Final Robot Competition (ME 5751 SP 2025)

- When: 9:30-10:05pm, April. 17th, Thursday
- Where: classroom
- Who: ME 5751 class, all teams

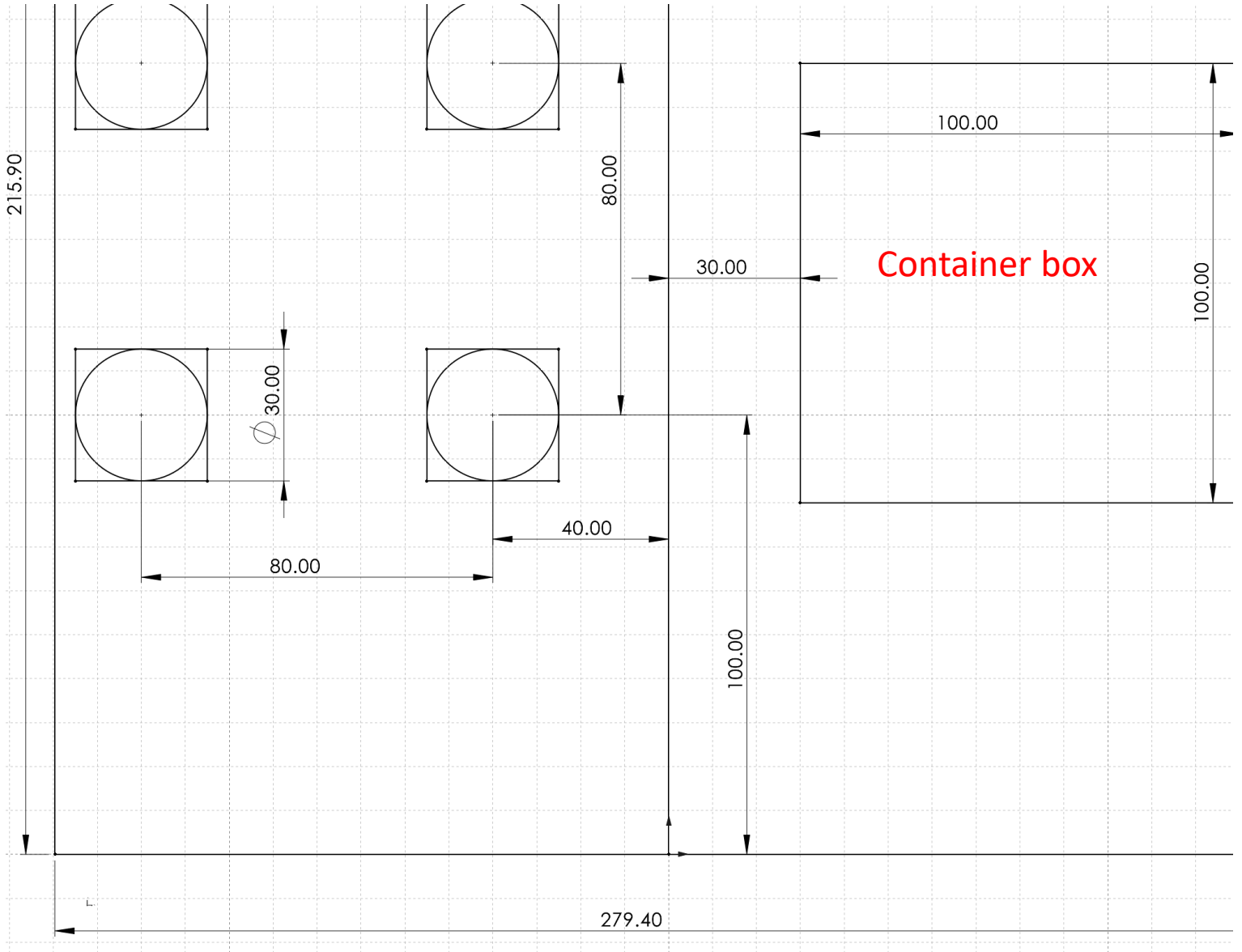
- Field size: one letter size 8.5”x11” (215.9mm x 279.4 mm)
- Container size: 100mm(W)x100mm(L)x50mm(H)
- See the attached field setup sheet for details

