SLIDE 1

TEAM NAME: ALA

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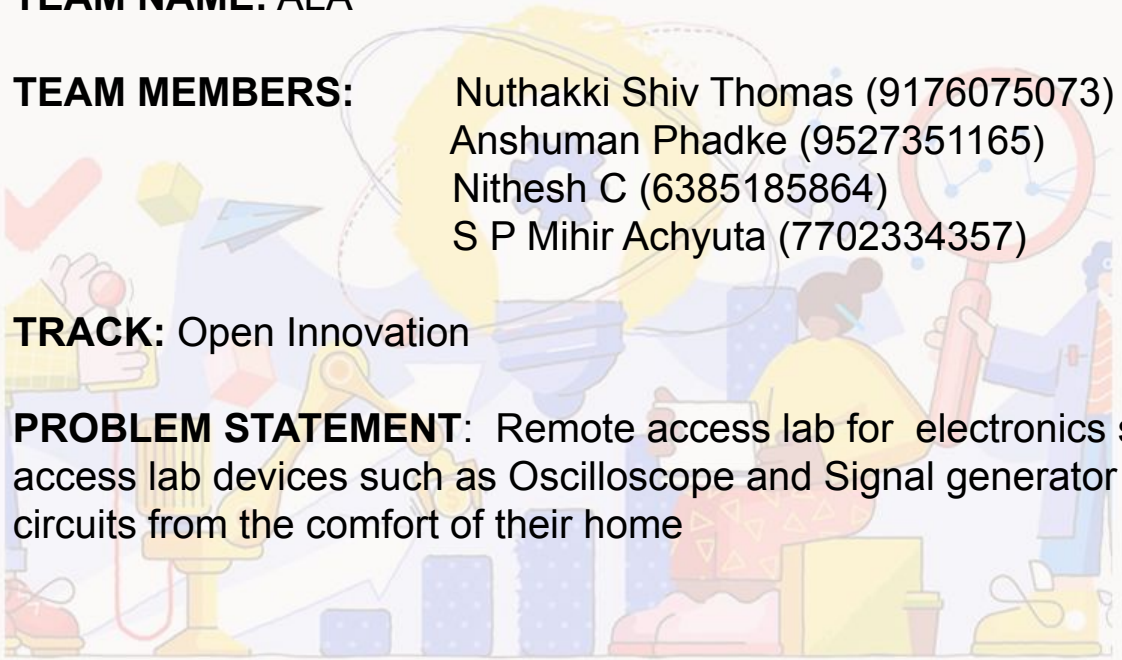
TRACK: Open Innovation

PROBLEM STATEMENT: Remote access lab for electronics students to access lab devices such as Oscilloscope and Signal generator and test their circuits from the comfort of their home



SLIDE 2

Abstract

One of the major issues faced by current electronics students is to get an hands on experience with electronic devices such as Oscilloscope or Signal generator, mainly in times like these. The high cost of these devices make it unaffordable and students are dependent on the minimal time during their lab hours to learn, which is also not possible during this pandemic

In order to overcome this issue we have come up with a remote electronics lab, through which a student will be able to access the devices in a remote lab and experiment with it, using minimal basic devices, from anywhere in the world. Our Prototype focuses on providing a remote lab which provides the facility of an oscilloscope, a signal generator controlled using basic devices from home and generating an equivalent circuit in the lab to be tested with, based on the breadboard connections made by the student.

SLIDE 3

Novelty

- The pre existing solutions for the given problem statement is only usage of a simulation software which restricts the student from getting a practical hands on experience.
- The existing remote labs are based on processors or microcontrollers, where a person can access them from the comfort of their home.
- This project has introduced remote lab access to devices such as Oscilloscope or Signal generator, which is not present before, and providing a lab like environment at home for students to physically experiment using these devices without actually having them.

