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Grupa 2

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**AUTOMAT PENTRU SECURITATEA UNEI CASE**

Proiect PSN

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# 1 Specificatii

O casă cu două camere are mai mulţi senzori:

-senzori de mişcare în fiecare camera

-senzor de deschidere geam în fiecare camera

-senzor de deschidere uşă principală.

Toţi senzorii sunt legaţi într-un sistem de alarmă, care supraveghează fiecare senzor şi dacă se întâmplă ceva (e.g. se deschide uşa), sună alarma, dacă modul în care este setat acest automat permite.

Modurile selectabile sunt:

-inactiv: în acest caz sistemul ignoră senzorii

-acasă: se iau în considerare doar senzorii de la uşă şi de la geamuri

-plecat: în acest caz sistemul ia în considerare toate dotările

Pentru a schimba modul sistemului, trebuie introdus un cod din patru cifre. Când se setează modul acasă, sirena sună în momentul în care un senzor, care se ia în considerare, se activează (e.g. se deschide geamul). Dacă modul setat este plecat, atunci există o întârziere de 15 secunde pentru a introduce codul şi a schimba în modul inactiv / acasă înainte de a suna sirena. Aceeaşi întârziere este valabilă când se setează modul plecat şi atunci sistemul ignoră orice activitate de senzor (pentru ca utilizatorul să aibă timp să deschidă uşa şi să plece).

# Proiectare

## Schema Bloc

## O imagine care conține text, scris de mână, Font, diagramă Descriere generată automat

Figura 1 Cutia neagra a sistemului cu intrările și ieșirile stabilite

## 2.2 Unitatea de Control și Unitatea de Execuție

Cutia neagră a sistemului trebuie descompusă mai departe pentru a putea găsi componente implementabile. Vom face o descompunere **top-down** a problemei pana cand ajungem la circuite cunoscute, iar apoi vom implementa **bottom-up**.

Prima descompunere a oricărui sistem este una în care vom diferenția între **logica de control** din sistem și **resursele sistemului**. Logica de control este reprezentată de Unitatea de Control iar resursele sunt reprezentate de Unitatea de Execuție. Orice algoritm poate fi descompus în acest fel.

### 2.2.1 Maparea intrărilor și ieșirilor cutiei mari pe cele două componente UC și UE.

O imagine care conține diagramă, Desen tehnic, Plan, linie

Descriere generată automat

Maparea intrărilor și ieșisilor cutiei negre pe intrările și ieșirile componentelor din prima descompunere

Putem împărți atât intrările cât și ieșirile în 2 categorii: *de date si de control*. Aceasta separare este esențială la început.

* **Intrări de date**: cod 4 cifre, clk, reset
* **Intrari de control:** butoane pentru selectia modului, buton ok, buton cod\_setat, senzori pentru geamuri, usa si miscare
* **Iesiri de control:** semnele sonor (sirena), inactiv\_led, plecat\_led, activ\_led, cod, cod\_bun\_led
* **Iesiri de date:** catozi

### 2.2.2 Determinarea resurselor (UE)

Pentru a stabili mai departe legăturile dintre UC și UE trebuie mai întâi **să identificăm resursele pe baza cărora luăm decizii sau resursele care devin informații pentru utilizator.** Aceste resurse pot sa genereze semnale către unitatea de control și pot fi controlate de UC prin semnale de Enable sau Reset.

Orice informație pe baza careia se ia decizii trebuie sa vină de la o resursă care generează acea informație și o transmite mai departe UC.

**RESURSE:**

1. Numărător 15 secunde TIMER15

Acesta este un numărător pe 4 biti modulo 15. Acest circuit va avea o iesire q (Q1 Q2 Q3 Q4) care va fi adevărată când au trecut 15 secunde. În plus, dorim sa pornim sau să oprim numărătorul la momentul potrivit deci are nevoie de o intrare clear care daca este ‘1’ reseteaza numaratorul.

