Wireless Quiz Buzzer

The College of Science, Kwame Nkrumah University of Science and Technology is preparing to host a quiz competition. The Department of Physics was tasked to come up with a system that will facilitate some aspects of the quiz competition – where multiple contestants would have to compete to be the first to answer one question.

Some factors were considered before coming up with a design for this system. Some of these factors include, the device being user friendly and its being able to detect the first contestant to press. Based on these factors three different designs were proposed. The first was a wired design (where cables would be used to connect the devices together), wireless design, using Bluetooth technology and a wireless design using Wi-Fi technology. The final design that was chosen was the wireless design using Wi-Fi technology because it doesn't require the use of cables which can be messy to set up. Another plus was that its range is superior to that of the Bluetooth technology. The range for 2.4 GHz Wi-Fi signal is about 40 m indoors and 80 m when outdoors whiles that of Bluetooth is about 10 m both indoors and outdoors.

The system consists of five different devices, which are connected to one another wirelessly. Out of these 5 devices one device (called the master device) is be used to control the others. The others are the contestants devices (four in number).This number can be increased later as the master device can handle a maximum of eight (8) contestants at a time. Some of the features of this system include;

1. A wireless connection
2. Built-in battery
3. Battery level indicator
4. Battery charging system
5. Low power consumption (battery lasts up to 24 hours)
6. A buzzer
7. An audio out
8. Display screen for the master
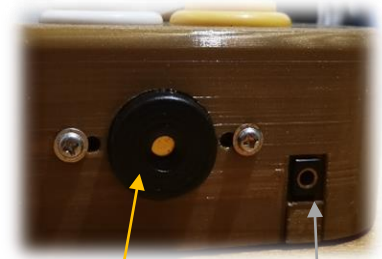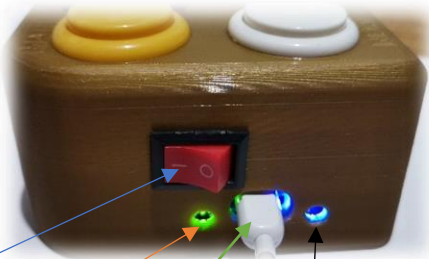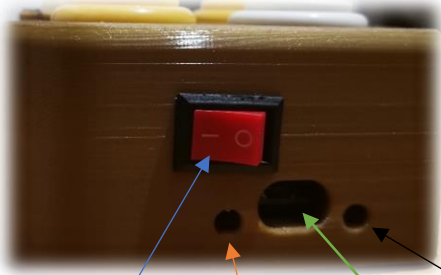9. An arcade push button

