809T Homework 6

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The Assignment is to assemble the parts for the gripper and pick up an object using Teleoperatic operation as seen in the previous homework and write new code to pick and place object in the same way.

Part 4:

The video showing the time lapse of the pick and place is shown below.

https://youtu.be/tKWh5JMNIno

Part 5:

The Calculation for the a and b parts are shown below

a) The number of Revolutions for moving 1 meter is given by.

$$\frac{(\text{gear Ratio})}{1 \text{ rotation}} \times \left(\frac{1}{\text{Circumference of Circle}}\right)$$

where. gear Ratio = 1:120.

$d = 65\,mm \Rightarrow 65/2 \Rightarrow r = 32.5\,mm$

$= 0.0325$ meter.

$$= \left(\frac{120}{1.}\right) \times \left(\frac{1}{2\pi r}\right) \Rightarrow \left(\frac{120.}{2\pi(0.0325)} \times\right)$$

for 1 meter $\Rightarrow \dfrac{120}{2\pi(0.0325)} \times 1$ meter

$= 587.64$ motor Revolutions.

b) To get the ticks. We know that each Revolution has 8 states and for each Revolution we get

$120 \times 8 = 960$ tick/Revolution.

Then we have.

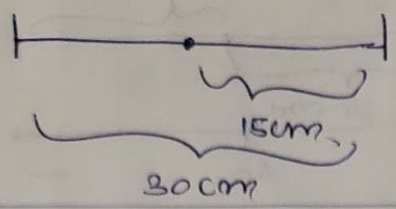
$$\left(\frac{960}{1}\right) \times \left(\frac{1}{2\pi r}\right) \Rightarrow \frac{960}{2\pi(0.0325)} \text{ per meter.}$$

For 2 meters we have. $\dfrac{960}{2\pi(0.0325)} \times 2$.

$= 9402.384$ ticks.

Part 6:

6.)



Since from the input. we can see the dia to be 30 cm the radius is 15 cm. The circumference is given by

$$\text{Circumference} = 2\pi r \Rightarrow 2 \times \pi \times 15.$$
$$= 94.2477 \text{ cm}.$$

Since it is a semi-circle (ie) 180° so. the distance to travel is 47.1238 cm.
The Revolutions are calculated to the above distance which is

$$= \frac{53}{1} \times (0.4712) \times \frac{1}{2\pi(0.07)}$$

where the gear ratio is 1:53. & radius of robot wheel is 7 cm.

$$= 56.785 \text{ revs}.$$