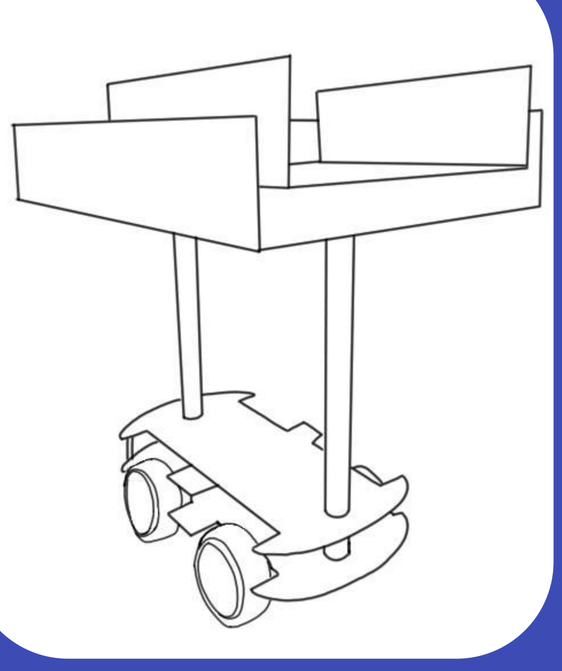
Ahmed Basem 202000188
Nour Sharaky 202000149
Omar Mohamed 202000140
Seifeldin Haytham 202001176
Yara H Shahin 202000137

