

Smart Bank Vault System

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1.Introduction

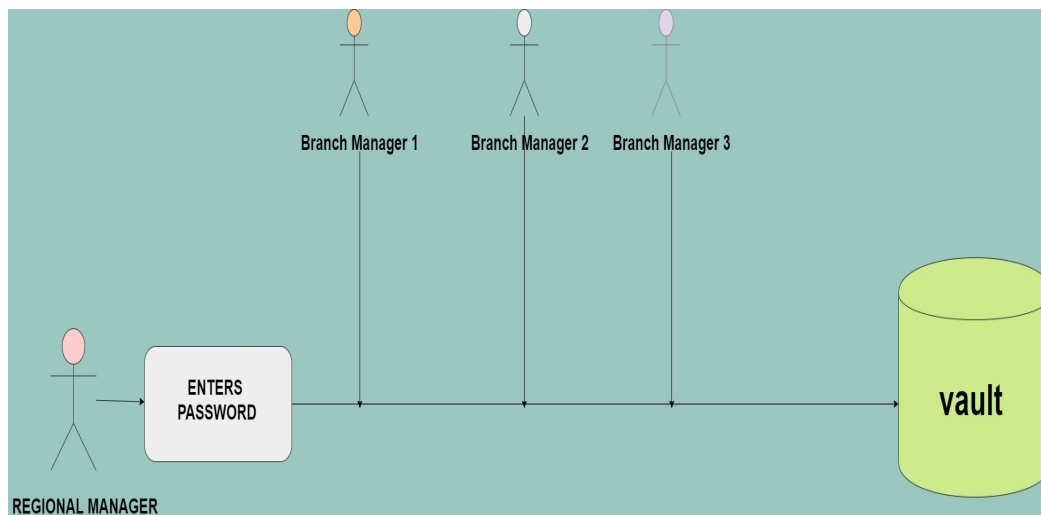
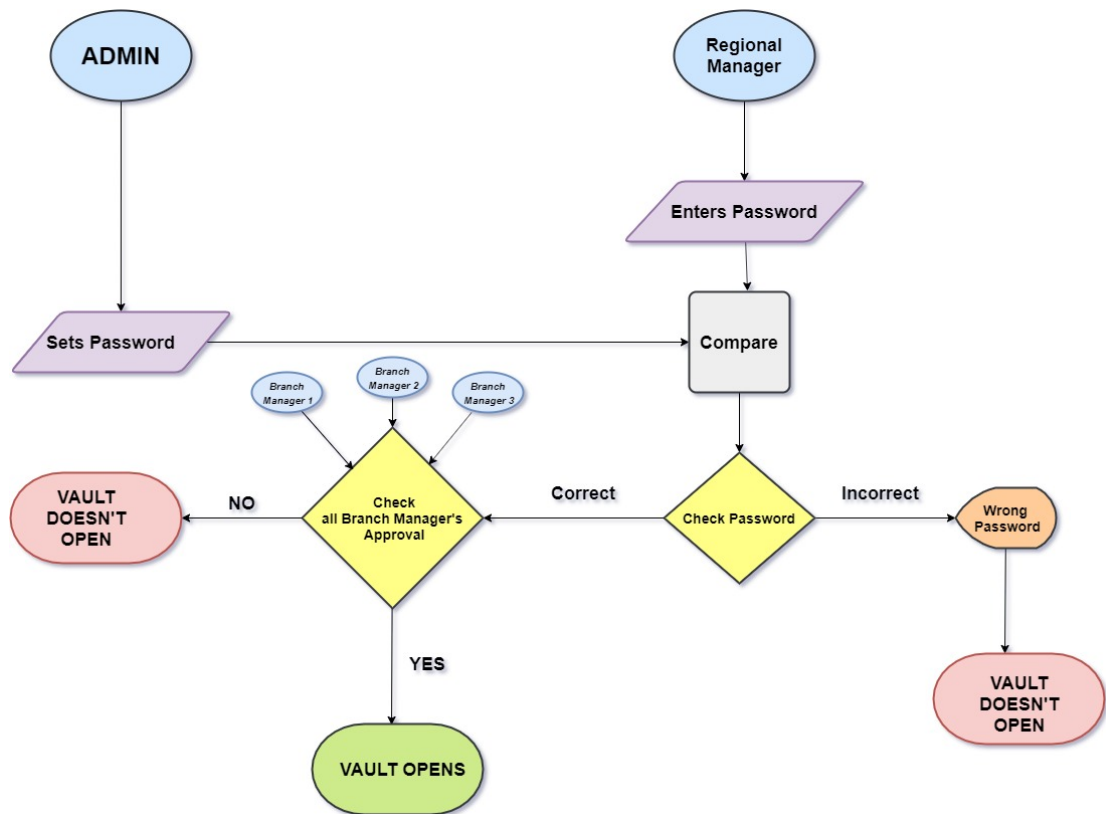
VAULT is the most important part of a bank where most of the confidential things are stored. This project focuses on ensuring a secured vault in a bank that requires approval of Regional Manager and other Branch Managers for opening the vault. Hence we get a secured and corruption free bank vault system.

