Assignment 2– Offline Programming Assessment

Advanced Robotic Systems – MANU2453

Dr Ehsan Asadi, School of Engineering
RMIT University, Victoria, Australia
Email: ehsan.asadi@rmit.edu.au

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Offline Programming Assessment

- This assessment contributes 20% to your final score.

- Deadline: Thursday of Week 7, i.e. 11 September 2020 midnight.

- There will be several tasks. In each task:

  - Use ABB IRB120 robot.

  - You will be given the CAD files of the workpiece and tools.

  - You will need to attach the tool on the robot, and create a tool frame.

  - You will need to position the workpiece such that it is within the reachable workspace of the robot. You will also create a workobject frame.

  - You will then program the robot to perform the required task.

  - You will simulate the robot and record the simulation (there is a button under the Simulation tab called "Record Simulation". Save the video and submit the video.

  - Finally, create the RAPID code (Synchronize to RAPID) and also submit the RAPID code.
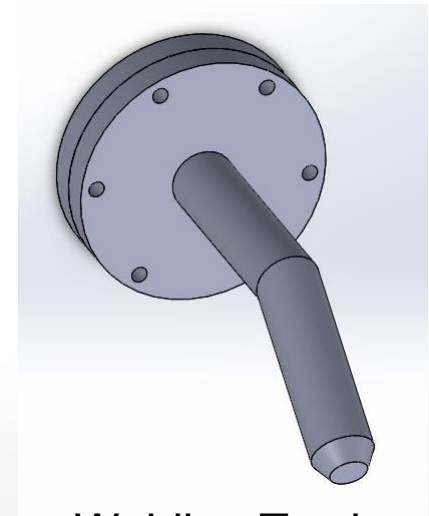
Task 1 – Welding (4%)

- Workpiece: Task1_Part1 & Task1_Part2
- Tool: Welding Torch (use the calibration data as shown in tutorial)
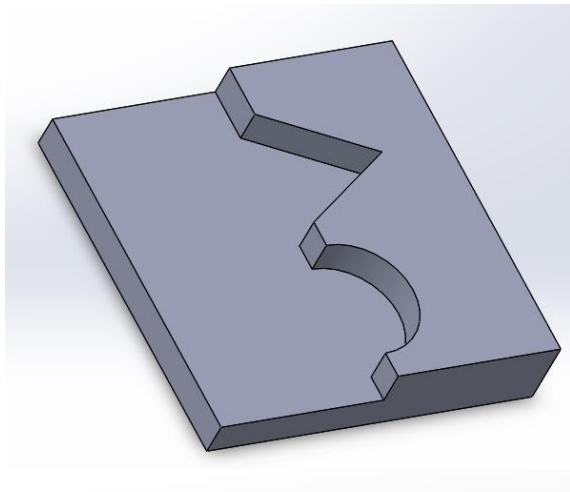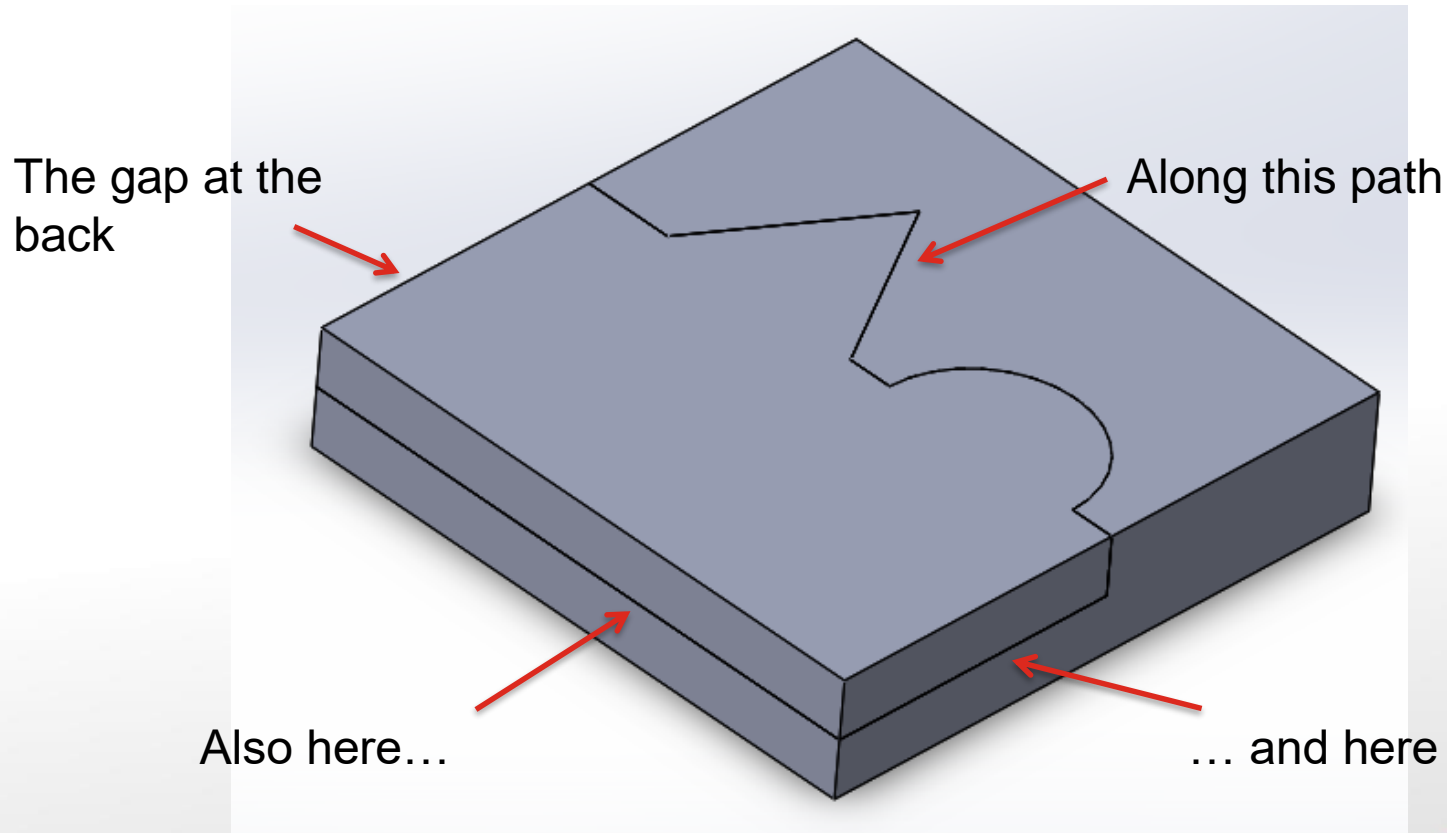