T-RAY

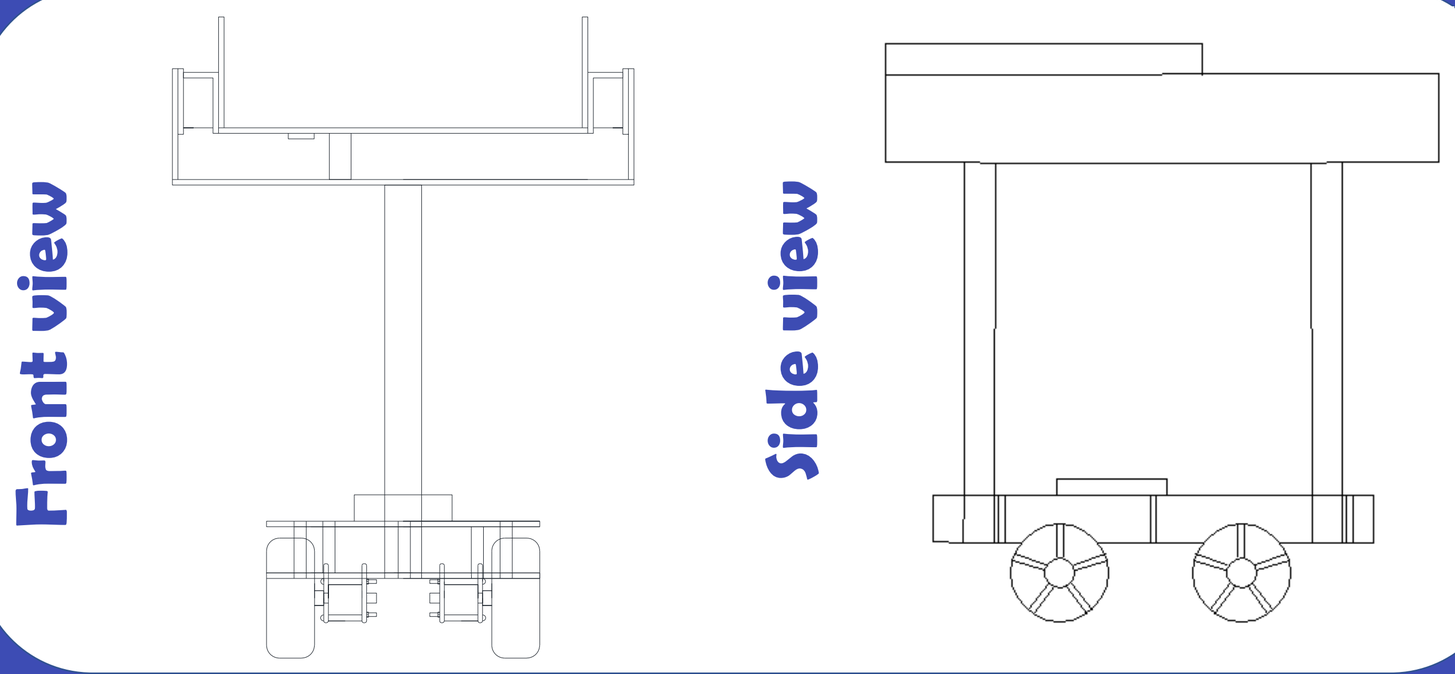
Coventry University

The Knowledge Hub Universities

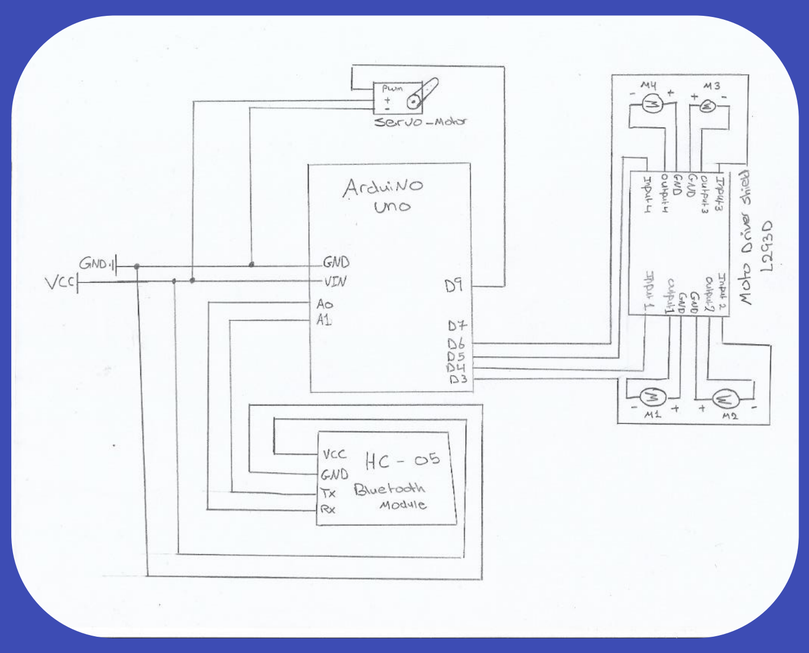
Free hand sketch of the system



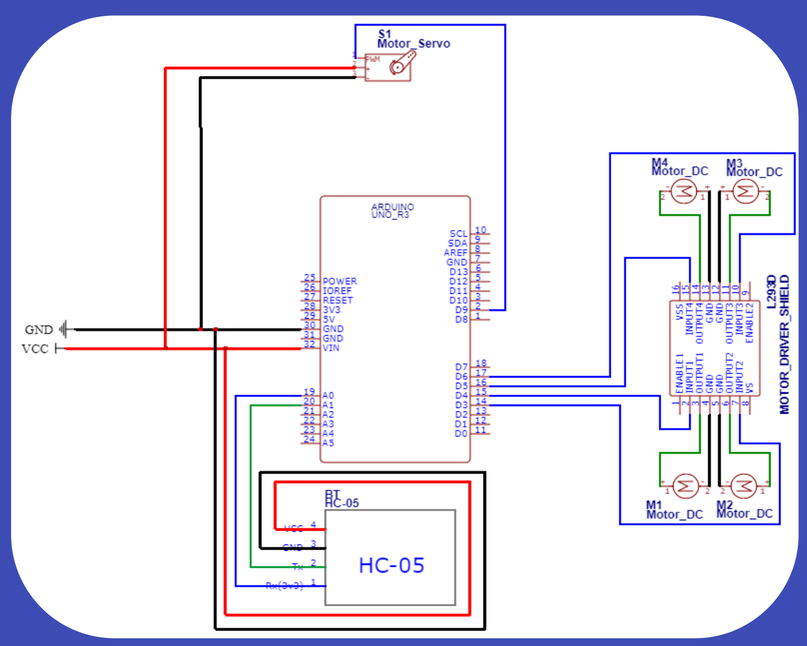
AutoCAD drawings of the system



Free hand sketch of the electric schematic



AutoCAD drawing of the electric schematic



Prototype

Calculations

Total load

Live Load+ Dead Load $= 22.05\ N$

Load per wheel

$$\frac{Total\ Load}{Number\ of\ Wheels} = \frac{22.050}{4} = 5.513\ N$$

Friction

per wheel $= 0.4 \times 5.513 = 2.210\ N$

Total friction $= 4 \times 2.205\ N = 8.820\ N$

Torque per wheel

$\tau \geq F \times r \geq 5.513 \times 0.033\ m \geq 0.179 Nm$

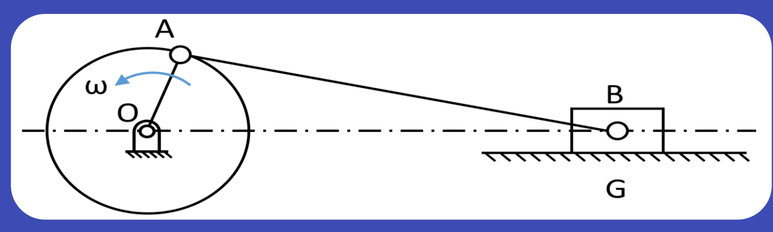
Power Consumption with 20% margin

$P_{total} = 9.652 + 9.652 \times 20\% = 11.582\ watt$

Battery Capacity

$$\geq \frac{Energy}{Voltage} \geq \frac{11.582}{12} \geq 0.9652A$$

In-line crank mechanism



Inline crank mechanism is a 4-bar mechanism that converts the servo's rotary motion to the tray's linear motion.

Also, the prototype was built using affordable sustainable materials.

Android application