Simple 8 Bit Combination Lock

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1. Abstract

The goal of this project is to create a 8-bit combination lock using basic logic gates, buttons, motor and LEDS. LED's and motors are used for denoting correct and incorrect passwords. The project is designed and simulated on Proteus. It can be later PCB designed and used practically.The project is simple but efficient as we can use it in our day to day life.

2. Methodology

- Admin set's a password in the Admin Panel.
- User Inputs their password.
- Enter button is pressed.
- If password is correct, Green LED blinks and motor runs indicating right password.
- If password is not correct, the Red LED blinks indicating password entered is wrong.
- Admin Panel password remains unknown to the user.

3. Circuit Explanation

→ XOR gates compare the inputs between Admin Panel &
User Input. If passwords match then we get 0 as output. If they doesn't match we get 1 as output.
→ All the outputs from each XOR gate goes through an Inverter making the total output 1 or 0 depending on the inputs,and then through NOR gates.
→ For correct password, the output goes through two NOR gates. The firs NOR gates make the output 0. It combines with the Enter button and goes through another NOR gate giving the final output 1. Thus we get the Green LED Blinking and the motors running.
→ For wrong password, the output goes through one NOR gate which has the Enter button as the second input. Giving the final output 1 and thus the Red LED blinks when the password is wrong.