2.METHODOLOGY

Opening the Vault:

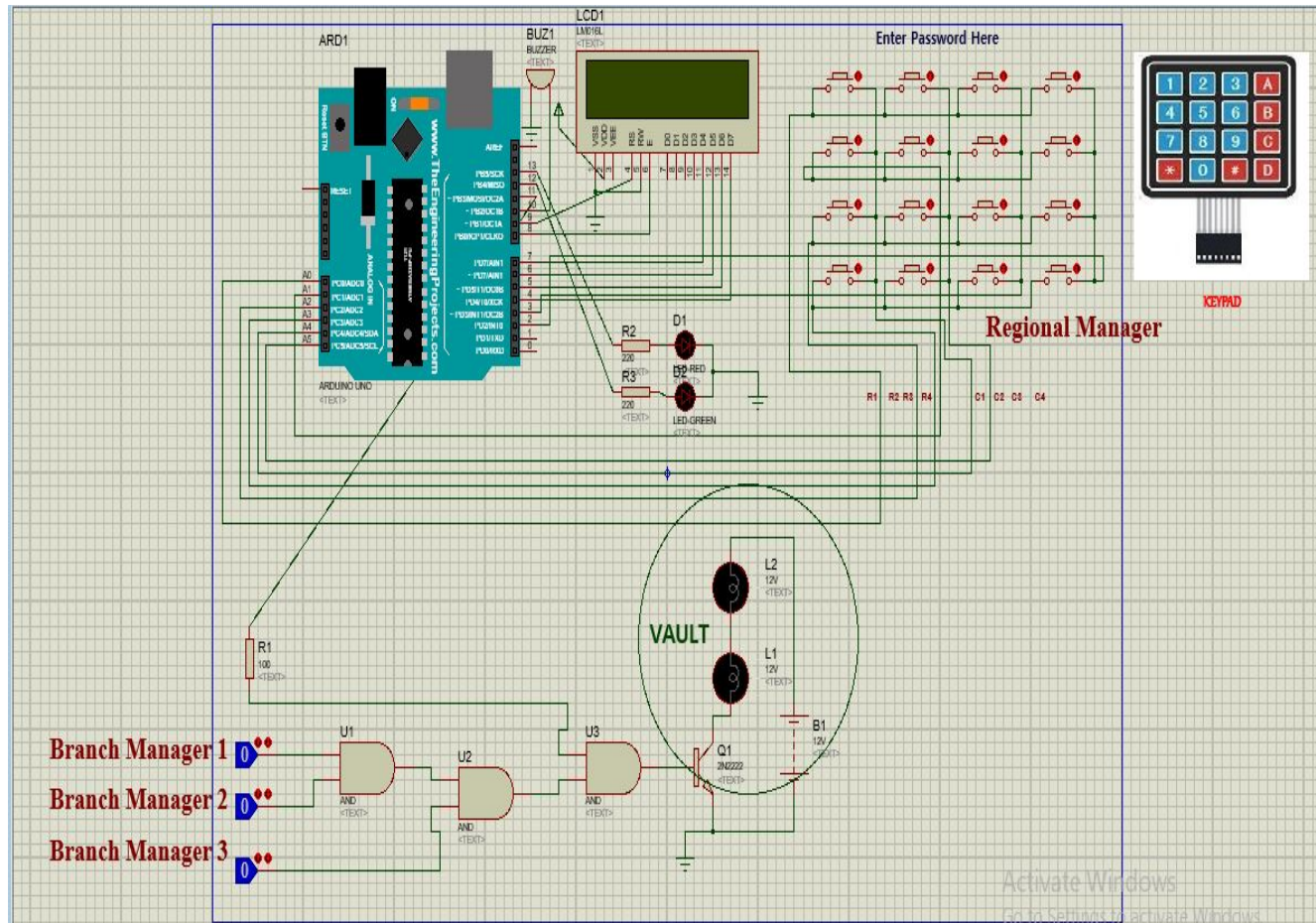
- Admin sets the password of the system in the Admin Panel which is only known to the Regional Manager.
- Regional Manager gains access by entering password set by the Admin.
- Branch Manager 1, Branch Manager 2 & Branch Manager 3 press their respective approval switches.
- VAULT opens.
- If password entered by Regional Manager is incorrect, The screen will show Wrong Password. VAULT doesn't open. If wrong password is pressed 3 times, then buzzer will turn on.
- If anyone of the Branch Manager doesn't press the approval switch, then VAULT won't open despite of the correct password.
- Thus the system doesn't allow any single individual to gain access to the VAULT.
- System security relies on more than one individual.