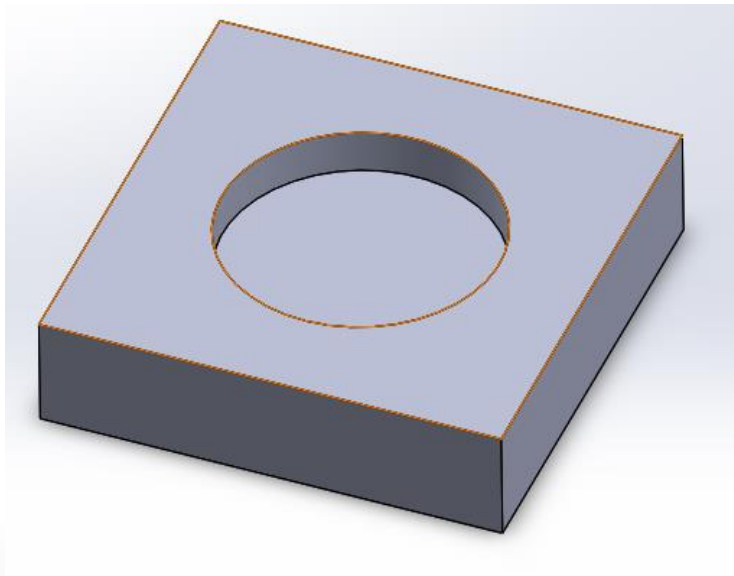Task1_Part1
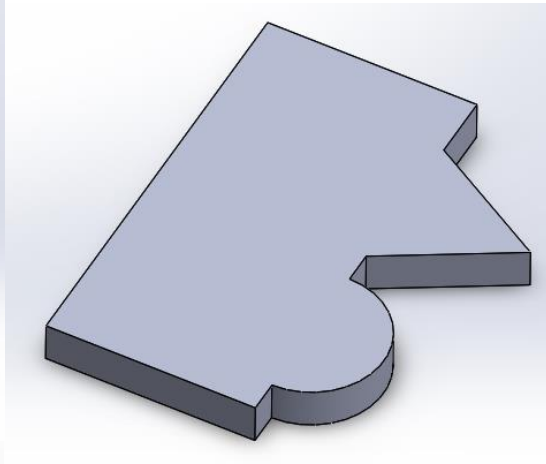
Task1_Part2

Welding Torch

Task 1 – Welding (4%)

- You are required to program the robot to join the two pieces together.

