PROJECT TWO: MILESTONE 3 – COVER PAGE

Team Number: Thurs-03

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

Full Name:	MacID:
Wenxiao Pan	panw10
Adam Podolak	podola2
Kareem Shabaka	shabakak
Kartik Chaudhari	chaudk4

MILESTONE 3 (STAGE 1) – PRELIMINARY SOLID MODEL (MODELLING SUB-TEAM)

Team Number: Thurs-03

You should have already completed this task individually prior to Design Studio 9.

1. Copy-and-paste each team member's screenshots of their preliminary solid model on the following pages (1 team member per page)
   → Be sure to clearly indicate who each model belongs to

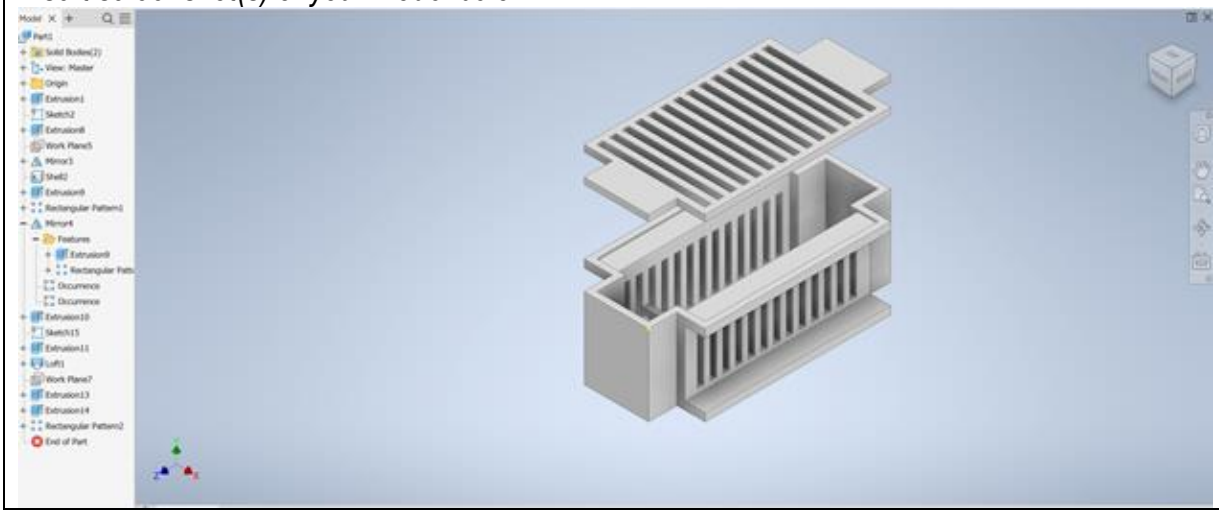
We are asking that you submit your work on both worksheets. It does seem redundant, but there are valid reasons for this:

- Each team member needs to submit their solid model screenshots 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 ***Stage 3*** of the milestone

Team Number: Thurs-03

Name: Adam Podolak	MacID: podola2

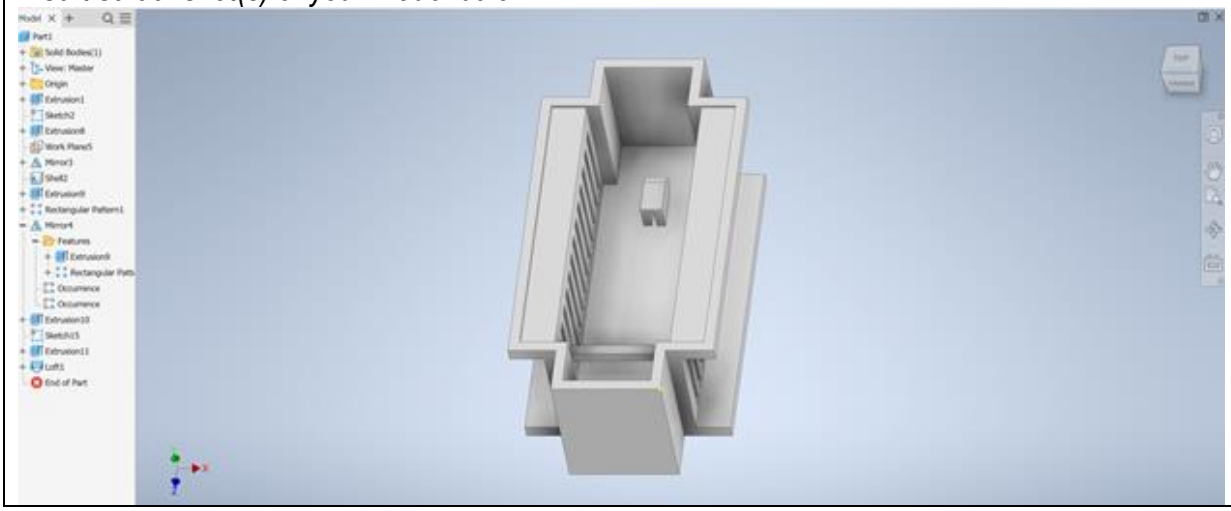
Insert screenshot(s) of your model below