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MASTER DEVICE

CONTESTANT DEVICE

ON & OFF SWITCH	BATTERY LEVEL INDICATOR	CHARGING PORT	CHARGING STATUS INDICATOR	BUZZER	3.5 mm AUDIO JACK

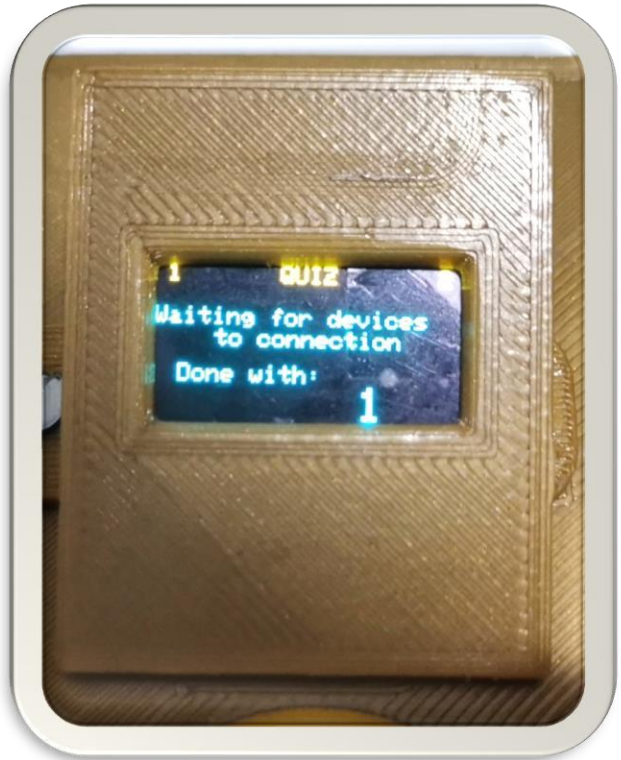| SCREEN	MAIN BUTTON	NEXT BUTTON	TIME BUTTON	BUTTON

WAITING
00:00:00

Set the number of contestants

Ranging from 2 to 8

waiting for contestant devices to connect

also displays the number of contestant devices that has already connected

Displays processing

Press contestant buttons to ensure that they are working

Displays WAIT command

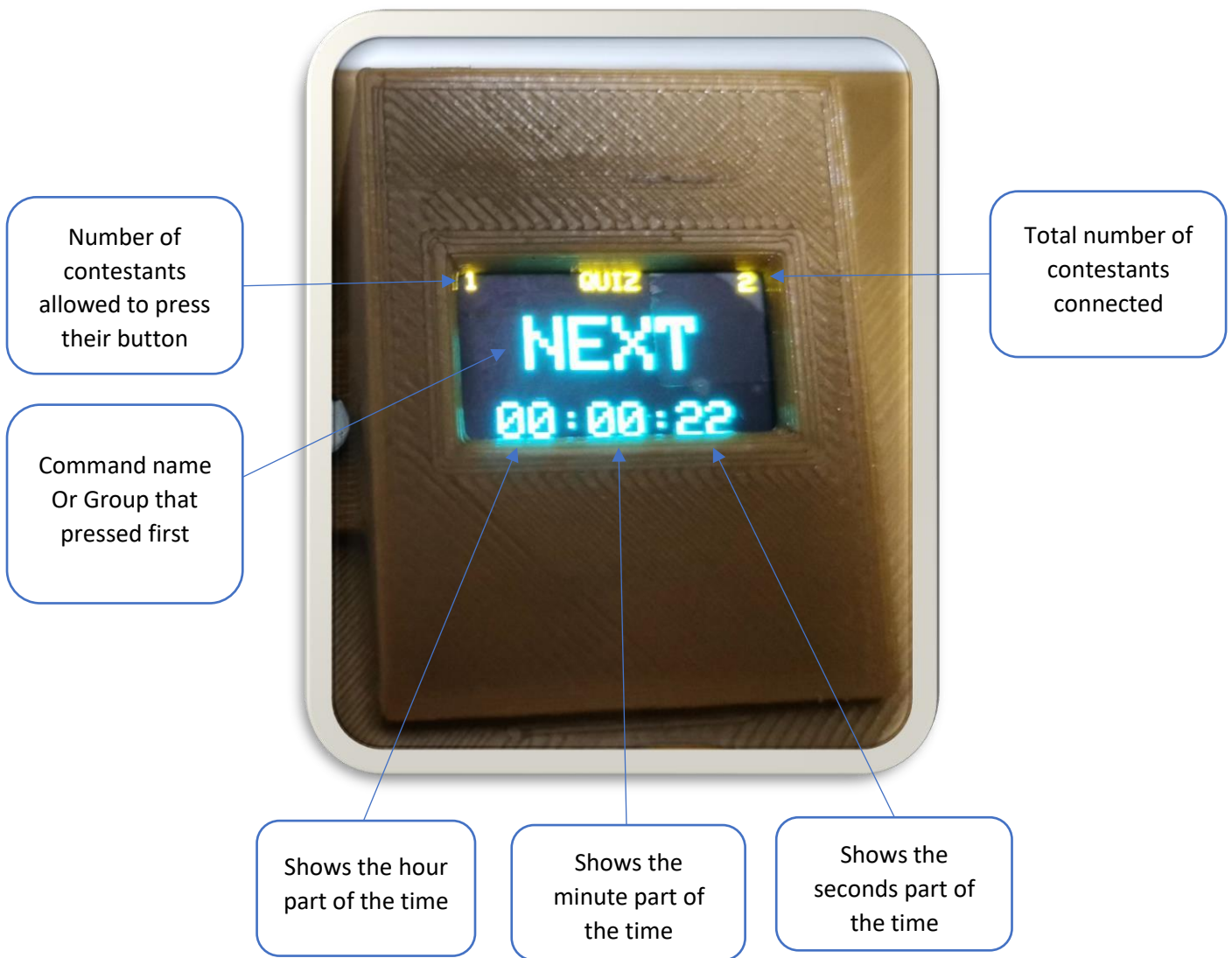| Displays START command |
|---|
| Also displays time |