Competition Rules

- Basic Rules
  - Pick and place an object and drop it into a designated container
  - The coordinates of the objects and the container/holder is given in prior
  - Pick and place as many as possible objects in a given time window
  - The robot should be pre-programmed to conduct the task automatically. Once it is set, no one can touch the robot or the object.
  - You can restart the program and the field setup as long as the time is not used up.
- There are three rounds (maximum 120+60+80=260 points)
  - Round #1 (3 tasks):
    - 90s for each task. The preparation time is not counted
    - Each team can choose your own order
    - The final score is the total of all 3 tasks
  - Round #2: (1 task).
    - 4 Randomly selected objects.
    - 90s. The preparation time is not counted
  - Round #3: (1 task)
    - Pen picking
    - Curve tracing
    - Pen returning
- Grading rule:
  - Ranking by total # of points earned
  - The first place receive a score of 100/100,
  - The last place receive a score of 70-85/100 (depends on the quality)
  - Team between the first and the last will receive a score by interpolating between 70-100.
  - The team who could not enter the competition receive 70/100

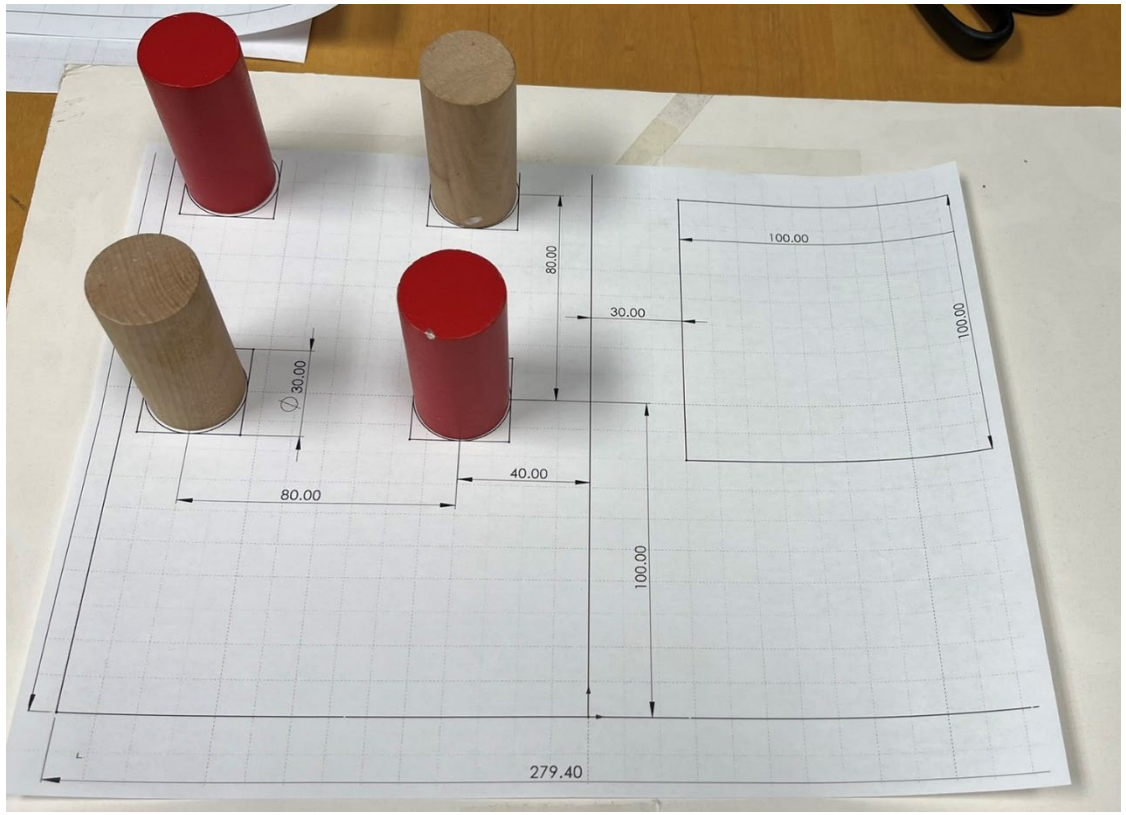
Dimensions of field setup for round 1 & 2

