HDSA2021

HARARE CHAPTER

WORKSHOP SCRIPT

Embedded Programming & Electronics

The following documentation provides a detailed description that serve as a guideline for participants

Workshop Activity: Fetching underground water using a simple button

Activity Goal: To provide a learning experience to participants in programming & setting up a sub-unit.

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
2	Arduino Male to Male Connectors	10
3	10cm x 10 cm PCB breadboard	1
4	LED 6mm (9 mm optional)	2

Pre-requisite Softwares

Software Tools	License type
Arduino IDE	Open
Fritzing Vrtual Prototyping Bench (Optional)	Open

Activity Guidelines

1. Go through the introductory material to familiarize yourself with the Arduino & basic electronics that relate to the activities you will be undertaking.
2. Now that you have familiarized yourself, we'll first dive into embedded coding, as we compile the source code that we are going to deploy on to the Arduino board of our sub-unit ☺
3. After successfully compiling our source code, we'll move on to a more hands-on session of our activity, where we'll test using real components.
4. We'll first lay the the electronic schematic of the sub-unit according to provided instructions, making sure each way goes to the right place accordingly.
5. Let's just double check if we had done our wiring correctly accordingly before we proceed to the final session of the activity which is the testing part ☺
6. After confirming our connections & source code, we proceed to the pilot test. Drumroll………….. ☺

Additional Notes:

1. Fritzing Software provides an alternate option for some of the participants who may not have access to the required components. So inorder to make sure they are not left out, this open-source software provides a virtual environment where they can build & deploy their source code from their workstation

Workshop Activity: Mitigating water usage using a soil moisture
Activity Goal: To provide a learning experience to participants
in programming & setting up a sub-unit

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
	Soil Moisture Sensor	1
2	Arduino Male to Male Connectors	10
3	10cm x 10 cm PCB breadboard	1
4	LED 6mm (9 mm optional) 1x red ; 1 x Green	2

Pre-requisite Softwares

Software Tools	License type
Arduino IDE	Open
Fritzing Vrtual Prototyping Bench (Optional)	Open

Activity Guidelines

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Workshop Activity: Monitoring water usage using an LCD output
Activity Goal: To provide a learning experience to participants
in programming & setting up a sub-unit

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
	Arduino flow rate sensor	1
2	Arduino Male to Male Connectors	10
3	10cm x 10 cm PCB breadboard	1
4	Arduino LCD Output module	2

Pre-requisite Softwares

Software Tools	License type
Arduino IDE	Open
Fritzing Vrtual Prototyping Bench (Optional)	Open

Activity Guidelines

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Workshop Activity: Securing the community borehole using an alarm system
Activity Goal: To provide a learning experience to participants in programming & setting up a sub-unit

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
	Magnetic + Reed Switch Sensor	1
2	Arduino Male to Male Connectors	10
3	10cm x 10 cm PCB breadboard	1
4	Arduino Buzzer Module	2

Pre-requisite Softwares

Software Tools	License type
Arduino IDE	Open
Fritzing Vrtual Prototyping Bench (Optional)	Open

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Workshop Activity: Fetching water using a real-time clock module
Activity Goal: To provide a learning experience to participants
in programming & setting up a sub-unit.

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
	Arduino Real-Time Clock Module	1
2	Arduino Male to Male Connectors	10
3	10cm x 10 cm PCB breadboard	1
4	LED 6mm (9 mm optional)	2

Pre-requisite Softwares

	Software Tools	License type
	Arduino IDE	Open
	Fritzing Vrtual Prototyping Bench (Optional)	Open

Activity Guidelines

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Workshop Activity: Building a smart water tap using an ultrasonic sensor
Activity Goal: To provide a learning experience to participants in programming & setting up a sub-unit

Workshop Materials

	Components	Quantity
1	Arduino Uno	1
2	Ultrasonic Sensor Module	1
3	5V DC Solenoid Valve	1
4	Flow-rate sensor (water)	1
5	Arduino Male to Male Connectors	10
6	10cm x 10 cm PCB breadboard	1
7	LED 6mm (9 mm optional)	2

Pre-requisite Softwares

Software Tools	License type
Arduino IDE	Open
Fritzing Vrtual Prototyping Bench (Optional)	Open

Activity Guidelines

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