Concept Draft Document

Hardware Engineering Lab (Group 2)

Vending Machine (Team F)

Project description:

A typical Vending machine which is programmed with advanced hardware using an FPGA development board. It will be designed in such way where every aspect is processed with high accuracy by creating a VHDL code which will then be implemented in a FPGA board. This machine gives the user the option of having various goods on the go by proving secure payment method and refund. The specialty of this machine is designed in its code where an FPGA development will play a crucial role as this whole system will be based on the board inputs and outputs in real time.

Components and tools used in this project:

- Nexys A7 100T FPGA board
- Xilnix Vivado Software
- ModelSim Vhdl
- UML diagrams
- KICAD

Connection Interface of the vending machine in real time:

- First the device will remain in an ideal state and after a user interacts with the machine it shows the products with their pricing which will be shown on 7 segment display.

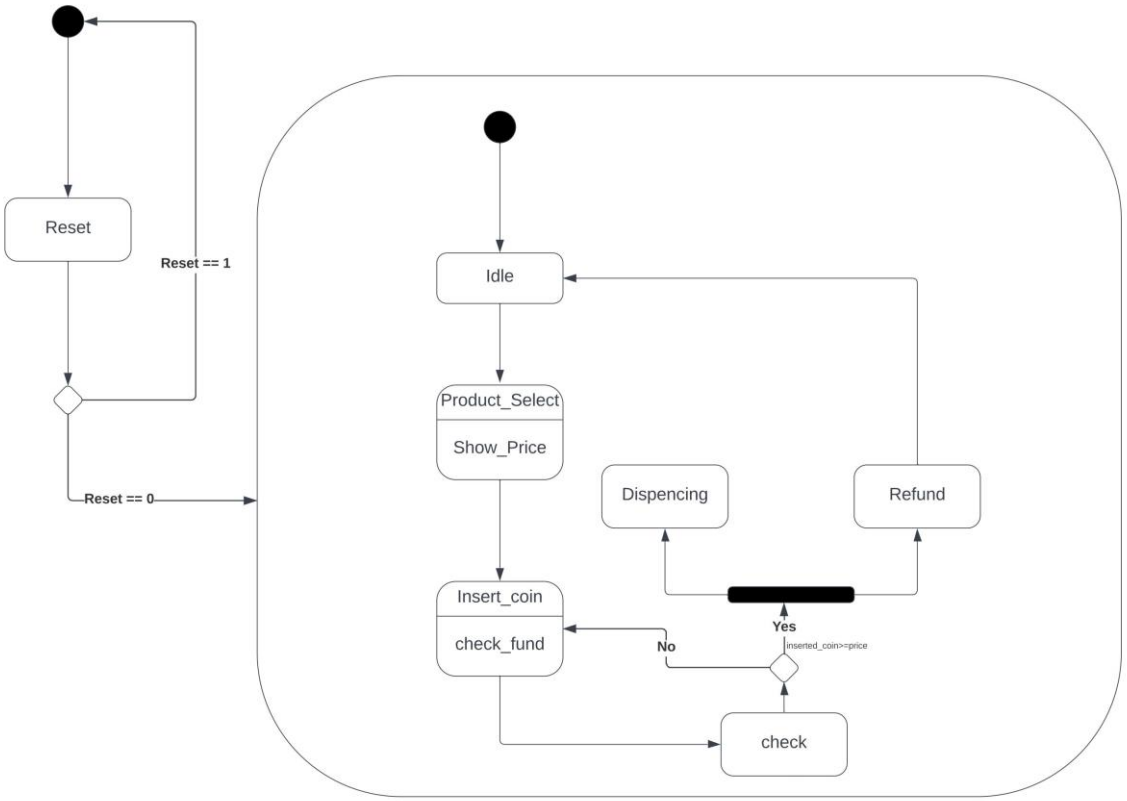
- The customer selects a product using the 3 switches available on the board. Based on this selection the product price and ID will be shown on the 7-segment display.

- Then the machine will go in" Inserting coin state". After inserting a coin (Acceptable coins: 10 cents ,20 cents, 50 cents and1 Euro) the machine compares the amount inserted with the price of the product. We use Pushbutton to simulate this process from the board.