Team Number: Thurs-03

Name: Adam Podolak	MacID: podola2

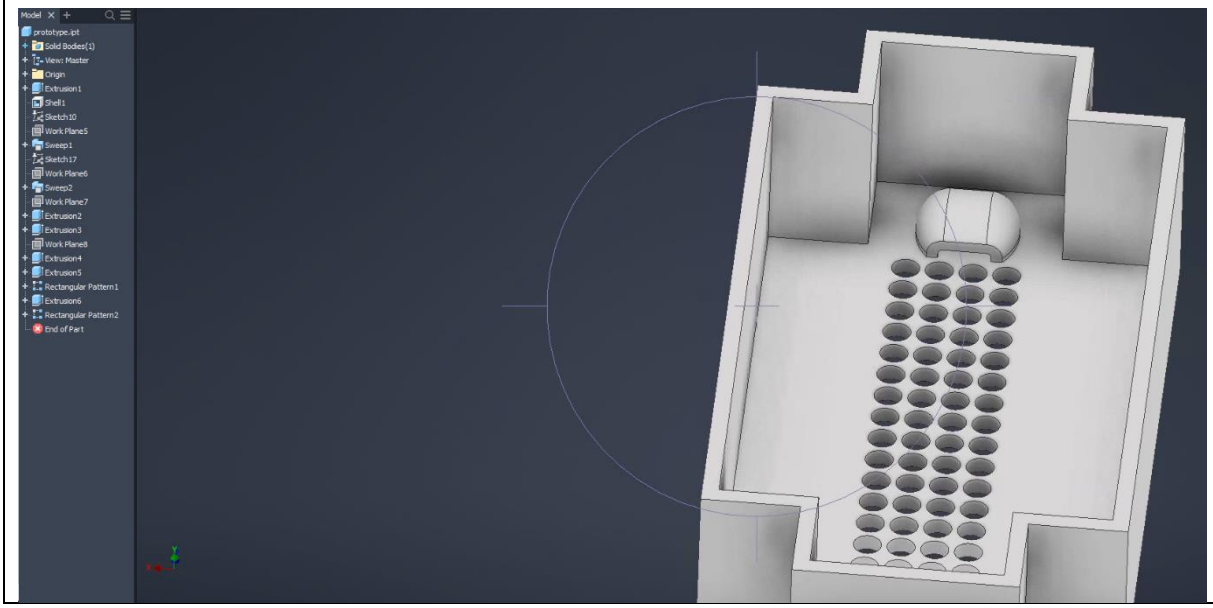
Insert screenshot(s) of your model below



Team Number: Thurs-03

Name: Kareem Shabaka	MacID shabakak

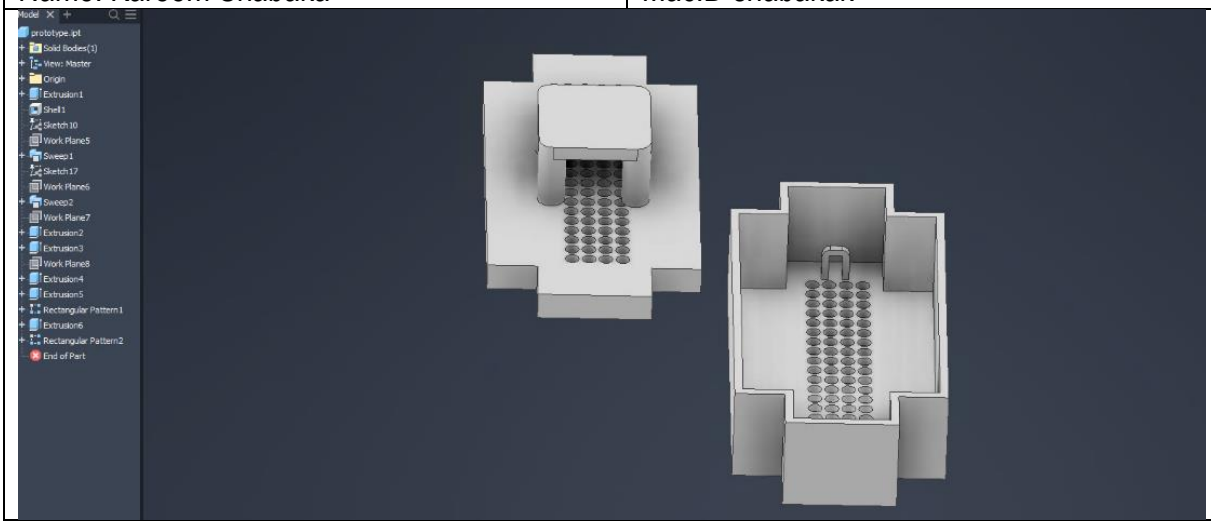
Insert screenshot(s) of your model below



