



ECE 593 Spring 2022 Assignment -1 Report

Group 16

BIDS22

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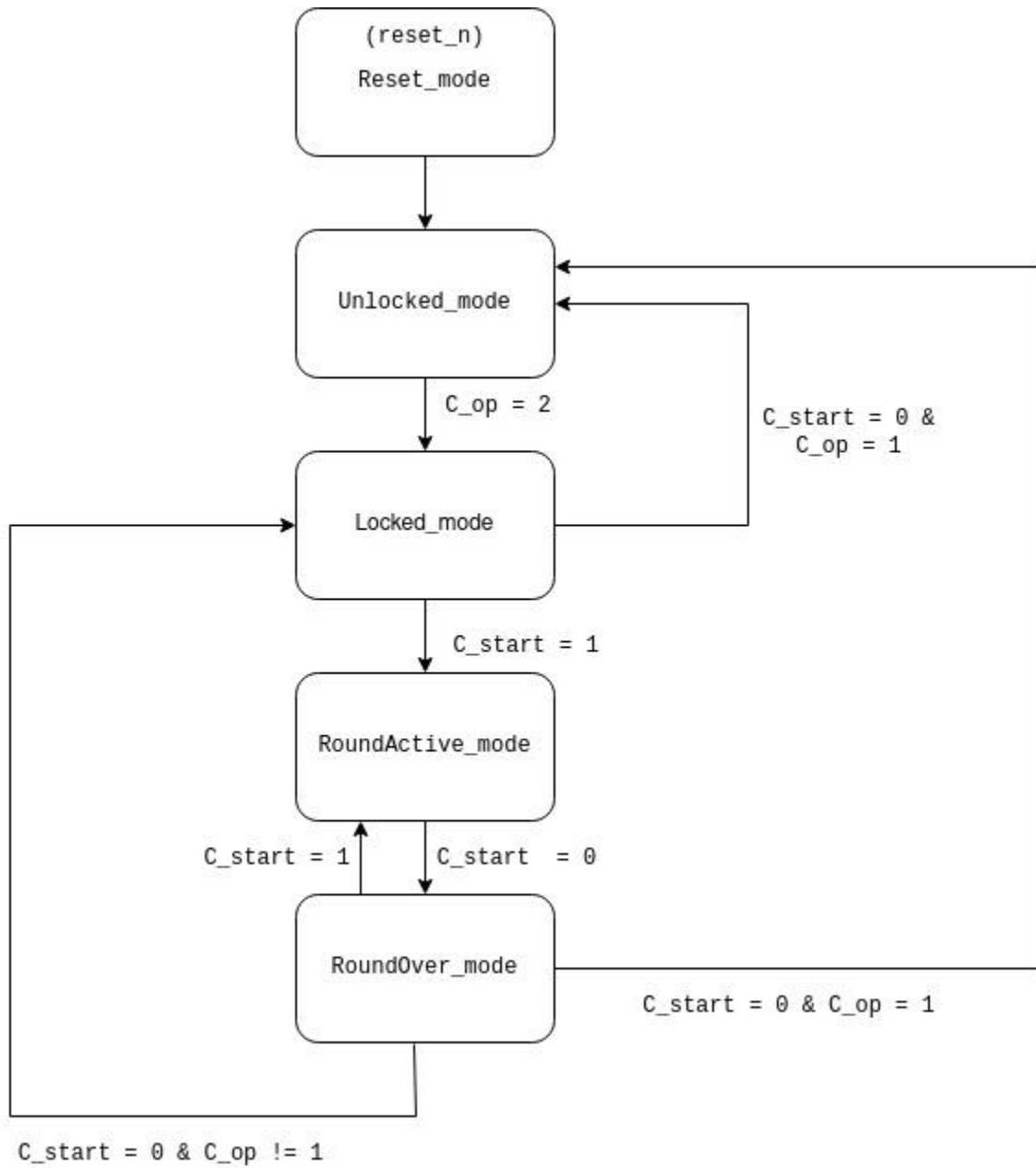
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Implementation

State Diagram:



- With reference to the above state diagram, the state when the `reset_n` is asserted, the code enters the `Reset_mode`
- In `Reset_mode`, all the output variables are set to 0 and the registers are set as follows:
 - `mask = 3'b111`
 - `timer = 4'b1111`
 - `key = 0`
 - `bid_cost = 1`
 - `X_value = 0`
 - `Y_value = 0`
 - `Z_value = 0`
- The next state is `Unlocked_mode`. In this state, we can update all the register values based on the opcodes i.e `X_value`, `Y_value`, `Z_value`, `mask`, `timer`, `bid_cost`
- From `Unlocked_mode`, we can only transition to `Locked_mode` if the opcode `C_op` is 2
- `C_start` cannot be asserted when in `Unlocked_mode`, `err` (error) would be asserted if done so
- Once in `Locked_mode`, if `C_start` is asserted, the rounds would begin by transitioning to `RoundActive_mode` else `key` would be checked, if validated would go to `Unlocked_mode` else would stay in `Locked_mode`
- If `RoundActive_mode` is entered, the `bid` signals if asserted for every player, `retract` signal not asserted can the player bid
- Participation of the player can only be determined if the `mask` bits are set likewise i.e `mask[2]` would mean X can participate, `mask[1]` Y, `mask[0]` Z
- `_ack` signals would go high, meaning no `err` (error) and otherwise if `mask` bits not set for that particular player
- Once the `_bidAmt` (bid amounts) are accepted, and `C_start` is deasserted, transition to `RoundOver_mode` would take place.
- In `RoundOver` state, the `maxBid` would be calculated, the winner would be declared, `_balances` would be updated for every player, and `roundOver` would go high meaning the round is over
- If `C_start` is asserted, the transition to `RoundActive_mode` would take place for another round else `C_op` would be checked for unlock and `key` would be validated to go to the `Unlocked_mode`, if bad would go to `Locked_mode`

Test Cases

Following are few scenarios that could be tested to check the functionality of the bid controller

- Every state is reached at least once
- Loading of internal value registers, timer, bid cost, mask registers by providing correct `C_op`
- Incorrect inputs i.e bad key, trying to unlock while being unlocked, asserting `C_start` when unlocked, invalid operation
- `_err(X, Y, Z)` : checking for inactive rounds, insufficient balance and invalid requests
- Equal bids from the players