Yuqian Hu 64122713 Coin casher for arcade machine

Recently one of my friends brought me to a local game arcade place. The game machines inside the arcade are fun to play with, and relatively simple compared to the modern game consoles. Inspecting the arcade machines, I started noticing their coin casher systems are nearly identical, so I thought it would be interesting to replicate such system in a FSM which can be used as a building block to optimize the arcade machine to suit the modern need.

The FSM constantly checks if the user inserts a coin, and keeps track of how many coin has been inserted. If user insert a wrong coin type, the FSM will return the coin. Once the user inserts one correct coin the casher, the FSM will start a timer. The casher will return the inserted coins if the user didn’t insert enough coins before the timer ends. When appropriated number of coins are inserted, The FSM will tell the arcade machine to start the game. During the game, the FSM will be halted. After the game finish the FSM will reset and wait for coin to be inserted. If the “return all coins pin” is pressed he FSM will also return all the inserted coins and reset the timer.

Module “insertcoin” set a flag to high for one clock cycle if it detects any coin inserted into the casher, and it also output the type of the inserted coin.

Module “timer” is default halting until it receives a enable flag from the FSM, in which case it starts count down and set a flag to high for one clock cycle once the count down finish. It also receives a reset flag, which tells this module to reset the count down and go back to halting when the flag is set to high.

The test bench verifies the state transitions/outputs in the following scenarios:

1. Nothing is inserted or pressed. The system should keep waiting.
2. One wrong coin is inserted. The system should reject the coin, and back to waiting.
3. One appropriate coin is inserted. The system should start the timer, increment coin count, then back to waiting
4. Another appropriate coin is inserted. The system should increment coin count, then back to waiting.
5. Another appropriate coin is inserted. The system should start the game, clear the coin count, reset the timer, reject any coin during the game, and wait for the game to finish.
6. Game is finished. The system should return to waiting (for coins).
7. Insert one coin, and press return all coin. System should start timer, increment coin counter. After the pin is pressed, the system should spit all coins, and reset timer.
8. Insert one coin, and wait for timeout. The system should System should start timer, increment coin counter. After timeout, the system should spit all coins, and reset timer.