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

Team Number: Thurs-03

Name: Kareem Shabaka	MacID shabakak



MILESTONE 3 (STAGE 2) – PRELIMINARY PROGRAM TASKS (COMPUTATION SUB-TEAM)

Team Number: Thurs-03

You should have already completed this task individually prior to Design Studio 9.

1. Copy-and-paste each team member's code screenshots on the following pages (1 team member per page)
   → Be sure to clearly indicate who each code belongs to

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 code screenshots 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 ***Stage 4*** of the milestone

Team Number: Thurs-03

Name: Kartik Chaudhari	MacID chaudk4

Insert a screenshot of your code below

File Edit Format Run Options Window Help

```
## ------------------------------------------------------------------------
## TEMPLATE
## Please DO NOT change the naming convention within this template. Some changes
## lead to your program not functioning as intended.

import sys
sys.path.append('../')

from Common_Libraries.p2_lib import *

import os
from Common_Libraries.repeating_timer_lib import repeating_timer

def update_sim ():
    try:
        arm.ping()
    except Exception as error_update_sim:
        print (error_update_sim)

arm = qarm()

update_thread = repeating_timer(2, update_sim)


## STUDENT CODE BEGINS
## ------------------------------------------------------------------------
## Example to rotate the base: arm.rotateBase(90)

arm.rotate_base(-75)
arm.rotate_base(75)
arm.rotate_base(75)
arm.rotate_base(80)
arm.rotate_shoulder(-25)
arm.rotate_shoulder(50)
arm.rotate_elbow(15)
print(arm.effector_position())
```

Ln: 36 Col: 29

p2_template.py - /home/p /Desktop /Python Files/p2_template.py (3.7.3)

File Edit Format Run Options Window Help

```
## TEMPLATE
## Please DO NOT change the naming convention within this template. Some changes
## lead to your program not functioning as intended.

import sys
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from Common_Libraries.p2_lib import *

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arm.rotate_base(75)
arm.rotate_base(75)
arm.rotate_base(80)
arm.rotate_shoulder(-25)
arm.rotate_shoulder(50)
arm.rotate_elbow(15)
arm.rotate_elbow(-45)
arm.rotate_shoulder(10)
arm.rotate_base(5)
arm.rotate_shoulder(3)
print(arm.effector_position())
```

Ln: 39 Col: 22

```
def __init__(self):
    self.Red_large = [-0.4184, 0.1951, 0.1902] # coordinate of the red bin drawer
    self.Red_small = [-0.5839, 0.2125, 0.3658]
    self.Blue_large = [0.0,0.4462,0.1902]# coordinate of the blue bin drawer
    self.Blue_small = [0.0,0.6484,0.3658]
    self.Green_large = [0.0,-0.4462,0.1902]# coordinate of the green bin drawer
    self.Green_small = [0.0,-0.6484,0.3658]
```

