

2021-22

**Assignment 3**

**Implementation of State Machines on Embedded Systems**

Autores: Bruno Feitais 93384

Afonso Lavrador 84881

Turma: P2

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Docente: Pedro Pedreiras

**Introduction:**

The objective of this assignment is to build an embedded application that emulates a vending machine. The vending machine accepts a subset of coins and allows the user to browse available products, buy one product and return the credit. The inputs are push-buttons and the output is done via UART/Terminal.

**Specification:**

• The system comprises eight push-buttons:

◦ Four of such buttons are the ones that are part of the Nordik development kit, while the other four buttons are external, assembled in a breadboard.

◦ Four buttons emulate the insertion of coins, whose values are: 10 cents, 20 cents, 50 cents and 1 EUR

◦ The other four buttons are for control: Browse Up, Browse Down, Select Product and Return Credit.

• Each time there is an user action the system gives feedback via the UART/terminal as follows:

◦ Inserting a coin should display the total credit

◦ Browse Up/Down should display the the previous/next product, its cost and the available credit

◦ Return Credit should print the message “x EUR return”, in which “x” is the available credit. The credit is set to 0

◦ Select Product should print the message “Product x dispensed, remaining credit y”, if the credit is enough, or “Not enough credit, Product x costs y, credit is z” if credit is not enough to buy the product.

• The available products are:

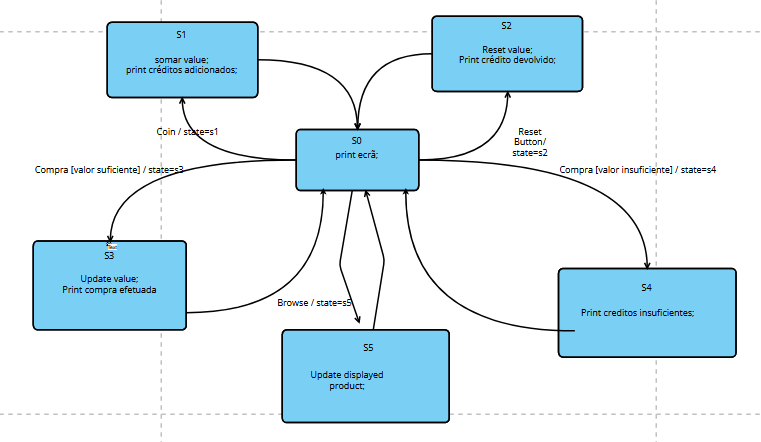
◦ Beer: 1.5 EUR

◦ Tuna sandwich: 1.0 EUR

◦ Coffee: 0.5 EUR

**State Machine:**

The first step consisted in modeling a state machine for the system.



1. S0 => works as a default state;
   1. Coin => the event of a new coin in the machine
   2. Reset Button => event created by the user to get the credit
   3. Compra => event created by the user to confirm the purchase
      1. [valor suficiente] => credito > preço
      2. [valor insuficiente] => credito < preço
   4. Browse => event created by the user to shift the product selection
2. S1=> adds de value of a new coin to the system
3. S2=> returns the credit in the machine to the user
4. S3=> releases the product to the user
5. S4=> denies the sale
6. S5=> Updates the selected product and shifts from products

**GitHub:**

On this link is possible to find the project repository containg the project code.

https://github.com/BrunoFeitais/assignment3SETR.git