### ****1. Title****

**Morse Code Decoder using Mealy FSM on Spartan-6 FPGA**

### ****2. Objective****

To design a Morse code decoder that detects dot and dash inputs via a button, decodes them in real-time using a Mealy FSM, and displays the corresponding character on a 7-segment display.

### ****3. Tools & Components****

* **FPGA**: Spartan-6
* **Input**: Push Button
* **Output**: 7-Segment Display
* **Language**: Verilog
* **Software**: Xilinx ISE / ModelSim

### ****4. Working Principle****

* Short press = Dot.
* Long press = Dash -
* FSM measures input timing and detects character completion.
* A decoder translates Morse sequences to letters shown on the display.

### ****5. Why Mealy FSM?****

Mealy FSM responds instantly to input changes, ideal for decoding based on **press durations** and **timing gaps**.

### ****6. Applications****

* Digital communication demo
* FSM and timing-based input learning
* Assistive tech concepts