

# THE VOTING MACHINE

## INTERNET OF THINGS

**Time:** 60 mins

## Introduction

In this class, the students will learn to create a voting machine using the ESP32 board.

## New Commands Introduced

- |   |   |
|---|---|
| • <code>#include &lt;ezButton.h&gt;</code>    | Imports the ezButton library into the project.                      |
| • <code>buttonname.setDebounceTime(n);</code> | Pauses the detections of signals from the button to 25 milliseconds |
| • <code>buttonname.loop();</code>             | Checks the state of the button continuously.                        |
| • <code>buttonname.isPressed()</code>         | Updates the value of the button to TRUE if the button is pressed.   |

## Vocabulary

- **Voting Machine** is a machine that is used to record votes in an election without paper.
- **Debouncing** is used for push-buttons in this technique the processing of signals are pause for some time once a signal from the button is received.

## Learning Objectives

Student/s should be able to:

- **Recall** how to connect and program the push-buttons and LCD.
- **Explain** the concept of debouncing.
- **Demonstrate** the creation of a voting machine.

## Activities

### 1. Class Narrative: (3 mins)

- Brief the student/s that the next challenge is to create a machine that determines the popular team.

### 2. Concept Introduction Activity: (4 mins)

- Let the student/s undertake the explore-activity to observe the working of the voting machine.

- Using the slides, explain that the student/s will learn:
  - to connect the devices
  - to tally the values
  - to display the winner

### 3. Activity 1: Connect the Devices (16 mins)

#### **Teacher Activity:** (8 mins)

- Explain the different parts of the circuit to create a voting system.
- Demonstrate how to connect the devices to the microprocessor.

#### **Student Activity:** (8 mins)

- Guide the student/s to add and connect the LCD and push buttons on the ESP32 board.

### 4. Activity 2: Tally the Values (10 mins)

#### **Teacher Activity:** (5 mins) .

- Explain the concept of increment with an example.
- Demonstrate how to program ESP32 to update the votes and display the vote share.

#### **Student Activity:** (5 mins)

- Guide the student/s to program the ESP32 board to configure the input pins, increment the count of votes, and create a function to display the tally of votes.

### 5. Activity 3: Display the Winner (12 mins)

- Explain the concept of debouncing and the use of ezButton library.
- Demonstrate how to store the correct vote count and display the winner.

#### **Student Activity:** (6 mins)

- Guide the students to display the winner by importing the ezButton library, adding a debounce value to the buttons, finding a nd displaying the winner.

### 6. Introduce the Post class project: (2 min)

- Create a feedback recorder for an amusement park.

### 7. Test and Summarize the class learnings: (5 mins)

- Check for understanding through quizzes and summarize learning after respective activities.

- Summarize the overall class learning towards the end of the class.

#### 8. Additional activities:

- Encourage the student/s to restart voting when the button is pressed.
- Encourage the student/s to control the restart of voting.

#### 9. State the Next Class Objective: (1 min)

- In the next class, student/s will learn how to create a motion detector using the ESP32 board.

## U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table		
Activity	Activity Name	Link
Class Presentation	The Voting Machine	<a href="https://s3-whjr-curriculum-uploads.whjr.online/25b17576-5bd0-405b-a40d-f80660a17d8b.html">https://s3-whjr-curriculum-uploads.whjr.online/25b17576-5bd0-405b-a40d-f80660a17d8b.html</a>
Explore Activity	The Voting Machine	<a href="https://wokwi.com/projects/384430921770433537">https://wokwi.com/projects/384430921770433537</a>
Teacher Activity 1	Connect the Devices	<a href="https://wokwi.com/projects/385886651560738817">https://wokwi.com/projects/385886651560738817</a>
Teacher Reference: Teacher Activity 1 Solution	Connect the Devices	<a href="https://wokwi.com/projects/385886675446253569">https://wokwi.com/projects/385886675446253569</a>
Student Activity 1	Connect the Devices	<a href="https://wokwi.com/projects/384432487057633281">https://wokwi.com/projects/384432487057633281</a>
Teacher Reference: Student Activity 1 Solution	Connect the Devices	<a href="https://wokwi.com/projects/384432363442036737">https://wokwi.com/projects/384432363442036737</a>
Teacher Activity 2	Tally the Votes	<a href="https://wokwi.com/projects/385887038464359425">https://wokwi.com/projects/385887038464359425</a>
Teacher Reference: Teacher Activity 2 Solution	Tally the Votes	<a href="https://wokwi.com/projects/385887073159649281">https://wokwi.com/projects/385887073159649281</a>
Student Activity 2	Tally the Votes	<a href="https://wokwi.com/projects/384433581669404673">https://wokwi.com/projects/384433581669404673</a>
Teacher Reference: Student Activity 2 Solution	Tally the Votes	<a href="https://wokwi.com/projects/384432613595603969">https://wokwi.com/projects/384432613595603969</a>
Teacher Activity 3	Display the Winner	<a href="https://wokwi.com/projects/385888057702355969">https://wokwi.com/projects/385888057702355969</a>

Teacher Reference: Teacher Activity 3 Solution	Display the Winner	<a href="https://wokwi.com/projects/385888104975319041">https://wokwi.com/projects/385888104975319041</a>
Student Activity 3	Display the Winner	<a href="https://wokwi.com/projects/384434663900640257">https://wokwi.com/projects/384434663900640257</a>
Teacher Reference: Student Activity 3 Solution	Display the Winner	<a href="https://wokwi.com/projects/384434130124018689">https://wokwi.com/projects/384434130124018689</a>
Student's Additional Activity 1	Restart Voting	<a href="https://wokwi.com/projects/384516815498994689">https://wokwi.com/projects/384516815498994689</a>
Teacher Reference: Student's Additional Activity 1 Solution	Restart Voting	<a href="https://wokwi.com/projects/384441833684852737">https://wokwi.com/projects/384441833684852737</a>
Student's Additional Activity 2	Control Restart Voting	<a href="https://wokwi.com/projects/384517859934299137">https://wokwi.com/projects/384517859934299137</a>
Teacher Reference: Student's Additional Activity 2 Solution	Control Restart Voting	<a href="https://wokwi.com/projects/384453061439282177">https://wokwi.com/projects/384453061439282177</a>
Post Class Project	Feedback Monitor	<a href="https://wokwi.com/projects/386056280512585729">https://wokwi.com/projects/386056280512585729</a>
Teacher Reference: Post Class Project Solution	Feedback Monitor	<a href="https://wokwi.com/projects/385981716232062977">https://wokwi.com/projects/385981716232062977</a>