![O imagine care conține scris de mână, Font, text, linie

Descriere generată automat](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4SgyRXhpZgAATU0AKgAAAAgABgALAAIAAAAmAAAIYgESAAMAAAABAAEAAAExAAIAAAAmAAAIiAEyAAIAAAAUAAAIrodpAAQAAAABAAAIwuocAAcAAAgMAAAAVgAAEUYc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAFdpbmRvd3MgUGhvdG8gRWRpdG9yIDEwLjAuMTAwMTEuMTYzODQAV2luZG93cyBQaG90byBFZGl0b3IgMTAuMC4xMDAxMS4xNjM4NAAyMDIzOjA1OjE4IDIxOjU3OjA2AAAGkAMAAgAAABQAABEckAQAAgAAABQAABEwkpEAAgAAAAM2NwAAkpIAAgAAAAM2NwAAoAEAAwAAAAEAAQAA6hwABwAACAwAAAkQAAAAABzqAAAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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1. Registru de memorare, mode activ pe 1

Acest registru de memorare are rol de a memora , atunci cand mode este ‘1’ ,codul introdus de catre proprietar pentru a-l seta. Utilizam 4 astfel de registre pentru fiecare dintre cele 4 cifre

![O imagine care conține Font, scris de mână, text, linie

Descriere generată automat](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4SbERXhpZgAATU0AKgAAAAgABgALAAIAAAAmAAAIYgESAAMAAAABAAEAAAExAAIAAAAmAAAIiAEyAAIAAAAUAAAIrodpAAQAAAABAAAIwuocAAcAAAgMAAAAVgAAEUYc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAFdpbmRvd3MgUGhvdG8gRWRpdG9yIDEwLjAuMTAwMTEuMTYzODQAV2luZG93cyBQaG90byBFZGl0b3IgMTAuMC4xMDAxMS4xNjM4NAAyMDIzOjA1OjE4IDIxOjU4OjIxAAAGkAMAAgAAABQAABEckAQAAgAAABQAABEwkpEAAgAAAAM2NwAAkpIAAgAAAAM2NwAAoAEAAwAAAAEAAQAA6hwABwAACAwAAAkQAAAAABzqAAAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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1. Registru de memorare, mode activ pe 0

Acest registru de memorare are rol de a memora , atunci cand mode este ‘0’ ,codul introdus de catre proprietar, ce urmeaza a fi comparat cu codul deja setat. Utilizam 4 astfel de registre pentru fiecare dintre cele 4 cifre

![O imagine care conține Font, scris de mână, text, linie

Descriere generată 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1. Comparator pe 4 biti

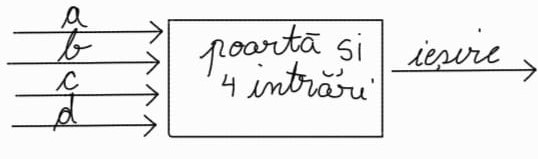
Folosim 4 astfel de comparatoare pe 4 biti pentru a compara numerele din registre, doua cate doua, iar daca numerele sunt egale pe iesire vom avea ‘1’ logic.

![O imagine care conține scris de mână, Font, linie, text

Descriere generată 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1. Poarta SI cu 4 intrari

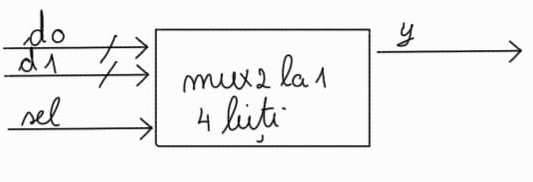
Avem nevoie de aceasta poarta SI pentru a verifica iesirile numaratorului modulo 15. Daca acesta a ajuns la numarul 15 inseamna ca cele 15 secunde de asteptare s-au scurs, iar modul plecat este activ.



1. MUX 2 la 1 pe 4 biti

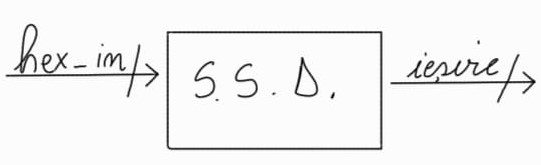
Am folosit 4 astfel de multiplexoare pentru a alege numerele ce vor fi afisate pe

Seven Segments Display, selectia fiind reprezentata de mode-ul registrelor in care au fost memorate numerele codului. Daca mode-ul e 1 se vor afisa numerele din primele 4 registre (codul ce a fost setat ), iar daca e 0 se vor afisa numerele din celelalte registre.



1. Circuitul 7447

M-am folosit si de un circuit 7447, insa implementat de mine, ce va afisa pe SSD numerele de la 0 la 15; numrele de la 10 la 15 in hex



**7447**

### 2.2.3 Schema bloc a primei descompuneri

O imagine care conține diagramă, text, Desen tehnic, Plan

Descriere generată automat



### 2.2.4 Reprezentarea UC prin diagrama de stari (organigrama)

Organigrama reprezintă partea decizională din orice algoritm, și ea poate fi apoi implementată direct în VHDL dacă e facută corect.

