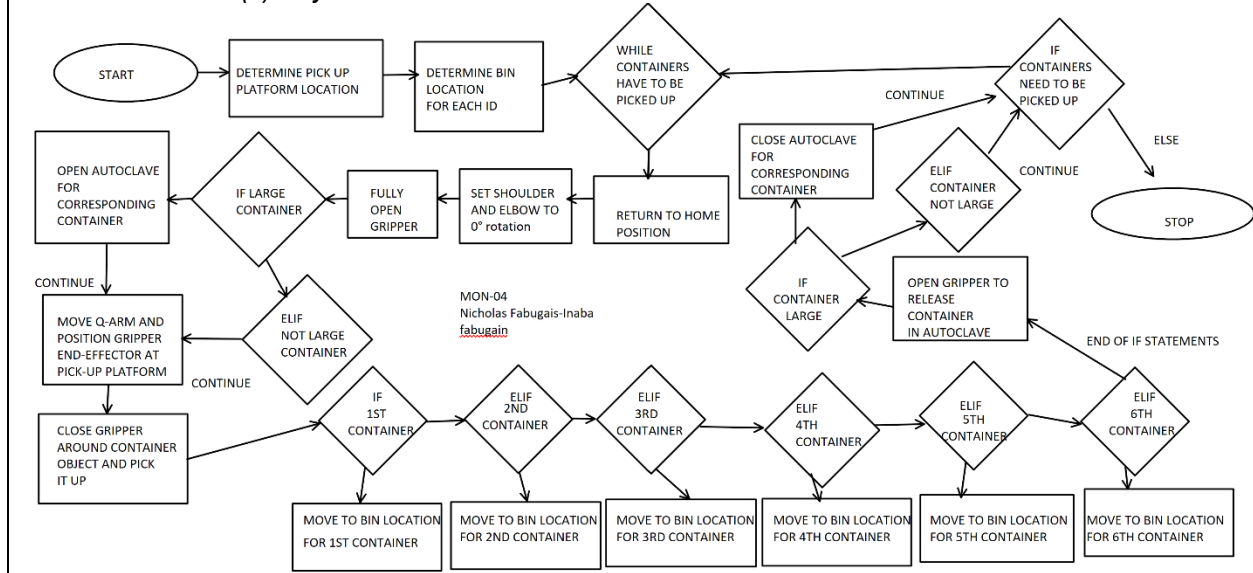
We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:

- 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

Name: Nicholas Fabugais-Inaba

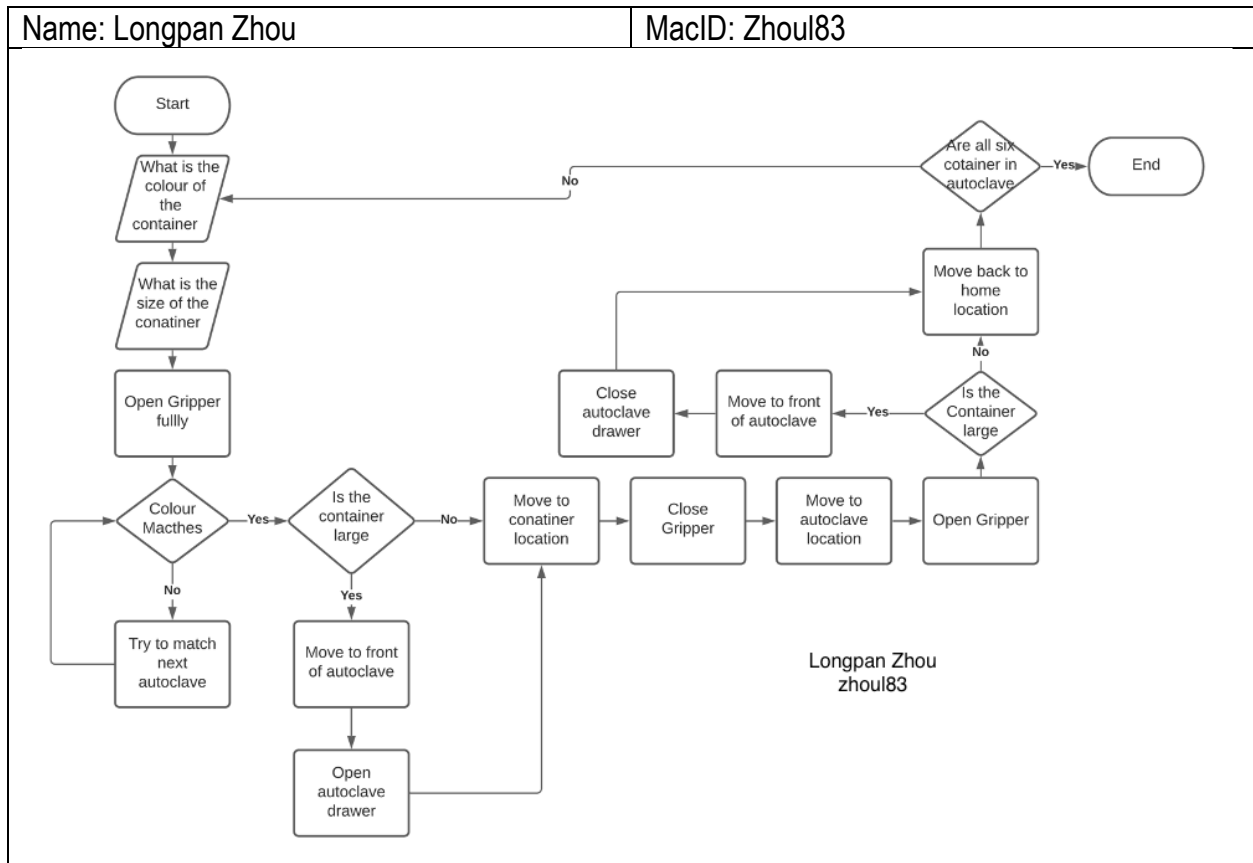
MacID: fabugain

Insert screenshot(s) of your workflow below



Name: Longpan Zhou

MacID: Zhoul83



*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:

Mon-04

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 <u>each</u> team member's prototype
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Team Number: Mon-04

