CME332 Lab 01
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OVERVIEW

Cyclic execution, which is commonly used for embedded systems design, can also be used for implementation of basic real-time systems. The purpose of this lab is to practice the timer-based cyclic execution approach.

A binary game was developed using a timer based cyclic approach as specified in the lab manual.

ARCHITECTURE & DESIGN DECISIONS

The binary game was designed using **Finite State Machine** using five states:

- IDLE
- PLAY
- PAUSE,
- OFF
- GAMEOVER

State setup:

The push button ISR assigned inputs to the state, and the next state transition was based on current state and inputs.

Task Handlers:

The tasks handler are implemented in utils.c. The the states are mapped to their corresponding handlers within the timer interrupt ISR. The tasks are called from the timer interrupt ISR in cyclic manner.

We implemented the following tasks:

- Task Idle State
- Task Play State
- Task Paused State
- Task Power Off

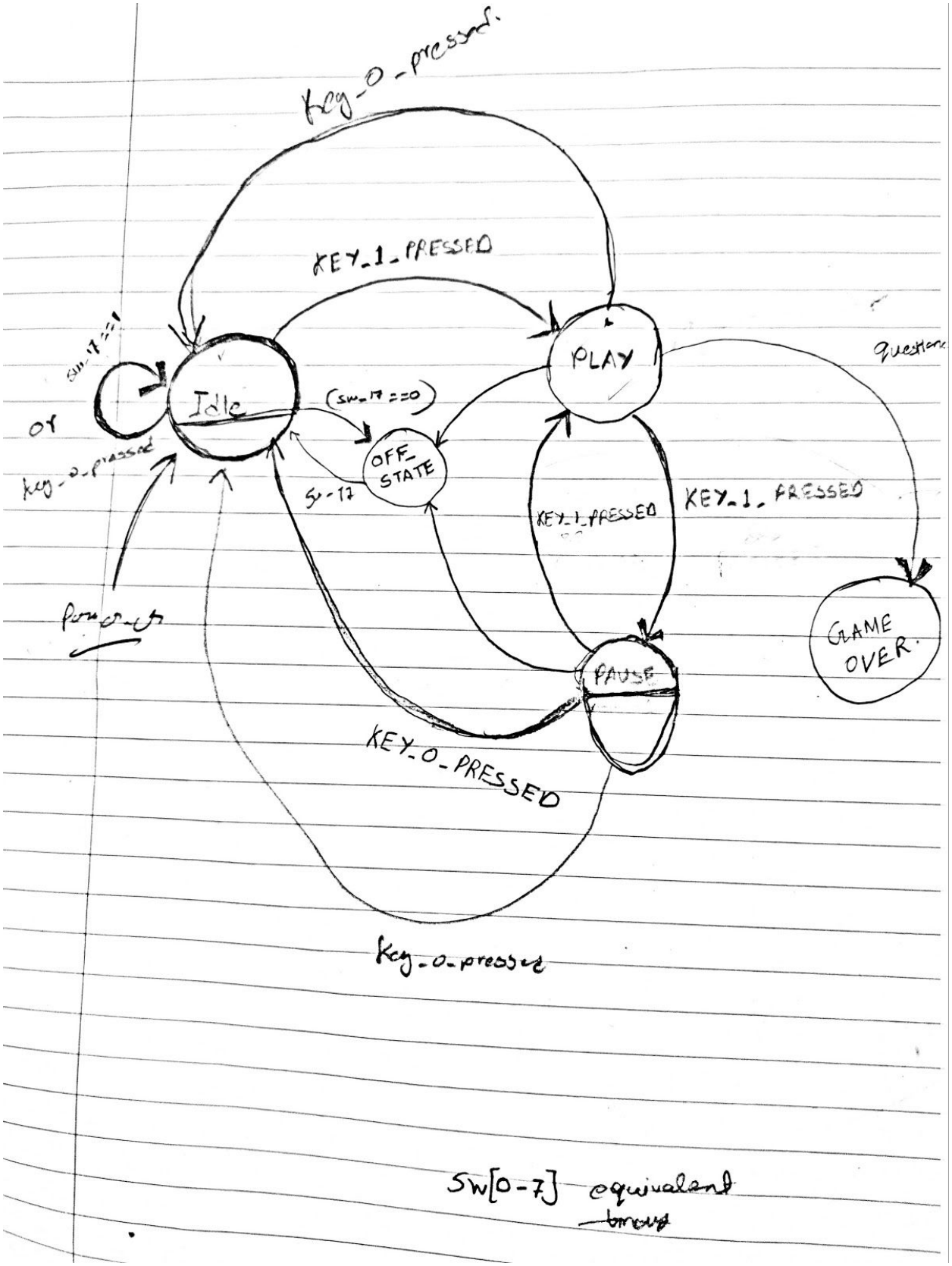
- Task Game Over State
- Task Score Calculation

Analysis:

Play State Task is our periodic task, which repeats itself after every 30 seconds.

Deadline: execution time of Task Score Calculation + User input < execution time of Play State Task

Deadline: deadline of Game Over State < total deadline


key_0_pressed.
KEY_1_PRESSED
Idle
PLAY
OFF_
STATE
KEY_1_PRESSED
KEY_1_PRESSED
GAME
OVER.
PAUSE
KEY_0_PRESSED
key_0_pressed
SW[0-7] equivalent