The gap at the back

Along this path

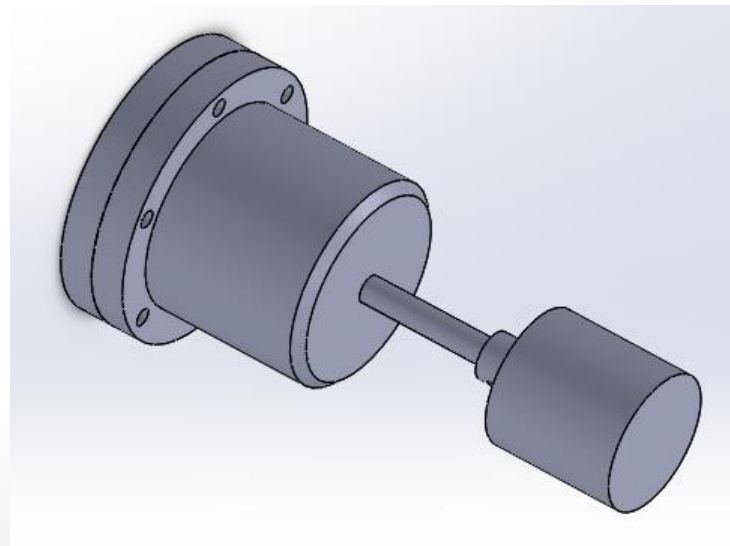Also here…

… and here

Task 2 – Deburring (6%)

- Workpiece: Task2_Part

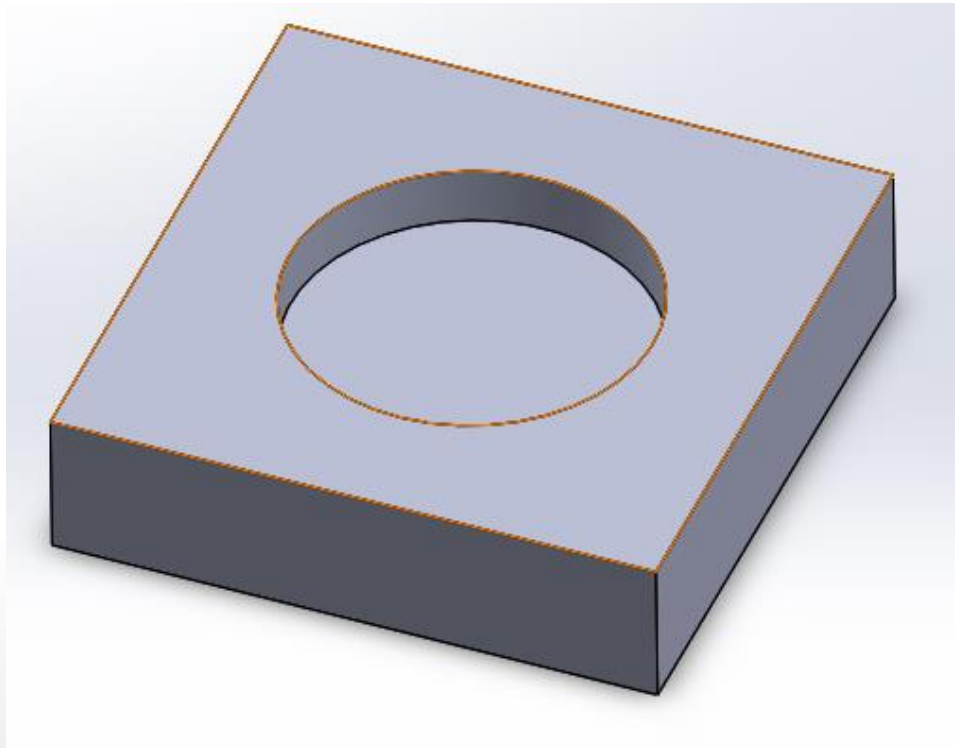- Tool: AssemblySpindleSide (You will need to create a tool frame yourself)
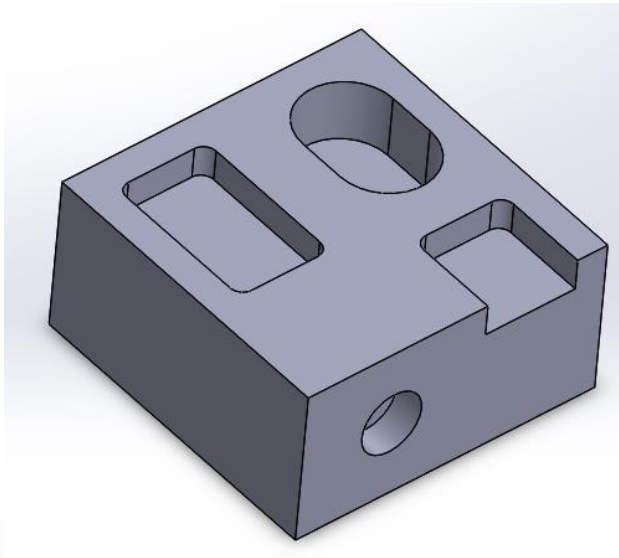

