1. The resolution of the waist incremental encoder is equal to $\Delta \theta = \pm 0.5/455 = \pm 0.0011 \text{rad} \\
\approx 0.063^\circ$.

2. When the six feet are on the ground, the supporting area is a rectangle. The maximum stability margin happens when all the feet are on the ground, which is 0.55 m.

![Diagram of robot's stability margin when all feet are on the ground.](image)

When the rare left is lifted, the robot has the minimal stability margin which is about 0.06 m. Note that all the feet have been moved forward by 0.145 m.

![Diagram of robot's stability margin when one foot is lifted.](image)

The duty factor of the robot is $5/6 = 0.833$.

3.