- A letter size paper
- Container box is 100mmx100mm
- Objects are placed at the center of the four circles
- Each circle is 30mm in diameter



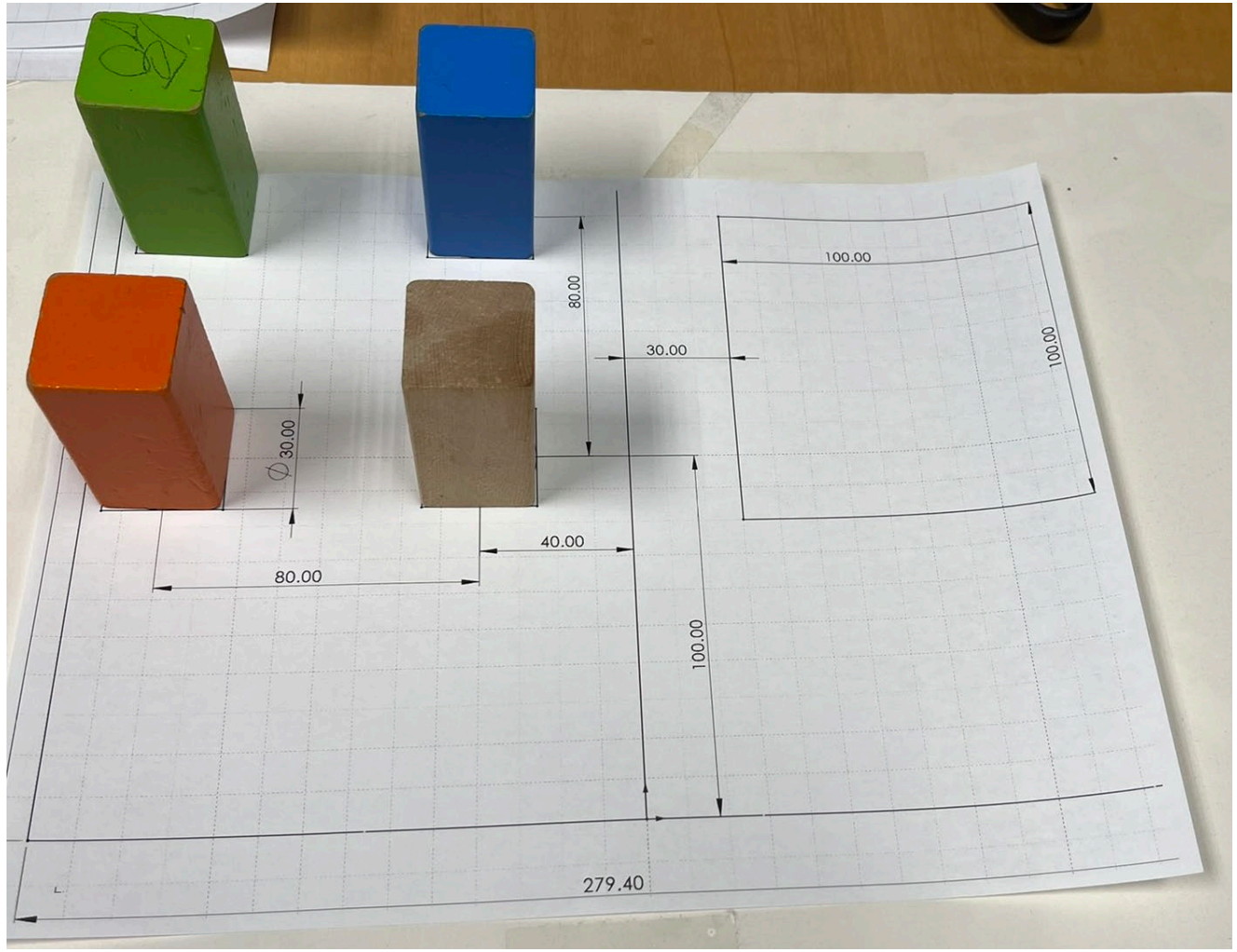
Round #1: Task #1

- Four identical cylinders:
  - 30mm diameter
  - 60mm height
- Total time: 90 secs
- 10 points if picking and placing each object into the container successfully
- Maximum points: 40