Task2_Part

AssemblySpindleSide

Task 2 – Deburring (6%)

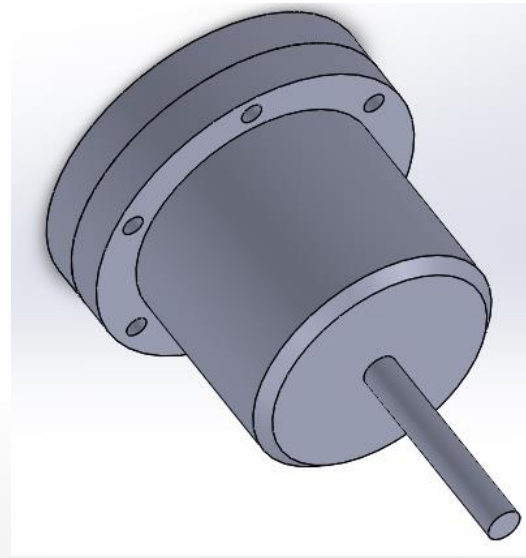- You are required to deburr all the edges highlighted in orange below.

Task 3 – Milling (5%)

- Workpiece: Task3_Part

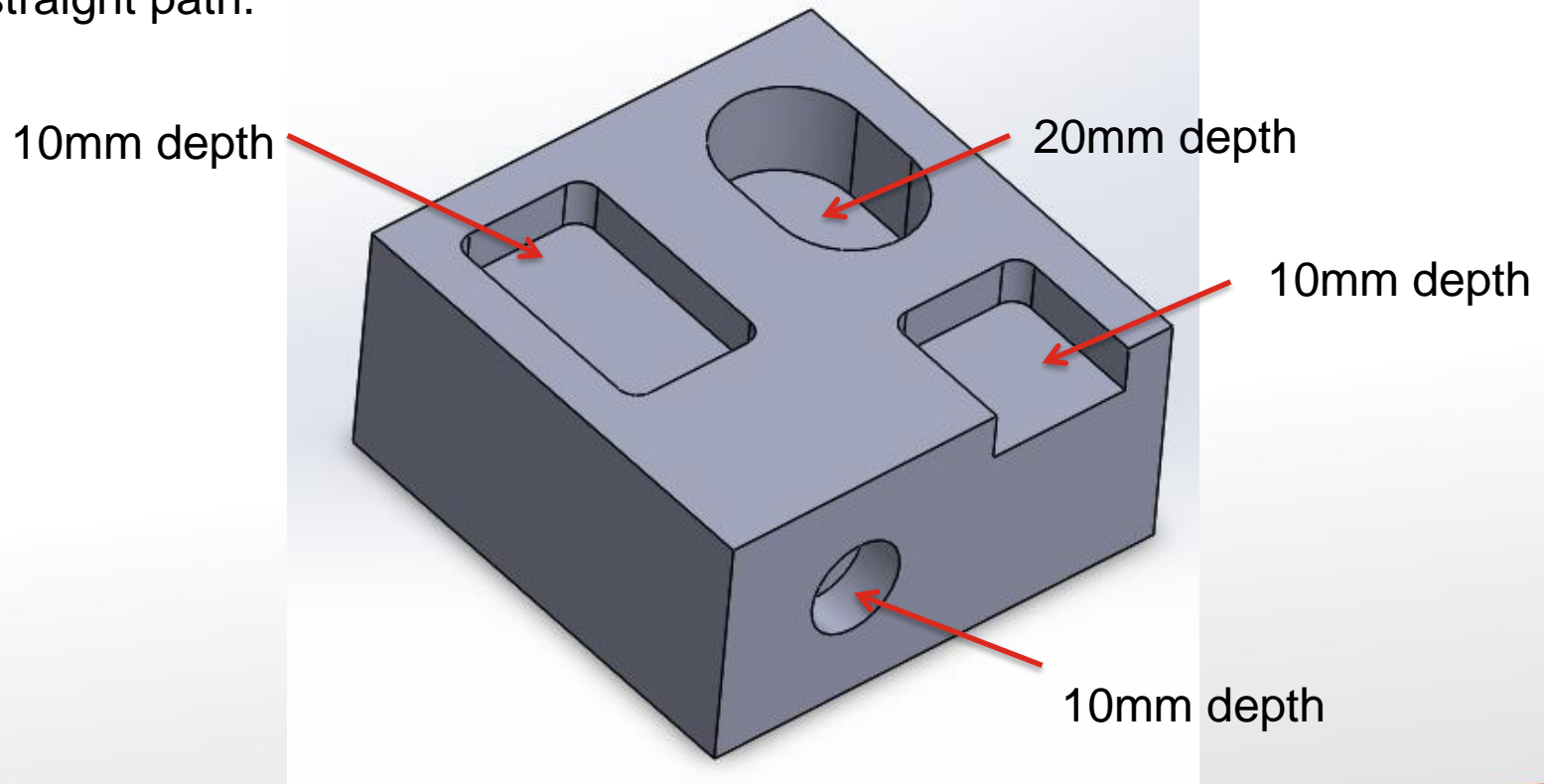- Tool: AssemblyMillCutter (You will need to create a tool frame yourself)