4. **Circuit Diagram**

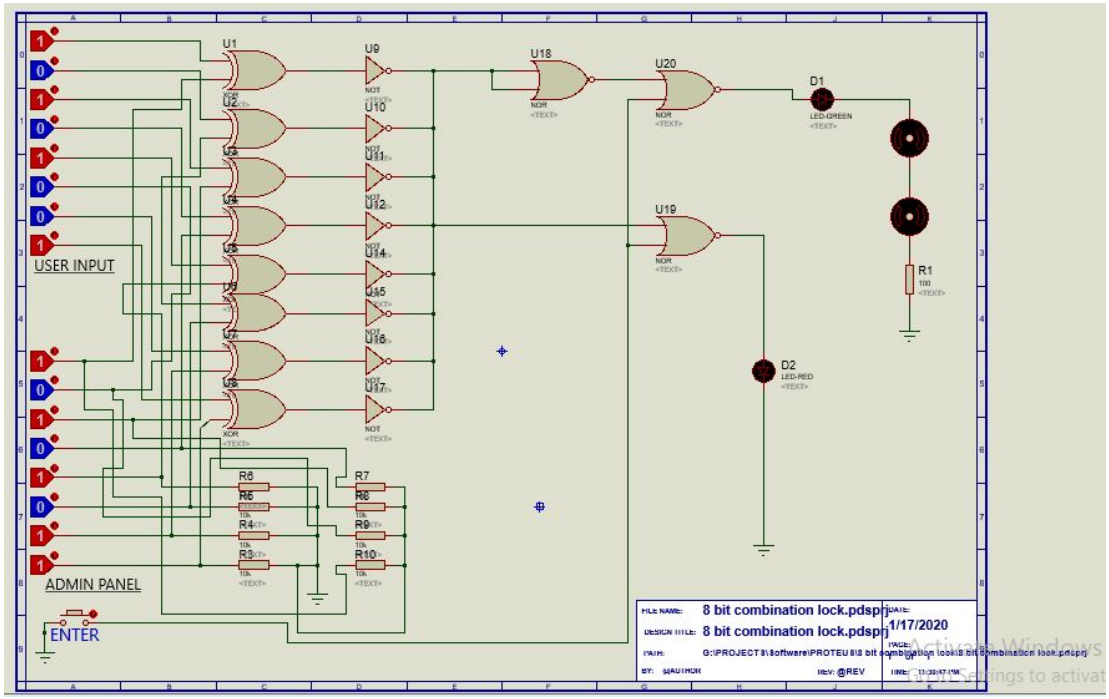
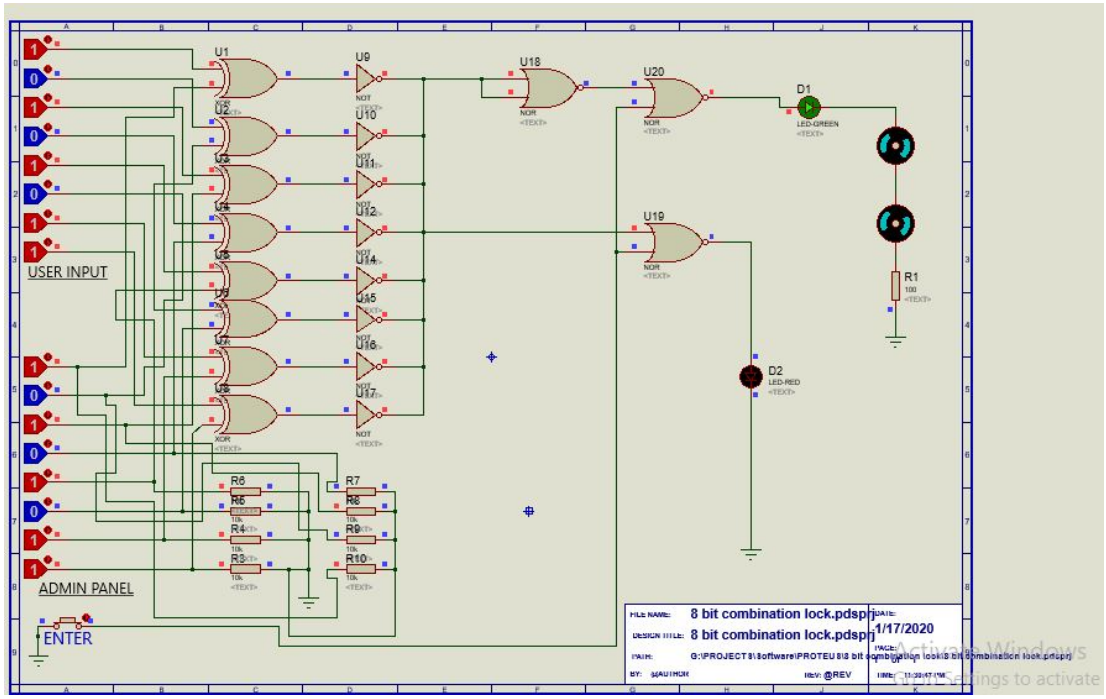
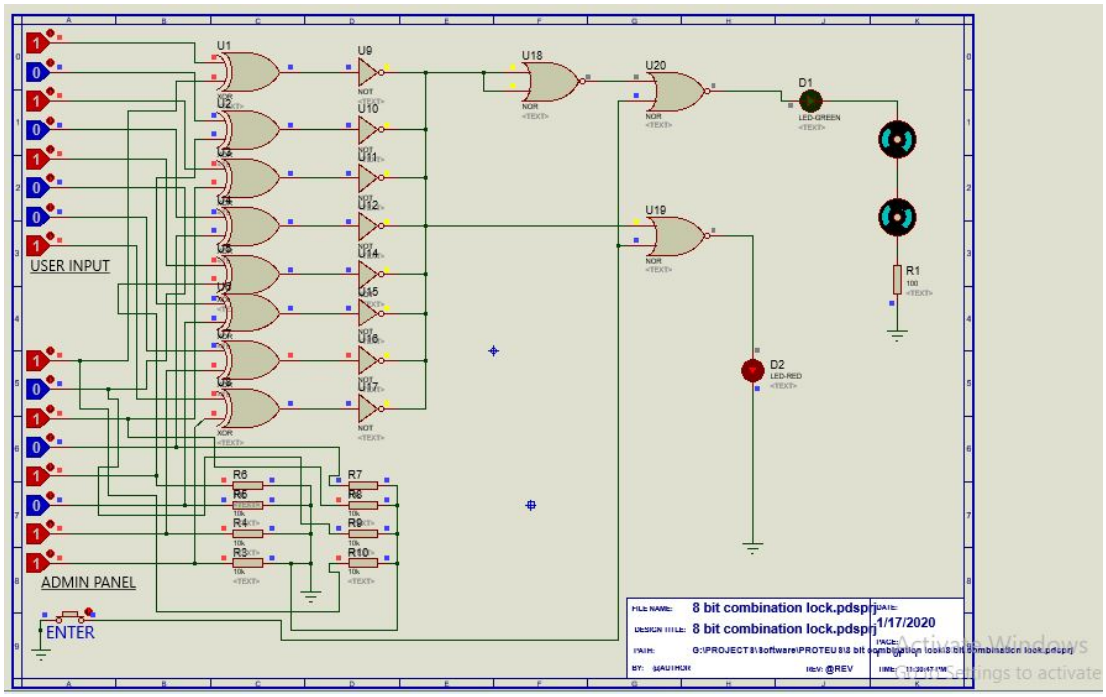


Figure : General Diagram

Case 1: Correct Password



Case 2 : Wrong Password



5. Applications

→ Can be used in a Home Security System.

→ Can be used in Door Locks with Minimal Security.

→ Can be used in Train or Automatic Cars, where transport will run after getting users approval.

→ Can be used in Automated Roller Coaster, where coaster will run only when passengers give approval and Rider enters password.

6. Improvements

→ The system can be made stronger if we use digital numbers or alphabets as input passwords.

→ For more security we can also use Face or Speech verification as password input.

→ Buzzer and Vault Lockdown can be introduced if anyone tries to breach in the system.