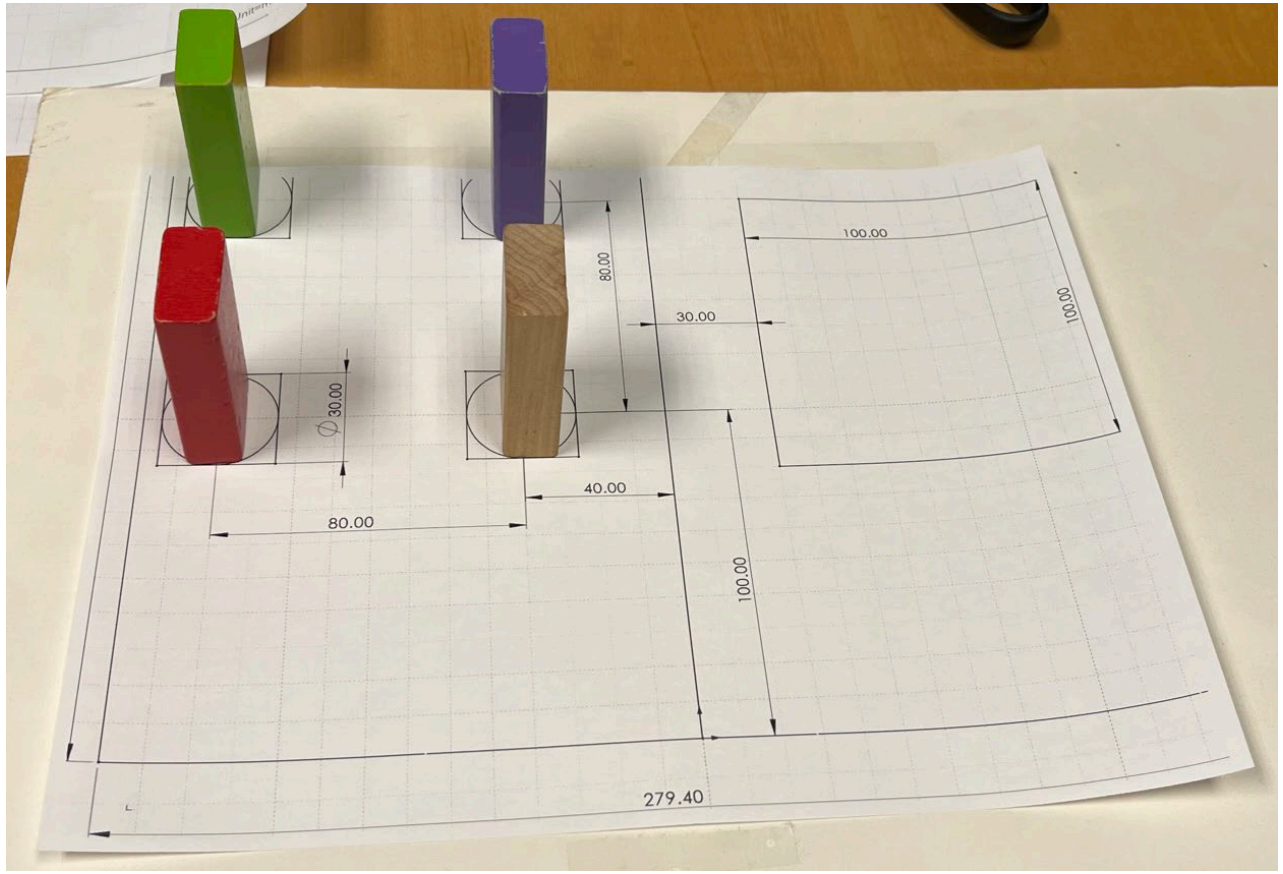
Round #1: Task #2

- Four identical square block:
  - 30x30mm
  - 60mm height
- Total time: 90 secs
- 10 points if picking and placing each object into the container successfully
- Maximum points: 40



