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Brief presentation of the topic
Software Engineering (CS3500) Assignment

Our team has decided to create a control system for an indoor vertical farm that uses aquaponics. For the sake of simplicity this farm grows butterhead lettuce exclusively but can be extended to manage the environment of other vegetables as well.

Introduction to vertical farms

Vertical farms are indoor farms that grow vegetables stacked on the vertical axis. In this manner, more crops can be cultivated on a smaller footprint than in traditional agriculture. The controlled environment offered by an indoor farm eliminates the risk of diseases and insects. Combined with aquaponics it increases 10 times the crop yield compared with traditional agriculture and reduces water consumption by 90% since it is recirculated in the system. Aquaponics means that the roots of the vegetables are placed in water enriched with nutrients instead of soil.

Inputs and outputs of the system

Since the control system of a vertical farm is quite sophisticated it requires a lot of inputs and outputs to be able to fully control the growing environment. The inputs and outputs of the system are the followings:

Inputs	Outputs
◦ time (different phases of growth)	◦ air conditioning system
◦ air temperature sensor	◦ ventilation
◦ water temperature sensor	◦ water dispenser
◦ nutrient sensors	◦ nutrient dispenser
◦ light intensity sensor	◦ LED strips
◦ light spectrum sensor	◦ humidifier
◦ humidity sensor	◦ pH controller
◦ pH level sensor	
◦ conductivity sensor	