EE 178 FINAL PROJECT

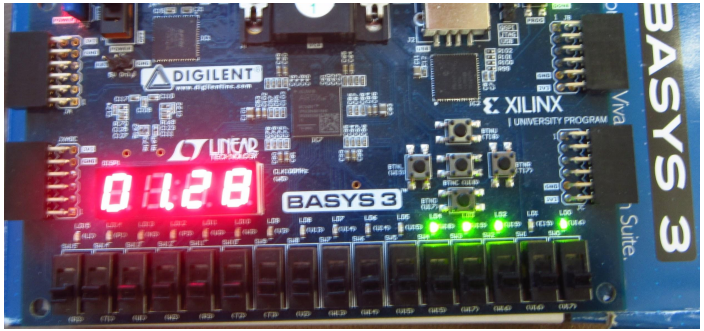
Analog & Digital Clock Design

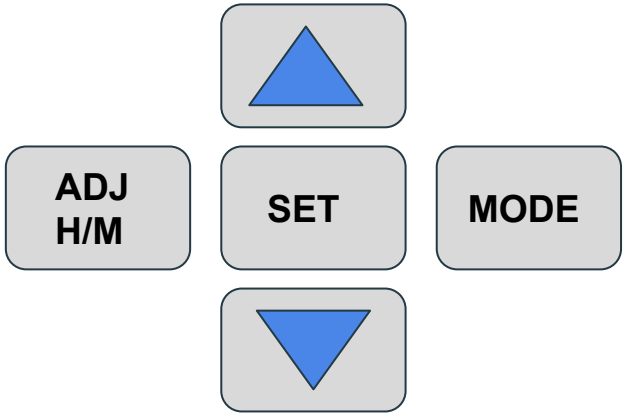
Group 11: **Diem Le, Phi Le, Van Anh Le, Ngan Cao**

Date: December 14, 2017

Project Description

- Use digital logic to display hours and minutes.
- Display seconds in binary logic by LEDs
- Display two clock modes concurrently: on the board and on the screen.





Work Assignment

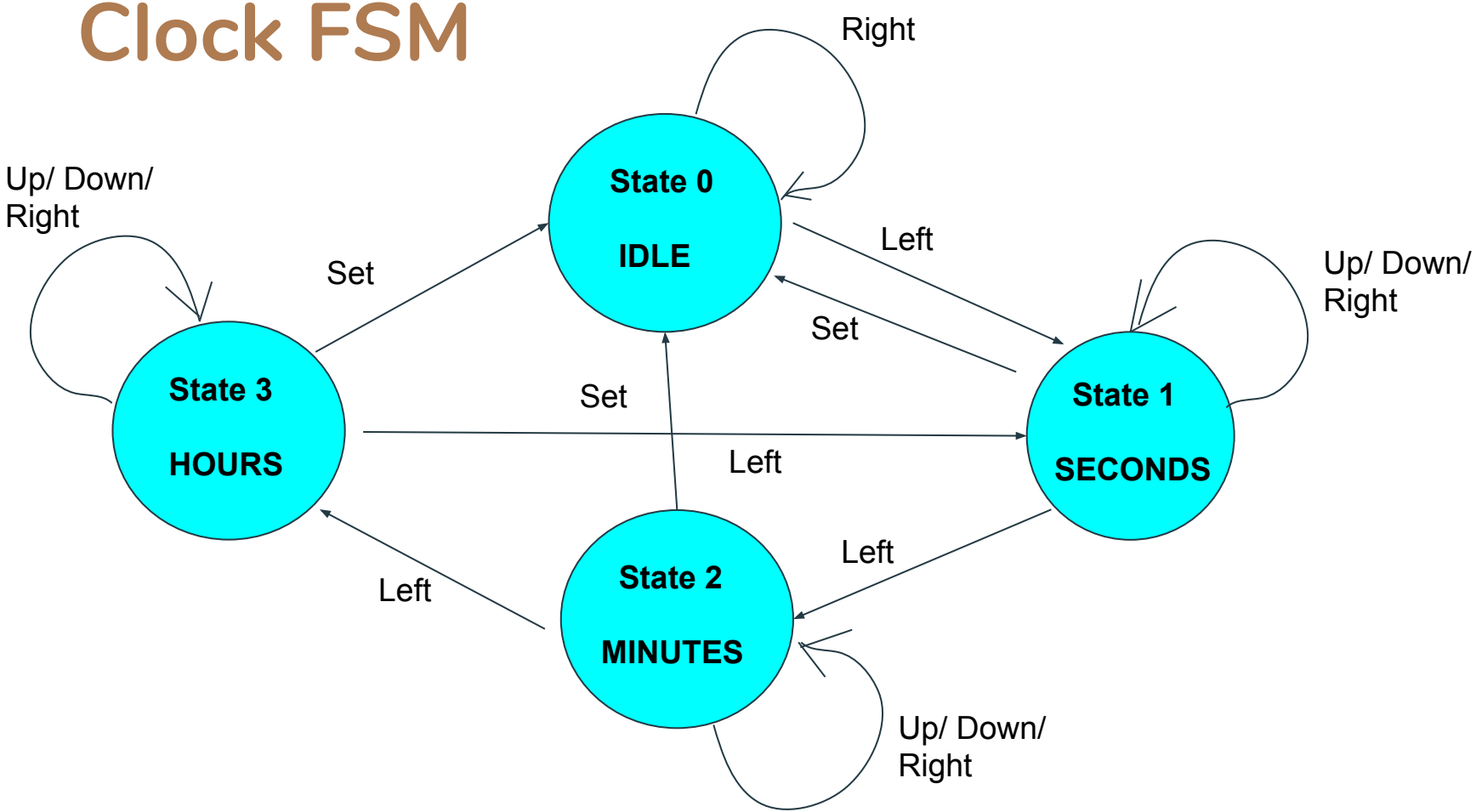
- **Diem Le**
  - Generate ideas
  - Setup Project in Vivado with all the needed files
  - Setup the frame buffer

