# Digital Systems 1 - Final Project Statement

This project involves the design and simulation of an automatic vending machine capable of selling two types of chocolates. The machine accepts coins of 5, 10, and 25 cents and returns the purchased chocolate along with any remaining change. The current amount entered into the machine is displayed on a two seven-segment display module.

## Problem Description

The vending machine offers two types of chocolates:  
• Chocolate A: 20 cents  
• Chocolate B: 45 cents  
  
The machine operates as follows:  
1. The user first selects the desired type of chocolate.  
2. Coins are then inserted into the machine sequentially.  
3. If no coin is inserted within 20 seconds after the chocolate selection, the machine resets to the initial state (awaiting chocolate selection).  
4. Once the required amount is reached, the machine delivers the selected chocolate and returns any change.

## Tasks

For designing this system, complete the following steps:  
1. Draw the state table.  
2. Choose the type of state machine and draw the state diagram.  
3. Optimize and design the circuit using any preferred flip-flops.  
4. Simulate the machine in Proteus software and implement at least three different scenarios (include scenarios for receiving both types of chocolates).  
5. Draw the timing diagram according to the considered input scenarios.

Good luck!  
Electrical Engineering Department - Digital Systems 1