# Hardware

The hardware of the robot regards itself with all the electronic components of the robot. This would be hardware components such as the Jetson itself, and camera(s). Though also be regarding wiring the components, designing and creating any circuits needed to interface the Jetson with any components (servos, sensors, motors). This task will involve sourcing (researching and deciding on), wiring, and connecting components. The robot is expected to require the following:

* Motors
* Speed controllers
* Servos
* Camera (Compatible with Jetson Nano)
* Wiring
* Possibly circuits

# Mechanical

The mechanical aspect of the robot is every non-electronic physical aspect. Members of this task will be responsible for designing and creating the structure of the robot, including:

* Wheels and tyres
* Axels
* Mounting of hardware (motors, servos, battery, camera, Jetson)
* Mechanisms for acquiring and releasing the balls accurately and controlled
* Sturdy robot base
* Promoting up-cycling philosophies to support the reduction of e-waste.

# Software

## Artificial Intelligence (Descriptive and/or Predicative)

The intelligence of the robot isn’t restricted to descriptive or predicative methods. Though the tasks that are required to be performed are clear:

* Detecting and storing zone AprilTags
* Detecting tennis and ping pong ball locations
* *Possibly: Detecting other robot locations and bounds*

This task is more theoretically challenging rather than programmatically challenging. It’s roots are in Visual Intelligence and Image Analysis (both are modules in year 3).

## Robot Control and Sensing

This task is programming the interface between all logic and the hardware. It does not handle when to perform a certain activity (operation framework), nor does it perform the logic of the robot. Rather, it’s the actor upon these two other aspects of the software implementation to realise the robot’s actions. Specifically, it’s responsible for:

* Controlling motor speed controllers
* Calculating robot position in the arena
* Planning the path back to base
* Aligning the robot with the two drop zones
* Manovering the robot around the arena towards balls
* Acquiring balls
* Dropping off balls into their zones
* *Possibly: Avoiding other robots*

## Operation Framework

For lack of a better name, Operation Framework refers to the robot’s approach to a match. This task will tentatively involves:

* Design strategies the can robot take in a match
* Implementing these strategies programmatically for the robot to execute while in a match
* Accounting for certain stimuli.
* Some areas of research may include:
  + State machines
  + Expert (rule-based) systems