Necessary equipment for this system:

1. CCTV camera with RTSP streaming feature
2. A projector
3. Laptop having Win10 and at least 4GB of Ram and Notepad++ installed
4. Axe color should be Black

Necessary files:

1. ImageProcess.py (python file)
2. Target.jpg (Image file to be projected on board)
3. Target4x4.bin (this file have necessary information required for python file)
4. ThresholdGUI3.py (python file for calibrating color combination of lines on board)
5. Python 3.10.2 should be installed
6. Libraries required for python (open CV (version 4.5.5), Numpy (version 1.22.3) and PyQt5 (version 5.15.6))

Operating Procedure:

1. Set RTSP URL of camera with password in line 86 of ImageProcess.py file in Notepad++
2. Connect camera through Lan cable to laptop
3. Set camera resolution to 1280\*720
4. Connect projector to laptop and set resolution of projector screen to 1024\*768
5. Select mode of projection to “Extend”
6. Keep projector image to screen 1 (left) and laptop to screen 2 (right)
7. Open windows terminal from run (win+R) by typing “cmd”
8. Goes to the folder in which all these files are saved
9. Run ImageProcess.py file from terminal
10. Throw axe on the board and wait for few seconds so the system will detect axe and will calculate distance of axe and will display score on laptop as well as on projector screen.

Calibration:

1. For Calibration you need to run your ImageProcess.py file at least once
2. For Color calibration run ThresholdGUI3.py
3. Click on red circle and note down color range of at least 10 points
4. Repeat above line for remaining two circles
5. Update color combination of all three circles in ImageProcess.py file from line 27-32
6. For setting focus area open Last\_Frame\_0.jpg file in paint
7. Using mouse cursor note down the focus area points of x-axis and y-axis and edit it in ImageProcess.py file from line 35-38
8. Repeat the above (line-6) procedure for selecting center point of circles on board and update the values of cX and cY in ImageProcess.py file in line 134