Displays NEXT command
Also displays time

Displays group that press its button first
Also displays time (how long it took)

Number of contestants allowed to press their button

Total number of contestants connected

Command name Or Group that pressed first

Shows the hour part of the time

Shows the minute part of the time

Shows the seconds part of the time

BUTTON NAME	IN QUIZ MODE	IN SETUP MODE
MAIN	Toggle between **START** and **WAITING** mode	Select
NEXT	**Eliminate** the **group that press** but allows the rest to be able to press	Increment
TIME	Reset time to **00:00:00**	Decrement

BLINKING CONDITIONS	WHAT IT MEANS
Every 1 sec., light comes on	Waiting to connect to master device (if master, to connect to the contestants)
Every 5 sec., light comes on	Connect to master or ready to be used

COLOUR	MEANING	HOW LONG
Green	Battery not low	Between 6 hours to 24 hours (1 day) to discharge
Red	Battery low	Less than 6 hours to discharge
Blue	Charging, but battery not full	Up to 5 hours to full charge
White	Battery full, done charging	0 min to full charge, can remove charger

INSTRUCTIONS FOR SETUP

1. Turn on the number of contestant devices corresponding to the number of contestants.
2. Turn on the master device.
3. Set the number of contestants by using the NEXT button for increment and the TIME button for decrement.
4. Press the MAIN button when done setting the number of contestants.
5. When all the contestant devices are turned on but are not connected, press the MAIN button to connect them or wait for at most 15 seconds then the master device would automatically connect them.
6. When they are connected their light would turn on and off every 5 seconds.
7. When "Prs Btn" is displayed on the master's screen, it means press each contestant button to determine whether or not it is working.
8. After pressing all the buttons and the display changes to "WAITING", it means the devices are ready to be used.

INSTRUCTIONS FOR QUIZ MODE

1. The MAIN button is use to toggle between START and WAIT commands.
2. In START command the contestants are allowed to press their button.
3. The group which pressed first would be displayed on the master's screen and that group's buzzer and that of the master would sound.
4. In this state no other group can press to override it.
5. For all group to be able to press, the master would have to press the MAIN button (until START command is written on the screen).
6. In WAIT command the contestants are not allowed to press their button. Even if they do it doesn't change anything.
7. This command is used when the master is reading a question and do not want the contestants to be able to press their button.
8. To allow them to press, press the MAIN button again to activate the START command.
9. When the contestants are allowed to press their button even when the master is reading a question, the master would have to put it in START mode before reading the question.
10. In case the master would like to eliminate the contestant that just press the button, the master would have to press the NEXT button.
11. When the master keeps pressing the NEXT button when a new contestant presses its button, it would also be eliminated.
12. To allow all the contestants to be able to press their button again, the master would have to press the MAIN button to activate the START command again.
13. The NEXT command can be used when doing riddles.
14. The TIME button is used to set the time back to 00:00:00.
15. How long it took the first group to press their button would be displayed at the time section on the screen.