3.Flowchart



VISUAL REPRESENTATION

4.Circuit Diagram:



Components Used:

Arduino
 LCD
 Switches
 LED
 Resistance
 AND Gates
 Bulbs
 Transistor
 Supply Voltage

5.Arduino Uno Code

```
//

#include <Keypad.h>
#include<LiquidCrystal.h>
#include<EEPROM.h>
LiquidCrystal lcd(9,8,7,6,5,4);
char password[4];
char pass[4],pass1[4];
int i=0;
char customKey=0;
const byte ROWS = 4; //four rows
const byte COLS = 4; //four columns
char hexaKeys[ROWS][COLS] = {
  {'1','2','3','A'},
  {'4','5','6','B'},
  {'7','8','9','C'},
  {'*','0','#','D'}
};
byte rowPins[ROWS] = {A0,A1,A2,A3}; //connect to the row pinouts of the keypad
byte colPins[COLS] = {A4,A5,3,2}; //connect to the column pinouts of the keypad
//initialize an instance of class NewKeypad
Keypad customKeypad = Keypad( makeKeymap(hexaKeys), rowPins, colPins, ROWS, COLS);
int led = 12;
int leds = 13;
int buzzer = 10;
int m11;
int m12;
void setup()
{
  Serial.begin(9600);
  pinMode(11, OUTPUT);

  lcd.begin(16,2);
  pinMode(led, OUTPUT);
  pinMode(leds, OUTPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(m11, OUTPUT);
  pinMode(m12, OUTPUT);
  lcd.print("Arduino");
  Serial.print("Arduino");
  lcd.setCursor(0,1);
  lcd.print("BankVault");
  Serial.print("BankVault");
  delay(2000);
  lcd.clear();
  lcd.print("Enter Password:");
  Serial.println("Enter Password:");
  lcd.setCursor(0,1);
  for(int j=0;j<4;j++)
    EEPROM.write(j, j+49);
  for(int j=0;j<4;j++)
    pass[j]=EEPROM.read(j);
}

void loop()
{
  digitalWrite(11, LOW);
  customKey = customKeypad.getKey();
  if(customKey=='#')
    change();
  if (customKey)
  {
    password[i++]=customKey;
    lcd.print(customKey);
    Serial.print(customKey);
    beep();
  }
  if(i==4)
  {
    delay(200);
    for(int j=0;j<4;j++)
      pass[j]=EEPROM.read(j);
    if(!strcmp(password, pass,4))
    {
      digitalWrite(led, HIGH);
      beep();
      lcd.clear();
      lcd.print("Accepted");
      Serial.println("Accepted");
      digitalWrite(11, HIGH);
      delay(2000);
    }
  }
}
```

```

        lcd.setCursor(0,1);
        lcd.print("#Change Password");
        Serial.println("#Change Password");
        delay(2000);
        lcd.clear();
        lcd.print("Enter Password");
        Serial.println("Enter Password");
        lcd.setCursor(0,1);
        i=0;
        digitalWrite(led, LOW);
        digitalWrite(leds, LOW);
    }
    else
    {
        digitalWrite(11, LOW);
        digitalWrite(buzzer, HIGH);
        digitalWrite(led, LOW);
        digitalWrite(leds, HIGH);
        lcd.clear();
        lcd.print("WRONG PASSWORD");
        Serial.println("WRONG PASSWORD");
        lcd.setCursor(0,1);
        lcd.print("#Change Password");
        Serial.println("#Change Password");
        delay(2000);
        lcd.clear();
        lcd.print("Enter Password:");
        Serial.println("Enter Password:");
        lcd.setCursor(0,1);
        i=0;
        digitalWrite(buzzer, LOW);
        digitalWrite(led, LOW);
        digitalWrite(leds, LOW);
    }
}
}
void change()
{
    int j=0;
    lcd.clear();
    lcd.print("Enter Curr pass");
    Serial.println("Enter Curr Pass ");
    lcd.setCursor(0,1);
    while(j<4)
    {
        char key=customKeypad.getKey();
        if(key)
        {
            pass1[j++]=key;
            lcd.print(key);
            Serial.print(key);
            beep();
        }
        key=0;
    }
    delay(500);

    if((strcmp(pass1, pass, 4)))
    {
        lcd.clear();
        lcd.print("WRONG PASSWORD...");
        Serial.println("WRONG PASSWORD...");
        lcd.setCursor(0,1);
        lcd.print("Try Again");
        Serial.println("Try Again");
        delay(1000);
    }
    else
    {
        j=0;
        lcd.clear();
        lcd.print("Enter New Pass:");
        Serial.println("Enter New Pass:");
        lcd.setCursor(0,1);
        while(j<4)
        {
            char key=customKeypad.getKey();
            if(key)
            {
                pass[j]=key;
                lcd.print(key);
                Serial.print(key);
                EEPROM.write(j,key);
                j++;
                beep();
            }
        }
    }
}

```

```
    lcd.print(" Success..");
    Serial.println(" Success..");
    delay(1000);
}
lcd.clear();
lcd.print("Enter Password:");
Serial.println("Enter Password:");
lcd.setCursor(0,1);
customKey=0;
}
void beep()
{
    digitalWrite(buzzer, HIGH);
    delay(20);
    digitalWrite(buzzer, LOW);
}
```

6. References

[1] Arduino based door lock system in proteus

<https://drive.google.com/drive/u/0/folders/1RBx5Np5X8zYmRpokrzbDibUhmAEFnYeZ>