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Introduction
Webots is a widely used robot simulator that allows users to create and simulate various robotic systems. The ArduCopter is a popular open-source unmanned aerial vehicle (UAV) platform that uses an Arduino-based flight controller. In this technical report, we will discuss how to simulate the ArduCopter using Webots.

System Design=
The ArduCopter simulation in Webots requires the following components:
ArduCopter flight controller
Quadcopter frame
Electronic Speed Controllers (ESCs)
Brushless DC motors
Propellers
The flight controller is responsible for controlling the motors and maintaining stability and orientation of the quadcopter. The ESCs regulate the power supplied to the motors, and the motors spin the propellers to generate lift.

Implementation
To implement the ArduCopter simulation in Webots, we need to create a new robot model and add the required components. We can use the "Quadcopter" template available in Webots as a starting point.

The ArduCopter flight controller can be added to the robot model by importing the ArduCopter firmware code as a library. The firmware code can be compiled for the ARM Cortex-M4 processor used in the flight controller.

The quadcopter frame, ESCs, and motors can be added to the model using the Webots built-in components. The motors are connected to the ESCs, and the ESCs are connected to the flight controller. The propellers are attached to the motors.

To simulate the flight, we need to define the flight plan and control inputs. The flight plan can be defined using a script that specifies the desired altitude, orientation, and velocity of the quadcopter. The control inputs can be generated by the flight controller based on the flight plan and sensor data.

Results
The ArduCopter simulation in Webots allows us to test the flight controller and control algorithms before deploying them to a physical drone. We can simulate various flight scenarios and test the performance of the system under different conditions.

Conclusion
In this technical report, we discussed how to simulate the ArduCopter using Webots. The simulation allows us to test the flight controller and control algorithms in a virtual environment before deploying them to a physical drone. The simulation can also be used to test the performance of the system under various flight scenarios.