Name: mark benn

MacID: bennm1

Insert screenshot(s) of your low-fidelity prototype below







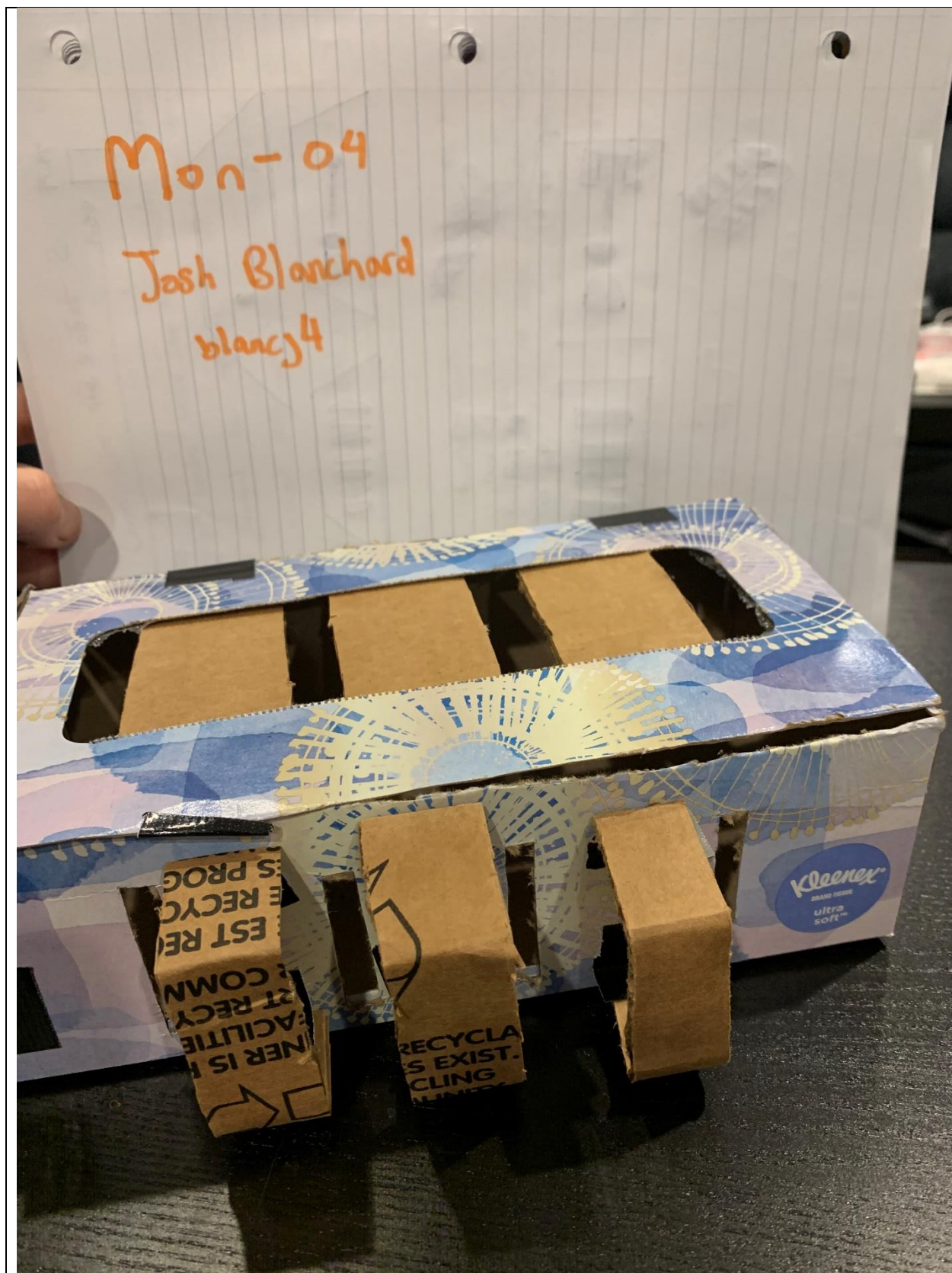


Team Number: Mon-04

Name: Josh Blanchard

MacID: blancj4





*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: Mon-04

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

*Document your observations for each prototype in the space below. It is recommended you document observations in a **table** or in bullet form (it should be clear which prototype you are referring to for each observation).*

Observations of the model that was created with Joshua's sketch (Mark made the prototype)

Advantages

- *Simplicity therefore low print time*
- *Will hold part well in the xz plane*
- *Lifting feature for fingers will work*

Disadvantages

- *May not hold tool well during movements in y plane*

Alignment with objectives, constraints, and functions

Objectives

- *easy to 3d print*
- *able to be transferred*

Constraints

- *all features are greater than 4mm*
- *container didn't fit in foot print*

Functions

- *allows sterilization*
- *might not keep contents in place*

Reliability of the design in securing the surgical tool

- It works well

Reliability of the design in securing the surgical tool

- May not work perfectly

Extent to which it allows for tool sterilization

- It works well

Observations of the model created from Mark's sketch (prototype by josh):

- **Pros**
- *Most aspects appear easy to 3D print*
- *Clips will effectively secure the tool from motion in all directions*
- *Slits in walls and ceiling allow for autoclave to sterilize the tool*
- *Rectangular shape and simple base makes the box easy to put together after printing*
- **Cons**
- *Sizing of clips may be an issue with design constraints of 4mm minimum feature*
- *Clips may be easy to break*
- **Alignment with obj., const., func.**
- **obj**
- *easy to 3d print (only uncertainty is the clips)*
- *easy to assemble*
- *effective use of materials*
- **const.**
- *clips may not align with minimum feature size*
- *may or may not fit within footprint*
- *uncertain on other constraints at this point*
- **func.**
- *Holds tool securely*
- *Allows for sterilization*
- *Closes in tool from outside*

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

Team Number: Mon-04

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

Similarities:

- After the autoclave drawer for large containers is opened, the arm is moved to the container's pick up location
- After a large container is placed in the autoclave, the autoclave drawer is closed immediately after
- ID/Colour is determined before the while loop is run
- The program is ended as soon as all the containers are placed in their respective autoclaves

Differences:

- Longpan's flowchart: input the size and colour for one container per execute, Nicholas' flowchart: input size and colour for all the containers first.
- Longpan's flowchart: open gripper fully from the start, Nicholas' flowchart: opens gripper fully before grabbing the container.
- Longpan's flowchart: returns to home position at the end of the while loop, Nicholas' flowchart: returns to home position at the beginning of the while loop.
- Longpan's flowchart: Uses while loop to match container with the autoclave, Nicholas' flowchart: uses if statement to match container with the autoclave.

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

Team Number: Mon-04

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

```
Set variable Finished = 0
Open gripper to max distance
Input the size of the container
Input colour of the container
While loop under condition the colour is not the same as autoclave[i]:
    next autoclave
    Determine the location of the corresponding container's autoclave
    If the container is large:
        Move to the front of the corresponding container's autoclave's location
        Open autoclave drawer
    Determine the location of the container
    Move to that location XYZ
    Close gripper
    Move to XYZ location for the corresponding container's autoclave
    Open gripper
    Finished = Finished + 1
    If the container is large:
        Close autoclave drawer
    If Finished is not equal to 6:
        Move to home position
        Repeat process
    Else:
        End program
```