- **Van Anh Le**
  - Determine the space between each digits
  - Draw lines for each digits

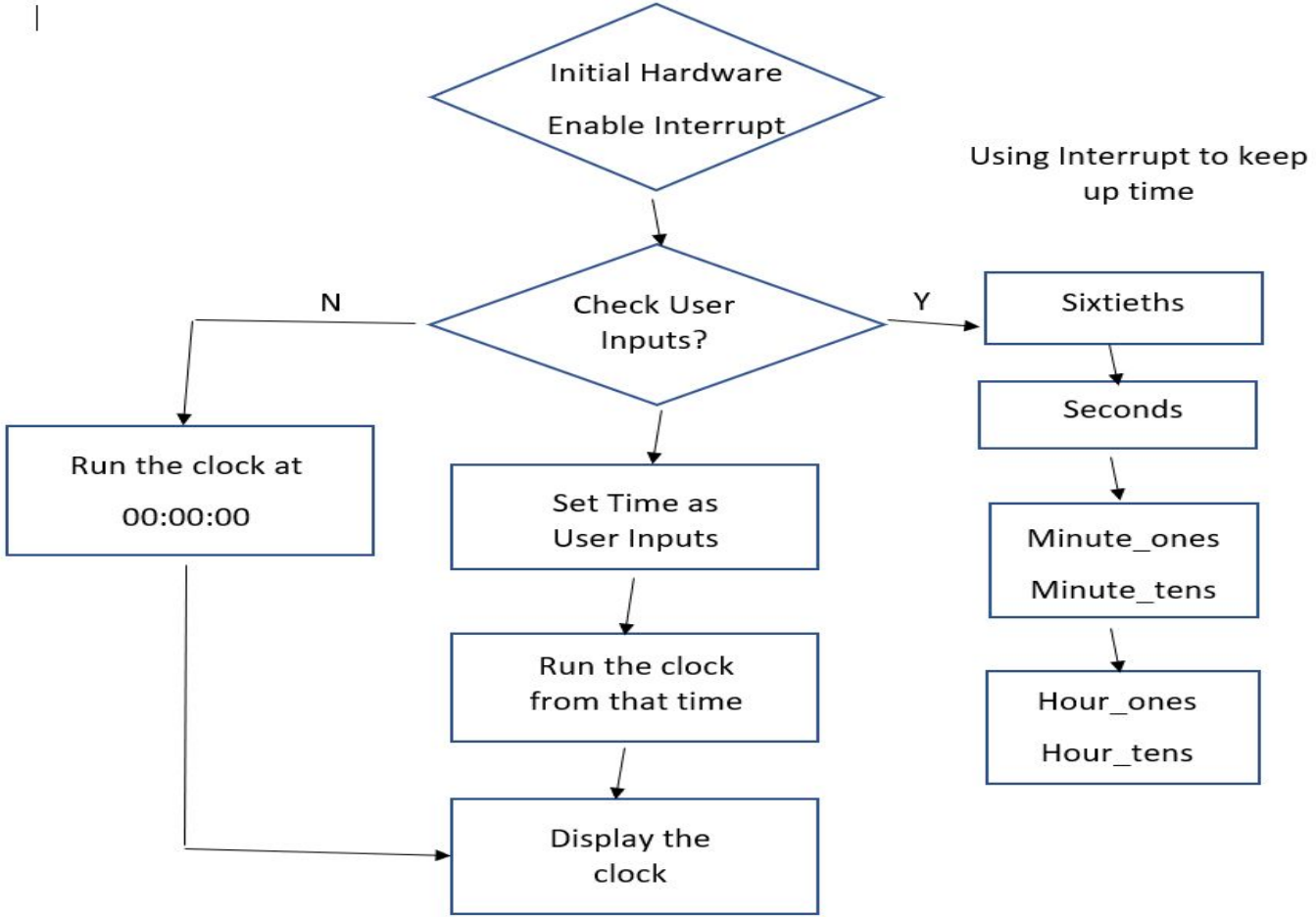
- **Phi Le**
  - Develop the algorithm to calculate timer
  - Generate the flow chart

- **Ngan Cao**
  - Prepare the presentation slides
  - Define debounce button and set beam low to show the currently adjusted digit.

