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## Project Ideas - Digital Logic Design

### ➤ Tablet-bottling system

A system for bottling tablets to control and display the tablets production. To begin, the tablets are fed into a large funnel-type hopper. The narrow neck of the hopper creates a serial flow of tablets into a bottle on the conveyor belt below. Only one tablet at a time passes the sensor, so the tablets can be counted. The system controls the number of tablets in each bottle and displays a continually updated readout of the total number of tablets bottled.

### ➤ Security Code Logic with Keypad

A security system that provides access to a secured area. Once a 4-digit security code is entered on the keypad, access is guaranteed for the correct code. Otherwise, the system gives an alarm if there are three wrong consecutive times.

### ➤ Elevator controller logic

Build a circuit for an elevator for a seven-story building. The circuit controls the elevator operation, determining the floor at which the elevator is located at any given time and displaying the floor number. For simplicity, there is only one-floor call/request for each elevator cycle. A cycle occurs when the elevator is called to a given floor to pick up a passenger and the passenger is delivered to a requested floor.

### ➤ Smart Parking Control

Nowadays, smart cities deploy smart parking systems. Parking yards are provided especially in malls, commercial establishments, offices, and schools, but sometimes you find yourself driving around a couple of blocks scanning for the area to park only to find out that is full. The Car park monitoring system is a simple project designed to monitor and provide visual indicators for the availability of parking yards.

### ➤ Digital Clock

Digital clock displays seconds, minutes, and hours. It may support an alarm, stopwatch option, and AM and PM indicator.

### ➤ E-Voting

Electronic voting machines have now replaced the traditional voting mechanism due to several advantages like security, automatic counting, etc. This project presents a way to develop an electronic voting machine that displays the count of votes. A user

can get his/her vote register through a set of switches (one for each candidate). After every cast of votes, the subsequent count can be seen on the digital 7-segments.

#### ➤ Calculator

The calculator has two purely digital inputs (4 bits per digit) and performs comparison, addition, subtraction, and multiplication operations. It has a display to show the output and the type of operation performed.

#### ➤ Smart Room

In smart cities, energy consumption is one of the challenges to achieve. Smart buildings try to implement systems to reduce energy consumption. One of these systems is the smart room. The smart room is able to detect and display the number of people inside. It keeps tracking individuals, when they enter/leave the room. The number of lights turning on in the room should be proportional to the number of people inside. The room monitors the temperature and maintains it at a preset level by switching a fan/air conditioner on/off. The room monitors the light levels outside, opens blinds, and switches off lights if the brightness outside is more than inside, provided the user has allowed these features.

For more details and ideas, Refer to:

- **Digital Fundamentals - ELEVENTH EDITION -Thomas L. Floyd**
- <https://www.electronicshub.org/electronics-mini-project-circuits/>
- <https://microcontrollerslab.com/digital-logic-design-projects-list/>

### **Note:**

- All implementations in pure logic gates, You are **not allowed** to use Arduino.
- if you will implement another idea, you have to discuss it and get approval from **Dr. Ahmed Shalaby** before you start implementation.
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GOOD LUCK  
Dr. Ahmed Shalaby