SLIDE 4

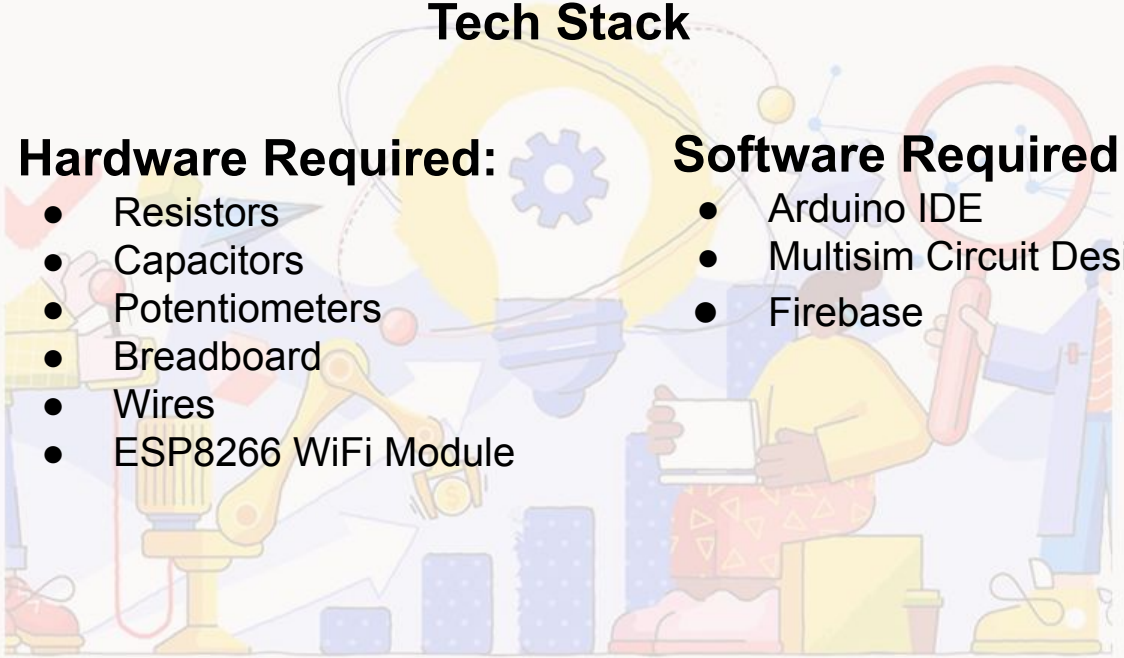
Tech Stack

Hardware Required:

- Resistors
- Capacitors
- Potentiometers
- Breadboard
- Wires
- ESP8266 WiFi Module

Software Required:

- Arduino IDE
- Multisim Circuit Design
- Firebase



Software and Hardware Implementation

- This project can be divided into two parts - The customer end and the lab end.
- In the consumer end we have devices which mimic the the working of the intended lab device, by exchanging data with the original lab device.
    - So here we have a pseudo signal generator that has basic devices such as a knob and an ESP8266 WiFi Module that will detect the angle of rotation of the knob and upload this data to the cloud.
    - A pseudo oscilloscope will be used to display all the data, collected from the original oscilloscope
    - A pseudo circuit breadboard will be used by the students to make the required circuits and these connections will be reflected on a circuit board with nodes connected by the electronic components and switches to construct the same circuit to be used for testing. The pseudo circuit board consists of open circuits by which the connections made can be observed using measuring instruments.
- The lab component has devices such as pseudo signal generator for regenerating the signal from the sensor data from the knob and displaying it on the oscilloscope.

Business Scope

- The proposed solution can be made into a product where the students will be provided the lab kits with basic devices to control and access the lab devices.
- Given the pandemic situation where the students don't have access to lab and in general students who will not be able to afford or access such devices and want to experiment with it can use this product.
- The tech stack used is minimal and the implementation is also easy and inexpensive.
- This solution will certainly help the students to learn and experiment with minimal devices.
- This product has the scope of becoming a device which every electronics students can have with them in order to carry out experiments.

THANK YOU