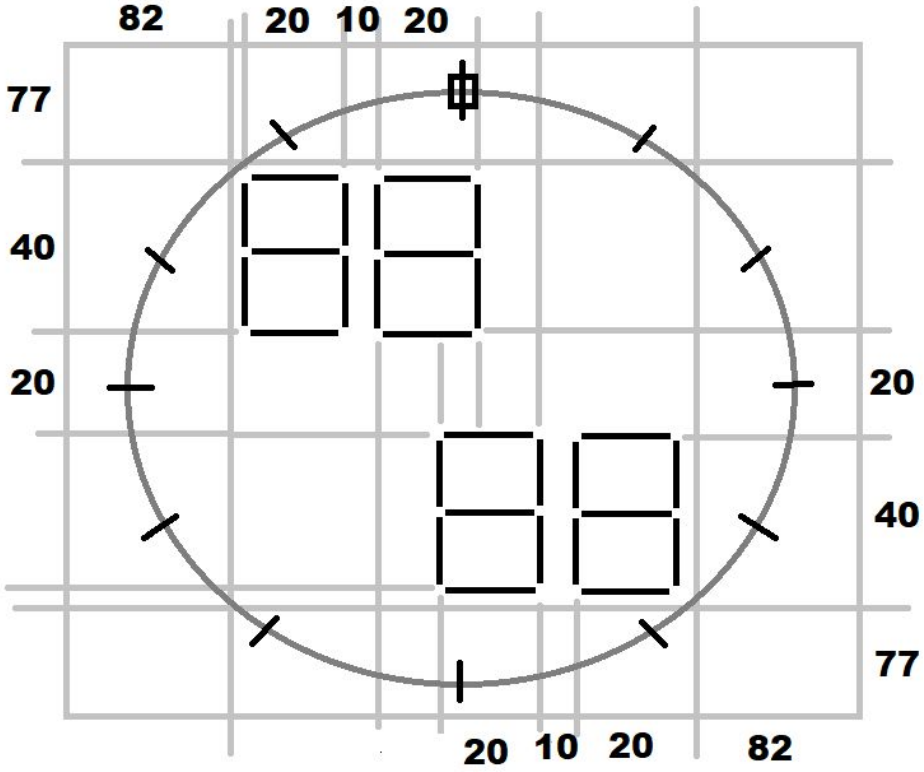
Clock FSM


Right
State 0
IDLE
Up/ Down/
Right
Left
Set
Up/ Down/
Right
Set
State 3
HOURS
Set
State 1
SECONDS
Left
Left
State 2
MINUTES
Left
Up/ Down/
Right

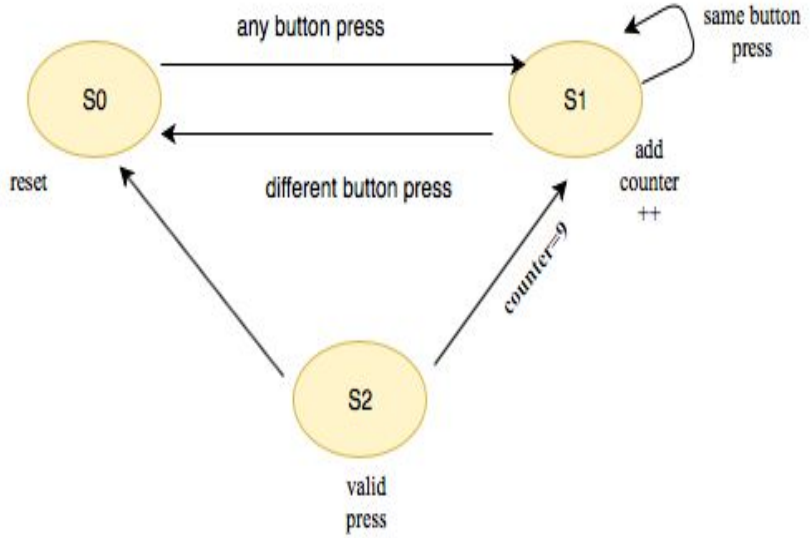
Flow Chart


Initial Hardware
Enable Interrupt
Using Interrupt to keep up time
Check User Inputs?
N
Y
Run the clock at 00:00:00
Set Time as User Inputs
Run the clock from that time
Display the clock
Sixtieths
Seconds
Minute_ones
Minute_tens
Hour_ones
Hour_tens

Linedraw



Debounce button



Set- beam-low

Challenge & Conclusion

- Challenges
  - First intention was a digital clock
    - Drawline file had bugs
  - After the bugs were fixed and we understood the code more
  - We customize the drawline file
    - Combined analog and digital clocks

- Conclusion
  - Wonderful, learning, and inspiring experiences
  - If it was a solo project, it would have been difficult to finish in time