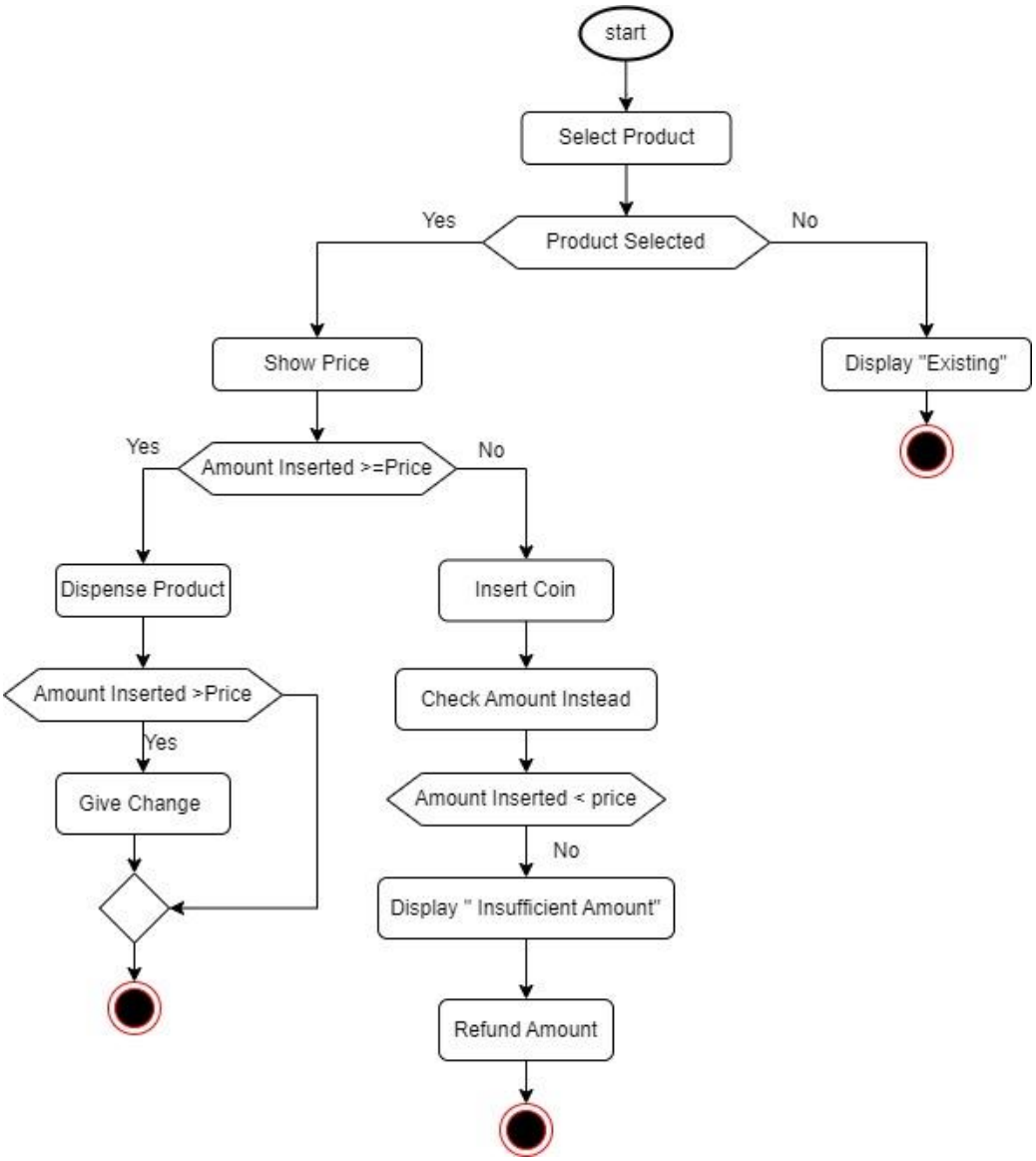
- After successful payment the machine dispenses the desired products to the customer with refunds if available.

- A state chart and flow chart is given below for better understanding of the system.

State Chart Diagram:



Flowchart:


start
Select Product
Product Selected
Yes
No
Show Price
Display "Existing"
Amount Inserted >=Price
Yes
No
Dispense Product
Insert Coin
Amount Inserted >Price
Yes
Give Change
Check Amount Instead
Amount Inserted < price
No
Display " Insufficient Amount"
Refund Amount