NAVODAYA INSTITUTE OF TECHNOLOGY, RAICHUR

DEPARMENT OF COMPUTER SCIENCE & ENGINEERING

IOT Lab

Program - 12

12 Develop a program to simulate interfacing with the keypad module to record the keystrokes.

🔧 Components Required

- Arduino Uno (or compatible)
- 4×4 Keypad Module (or 4×3 keypad)
- Breadboard + jumper wires
- Arduino IDE (Serial Monitor for output)

⚡ Working Principle

- The **keypad** is arranged in a matrix of rows & columns.
- When you press a key, a row and a column connect → Arduino detects the pressed key.
- Using the **Keypad library**, Arduino can easily scan and decode the keystrokes.
- Recorded keystrokes can be displayed on the **Serial Monitor**.

🔌 Circuit Connections (4×4 Keypad to Arduino Uno)

Keypad Pin	Arduino Pin
R1	9
R2	8
R3	7
R4	6
C1	5
C2	4
C3	3
C4	2

(For 4×3 keypad, just leave out one column.)

🧪 Steps to Do the Experiment

1. Connect the **keypad pins** to Arduino as per table.
2. Install the **Keypad library** in Arduino IDE:
   - Go to **Sketch → Include Library → Manage Libraries**.
   - Search for **Keypad by Mark Stanley & Alexander Brevig** and install it.
3. Write the program (below).
4. Upload it to Arduino Uno.
5. Open the **Serial Monitor (9600 baud)**.
6. Press different keys on the keypad → observe keystrokes displayed.

💻 Arduino Program (Keypad Keystroke Recording)

```
#include <Keypad.h>

// Define keypad size
const byte ROWS = 4; // Four rows
const byte COLS = 4; // Four columns

// Keymap for 4x4 keypad
char keys[ROWS][COLS] = {
  {'1','2','3','A'},
  {'4','5','6','B'},
  {'7','8','9','C'},
  {'*','0','#','D'}
};

// Pin connections
byte rowPins[ROWS] = {9, 8, 7, 6};   // R1,R2,R3,R4
byte colPins[COLS] = {5, 4, 3, 2};   // C1,C2,C3,C4

// Create Keypad object
Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, ROWS, COLS);

void setup() {
  Serial.begin(9600);
  Serial.println("Keypad Ready - Press keys:");
}

void loop() {
  char key = keypad.getKey();

  if (key) {  // if a key is pressed
    Serial.print("Key Pressed: ");
    Serial.println(key);
  }
}
```