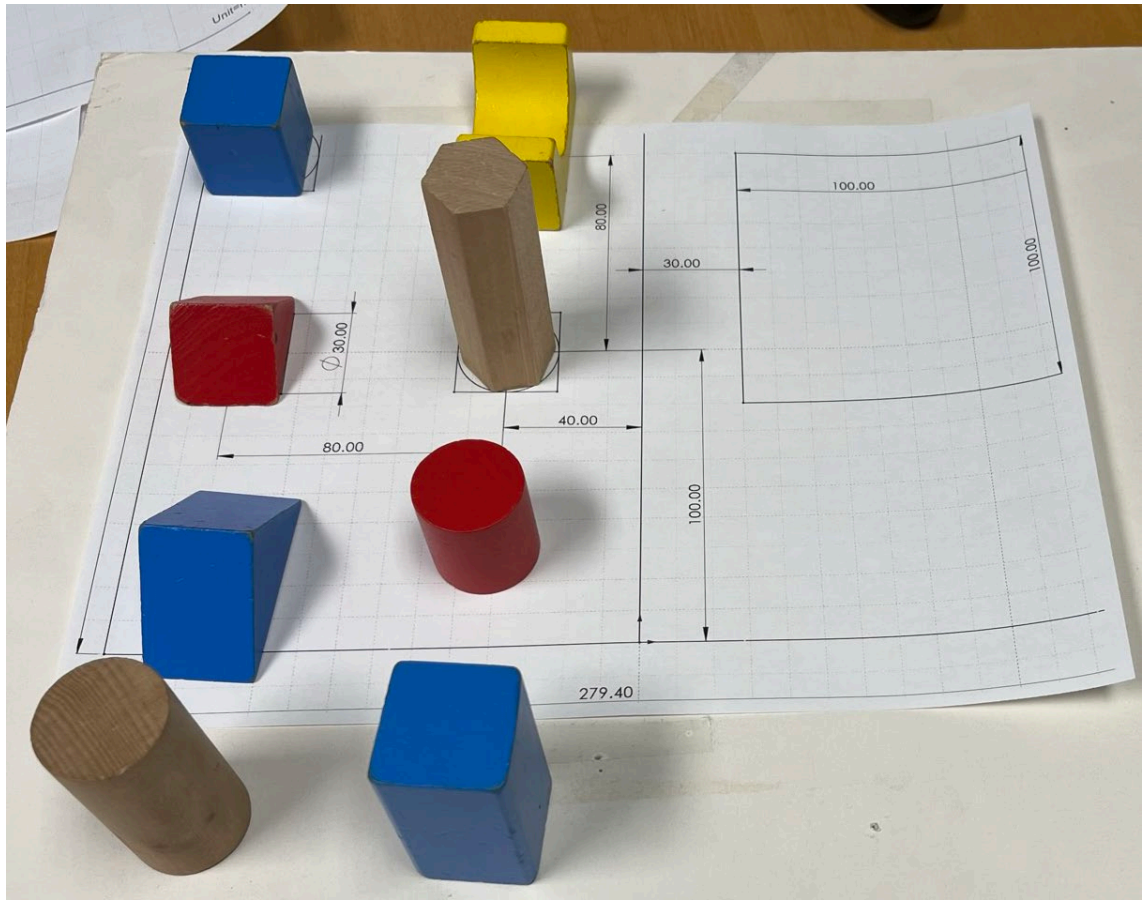
Round #1: Task #3

- Four identical rectangular block:
  - 15x30mm
  - 60mm height
- Total time: 90 secs
- 10 points if picking and placing each object into the container successfully
- Maximum points: 40