Task3_Part

AssemblyMillCutter

Task 3 – Milling (5%)

- You are required to mill out all the "holes" from the stock.
- Remember that robot path for milling of each "hole" might not be one single straight path.

10mm depth
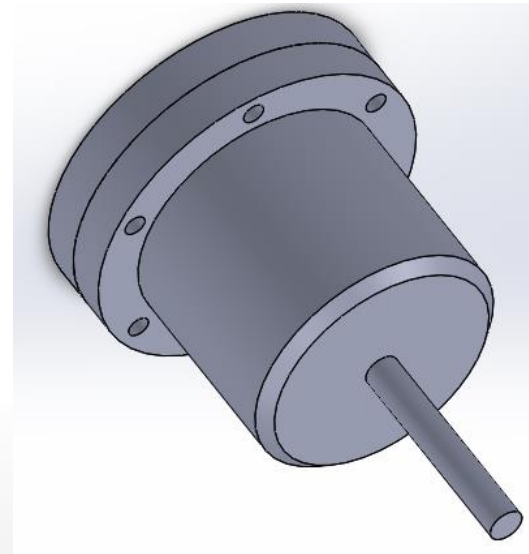
20mm depth

10mm depth

10mm depth

Task 4 – Drilling on Long WPc (5%)

- Workpiece: Task4_Part – Longer than robot workspace

- Tool: AssemblyDrillbit (You will need to create a tool frame yourself)
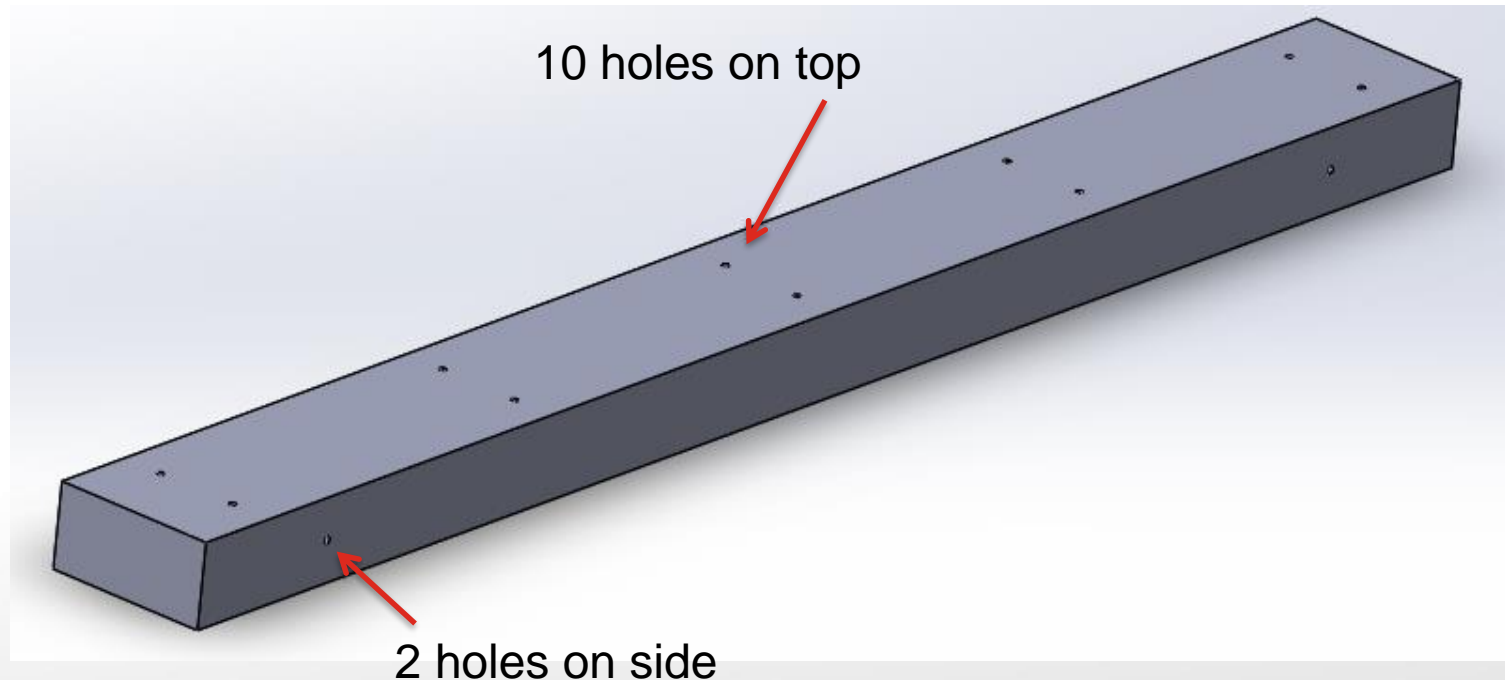

2m
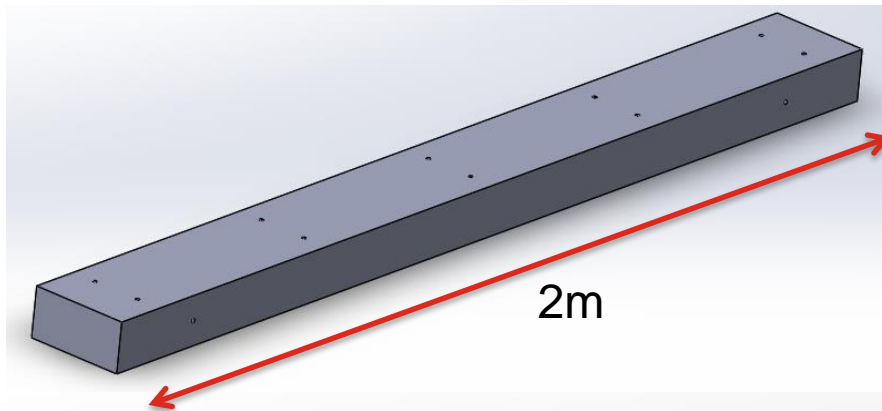
Task4_Part

AssemblyDrillbit

Task 4 – Drilling on Long WPc (5%)

- You are required to drill all the holes.
- You will need to use an external mechanism to accomplish this task.

10 holes on top

2 holes on side

Rubric

- Robot completes the tasks fully and correctly – Full mark for the tasks.

- Point deductions:
  - Non-smooth circular paths (if any): 1 point
  - Tool angles incorrect: 1 point
  - Incomplete path / task: 1 point
  - Path not covering the whole required area / surface: 1 point
  - Not using workobject frame: 1 point
  - Tool collision with object: 1 point
  - Video incomplete: 1 point
  - Not follow instructions on slide two: 1 point
  - Other errors as deemed critical by lecturer (Ehsan): 1 point