* **Stările** sunt reprezentate printr- un cerc. O stare reprezinta un moment de timp (o perioada). O imagine care conține cerc, Grafică, captură de ecran, Font

  Descriere generată automat



* **Deciziile** luate în fiecare stare sunt reprezentate prin romb.

O imagine care conține Font, Grafică, linie, proiectare

Descriere generată automat

* **Ieșirile** generate în fiecare stare sunt reprezentate prin dreptunghi. În interiorul dreptunghiului se enumeră ieșirile care sunt adevărate în acel moment.

O imagine care conține captură de ecran, Font, Dreptunghi, text

Descriere generată automat

O imagine care conține captură de ecran, Color, proiectare

Descriere generată automat

### 

### 2.2.5 Schema de detaliu a proiectului

O imagine care conține text, diagramă, captură de ecran, Plan

Descriere generată automat

*Schema de detalii a proiectului conform implementării din Logisim*

# Manual de utilizare și întreținere

Acest automat pentru securitatea unei case este folosit cu scopul de a proteja proprietarul. Functiile impreuna cu care automatul vine vor fi exemplificate in randurile urmatoare.

Pentru a utiliza acest sistem de securitate este necesara introducerea unui cod, de 4 cifre, ce va fi memorat si folosit de fiecare data cand utilizatorul doreste sa schimbe modul in care se afla. Pentru asta este necesar ca ”mode”=1 si sa apasam butonul ”cod\_setat”. Ledul ”cod” devine rosu. Ulterior pentru a putea activa unul din modurile de care este insotit automatul este nevoie ca ”mode”=0 si sa reintroducem codul, iar cand codul a fost reintrodus sa apasam butonul „ok”. Ledul ”cod\_bun\_led” capata culoarea rosie daca codul introdus a fost corect, in caz contrar ”reset\_numarator”=1 si adaugam pe rand cele 4 cifre ale codului.

Daca ”cod\_bun\_led”=1 atunci putem alege unul dintre cele 3 moduri ale automatului:

-acasa

-plecat

-inactiv

fiecare dintre acestea fiind insotie de cate o functie.

1. **MOD ACASA**

* ledul ”acasa\_led” devine rosu.
* este insotit de 2 tipuri de senzori, pentru geamuri si pentru usa principala. Daca unul dintre senzorii pentru geamuri din cele doua camere sau cel de la usa principala este activat , atunci ledul „sirena” se coloreaza.

1. **MOD PLECAT**

* ledul ”plecat\_led” se aprinde dupa 15 secunde, timp in care utilizatorul poate parasi domiciliul sau reseta codul.
* este insotit de 3 tipuri de senzori, pentru geamuri, de miscare si pentru usa principala. Daca unul dintre senzorii pentru geamuri sau miscare din cele doua camere sau cel de la usa principala este activat , atunci ledul „sirena” se coloreaza.

1. **MOD INACTIV**

* ledul „inactiv\_led” devine rosu.
* In cadrul acestui mod, daca „activeaza”=1 ne intoarcem in starea de reintroducere a codului, deci ”reset\_numarator”=1.

In cazul in care vrem sa resetam modul in care ne aflam „reset”=1 si ajungem din nou in starea de introducere a codului.

# Justificarea soluției alese

Am optat pentru descrierea comportamentala a unitatii de control, folosind 3 procese, unul pentru actualizarea starii, unul pentru verificarea starii curente si unul pentru output-uri.

Totodata am facut un circuit de introducere al codului in care am si verificat daca codul introdus este egal cu cel deja memorat, pentru a-mi fi mai usor sa il pun in main.

# Posibilități de dezvoltări ulterioare

Am incercat sa fac proiectul sa functioneze cat mai bine, dar mereu exista lucruri de imbunatatit. In cazul de fata as zice ca folosirea unei memorii RAM pentru pastrarea codului setat, dar si al codului ce urmeaza sa fie introdus pentru verificare ar fi mai eficienta decat cei 8 registrii de memorie pe care eu i-am folosit.

# Bibliografie

Cursurile de Proiectarea Sistemelor Numerice prof. Dragos Florin Lisman

Lucrarile de laborator ale materiei Proiectarea Sistemelor Numerice

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