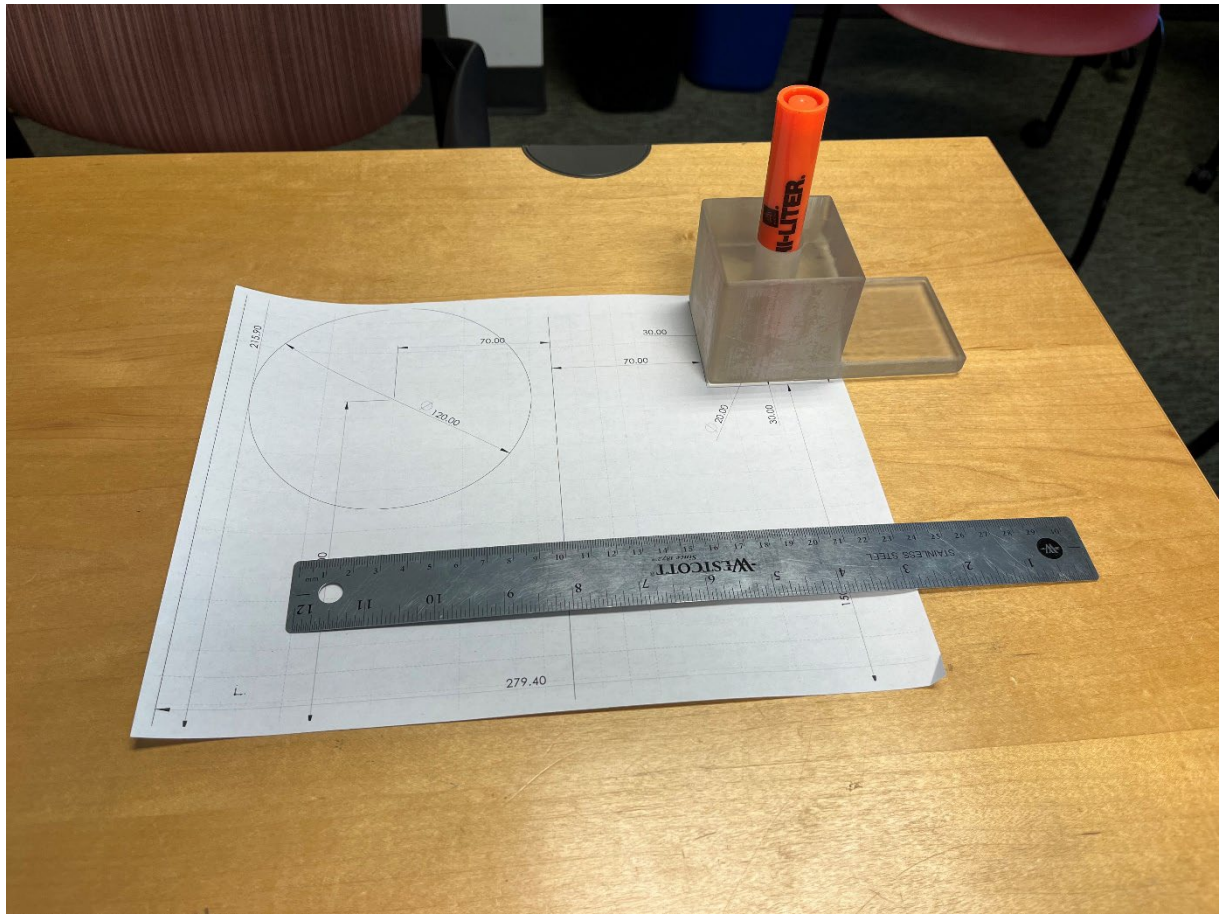
Round #2

- 4 randomly selected objects at a random position
  - Triangular prism, hexagon, bridge, cylinder, rectangular box etc.
  - Size: 30-60mm
  - Height: 30-90mm
- Total time: 90 secs
- 15 points if picking and placing each object successfully
- Maximum points: 60



Round #3: Pen Picking and Curve Tracing

- Robot grasps a marker pen (see dimensions from the next slide) from a pen holder: 20 points
- Robot use the pen to trace a curve on the field paper (letter size)
  - 40 points: a circle (see dimensions in the next slide)
  - Judge deduct points (2pts each time) if the pen tip is not aligning within +-5mm of the curve.
- Robot place it back into the pen holder
  - 20 points
- As an option, you can skip picking and/or placing pen task.
- Total time: 120 secs
- Maximum points: 80



Dimensions of field setup for round 3

- A letter size paper
- The pen holder box is 60mm (W)x60mm(L)x60mm(H)
- Pen is about 20mm diameter and 130mm long and is inserted into the pen hold with the head pointing down.
- The curve to be traced is a circle on the paper.
- It is not required that the pen head must touch the field plane, preferably leaving about **10mm** distance from the plane