Team Number: Thurs-03

Name: Wenxiao Pan	MacID: panw10

Insert a screenshot of your code below

p2_template.py

P2_stage-2 > p2_template.py > armAction

```python
class armAction:
    #move to smaller blue bin
    def move2BlueS(self):
        arm.move_arm(self.Blue_small[0], self.Blue_small[1], self.Blue_small[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.7)

    #move to blue bin drawer
    def move2BlueL(self):
        arm.open_blue_autoclave(True)
        time.sleep(1.7)
        arm.move_arm(self.Blue_large[0], self.Blue_large[1], self.Blue_large[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.2)
        arm.open_blue_autoclave(False)
        time.sleep(1.2)

    #move to smaller red bin
    def move2RedS(self):
        arm.move_arm(self.Red_small[0], self.Red_small[1], self.Red_small[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.7)

    #move to red bin drawer
    def move2RedL(self):
        arm.open_red_autoclave(True)
        time.sleep(1.7)
        arm.move_arm(self.Red_large[0], self.Red_large[1], self.Red_large[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.2)
        arm.open_red_autoclave(False)
        time.sleep(1.2)

    # move to smaller green bin
    def move2GreenS(self):
        arm.move_arm(self.Green_small[0], self.Green_small[1], self.Green_small[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.7)

    # move to green bin drawer
    def move2GreenL(self):
        arm.open_green_autoclave(True)
        time.sleep(1.7)
        arm.move_arm(self.Green_large[0], self.Green_large[1], self.Green_large[2])
        time.sleep(1.2)
        arm.home()
        time.sleep(1.2)
        arm.open_green_autoclave(False)
        time.sleep(1.2)

    # reset everything to the initial status
    def reset(self):
        arm.home()
        time.sleep(1)
        arm.open_red_autoclave(False)
        arm.open_green_autoclave(False)
        arm.open_blue_autoclave(False)
```

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

MILESTONE 3 (STAGE 3) – PUGH MATRIX (MODELLING SUB-TEAM)

Team Number: Thurs-03

1. As a team, evaluate your designs for the sterilization container in the table below
   → List your Criteria in the first column
      - You should include a minimum of 5 criteria
   → Fill out the table below, comparing your designs against the given baseline
      - Replace "Design A" and "Design B" with more descriptive labels (e.g., a distinguishing feature or the name of the student author)
      - Assign the datum as the baseline for comparison
      - Indicate a "+" if a concept is better than the baseline, a "–" if a concept is worse, or a "S" if a concept is the same

	Datum	**Adam Podolak (Rail Feature)**	**Kareem Shabaka (Platform Handle Feature)**
Facilitates Sterilization	S	S	S
Securely holds tool	S	S	S
Allows for easy transportation	S	+	+
Rigid/Prevents damage to tools	S	-	-
Minimal material used	S	+	-
Greater than 4 mm thickness for all components	S	+	+
Width less than 80 mm	S	+	+
Total +	0	4	3
Total –	0	1	2
Total Score	0	3	1

*For a team of 3, click the top-right corner of the table to "Add a New Column"

2. Propose one or more suggested design refinements moving forward

Adam Podolak's Design

- Add holes or slots in the bottom of container to allow for steam to pass through
- Add one or more support beams to securely hold tool
- Possibly add another slot or something where the tips/pincers of the tweezers are secured in place.

Kareem Shabaka's Design

- Use an open platform for the gripper instead of a solid square
- Allow more steam to pass through the container by adding more grills or holes in the bottom and top of the container

MILESTONE 3 (STAGE 4A) – CODE PEER-REVIEW (COMPUTATION SUB-TEAM)

Team Number: Thurs-03

Document any errors and/or observations for each team member's preliminary Python program in the space below

Identify Autoclave Bin Location Task	**Team Member Name**: Kartik Chaudhari
• The coordinates of each component of autoclave bins found by Kartik are correct, no conflicts on the paths. • It successfully returned the possible locations for the autoclave. • Very error-prone during development	

Move End-Effector Task	**Team Member Name**: Wenxiao Pan
• The Q arm moved correctly and didn't have any problems during its motion because the functions were well defined for the Q arm to move to the next point and there was proper usage of the sleep function. • Responds to muscle sensors effectively and smoothly. • The code had no errors and successfully moved the end arm effector to the designated drop off location	

MILESTONE 3 (STAGE 4B) – PROGRAM TASK PSEUDOCODE (COMPUTATION SUB-TEAM)

Team Number: Thurs-03

As a team, write out the pseudocode for each of the *remaining* tasks in your computer program in the space below.

Control Gripper

If the EMG simulator has a specific value or greater then close the gripper to grab the container using a function

If not then open the gripper to release the container in right position

Open Autoclave Bin Drawer

Open the #color autoclave bin drawer

Sleep 2 sec

Move the arm to the position of the drawer

Sleep 2 sec

Drop the container

Sleep 2 sec

Close the #color autoclave bin drawer

Continue or Terminate

List of bins <- [coordinates of each bins]

If there are bins left:

    continue

    Repeat the process of grabbing container

    Repeat the process of open/close bin drawer

    Repeat the process of dropping container

Else:

    terminate