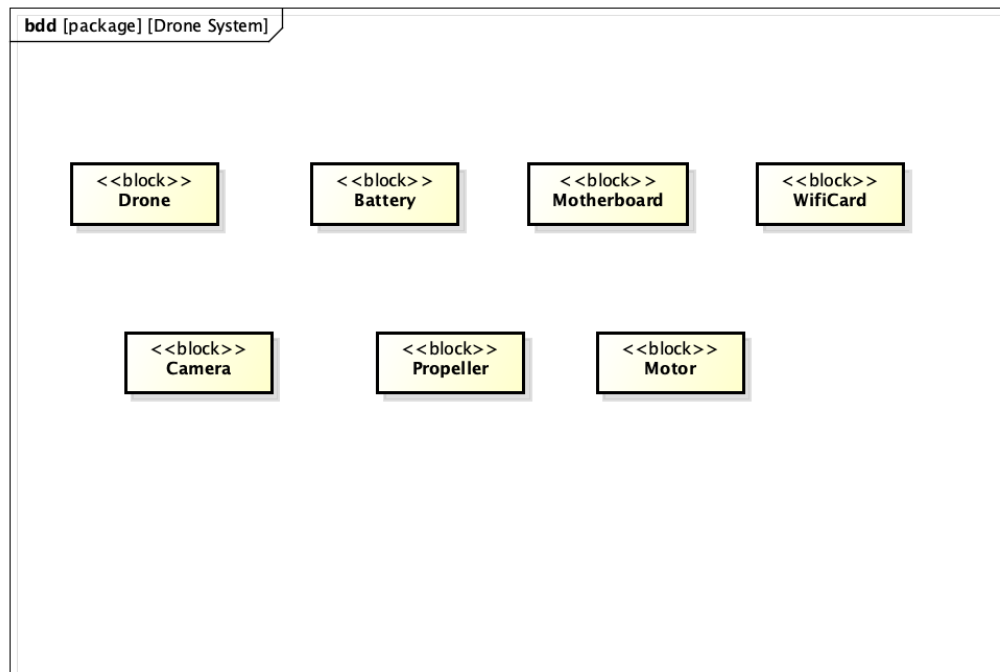


The system we are interested in is an aerial drone. This drone is operated from a remote device that is not part of the system. The drone is equipped with: four propellers, a motor for each propeller, two cameras (one for the front and one for the rear), a wifi card, a motherboard and a battery.

## 1. Blocks diagram



- 1.1. Add the appropriate elements on the BDD diagram above in order to specify the known elements of the system. **(2 points)**
- 1.2. The motherboard is in charge of controlling the motors according to commands received from the remote device. Modify the relevant blocks to represent this control mechanism. **(2 points)**
- 1.3. Several different types of batteries exist, for example, Lithium batteries or Solar batteries. Each type of battery is characterized by, at least, a maximum duration (in hours), a charging time (hours also) and a cost. Add elements and/or modify the diagram accordingly. **(2 points)**

## 2. Internal block diagram

- 2.1. Specify with an internal block diagram the connections corresponding to the question 1.2. **(3 points)**

## 3. Parametric diagram

- 3.1. Define all elements needed (you can also modify already defined elements) by a trade-off analysis for different types of drones based upon an objective function that use the elements defined in question 1.3 and an environment friendliness value. **(4 points)**

## 4. State machine diagram

The drone is entirely operated from the remote device. It can be used either in manual or automatic mode. The automatic mode consists in pre-programmed behaviors: take off, landing and autopilot (aiming towards a specific direction given by the user). The manual mode allows to pilot each propeller separately (the user has to choose one and then define the power for this specific propeller) or all propellers together (in this case the power is apply to all propellers). In all cases the four propellers are functioning continuously with the last known command. The drone does not send the video captured by default but the user can choose to do so. The drone sends the battery state of charge every minute. The drone receive commands and informations from the remote device continuously. If it is not so (drone out of reach) the drone tries to return to a previously occupied zone. When such a zone is reached the drone apply the last known behavior.

- 4.1. Define a state machine diagram for the specification of the system behavior with all relevant elements. **(7 points)**