LAB-REPORT-2

M . SRUJANA
EE24BTECH11042

March 24, 2025

1 Aim :

Scientific Calculator Using AVR-GCC

2 Installation :

1. In termux: apt install avr-gcc avr-binutils avr-libc avrdude make -y

3 Apparatus:

- Arduino Uno
- JHD162A LCD display
- push buttons
- 2kΩ, 15kΩ, resistors
- Jumper wires
- Breadboard

4 Connections :

Make the connections as mentioned below:

Table 1: Connections

S.No	From	tO
1	Arduino digital pin 0	Push button
2	Arduino digital pin 1	Push button
3	Arduino digital pin 2	LCD pin 4
4	Arduino digital pin 3	LCD pin 6
5	Arduino digital pin 4	LCD pin 11
6	Arduino digital pin 5	LCD pin 12
7	Arduino digital pin 6	LCD pin 13
8	Arduino digital pin 7	LCD pin 14
9	Arduino digital pin 8	Push button
10	Arduino digital pin 9	Push button
11	Arduino digital pin 10	Push button
12	Arduino digital pin 11	Push button
13	Arduino digital pin 12	Push button
14	Arduino digital pin 13	Push button
15	Arduino analog pin A1	Push button
16	Arduino analog pin A2	Push button
17	Arduino analog pin A3	Push button
18	Arduino analog pin A4	Push button
19	Arduino analog pin A5	Push button
20	Arduino analog pin A0	Push buttons no. 1-10 (digit buttons)
21	LCD pin 1	Ground
22	LCD pin 2	5V
23	LCD pin 15	5V via 1kΩ resistor
24	LCD pin 16	Ground
25	LCD pin 3	Ground via 1.5kΩ resistor
26	LCD pin 5	Ground
27	LCD pin 5	All push buttons

5 LOGIC :

- Basic arithmetic operations (addition, subtraction, multiplication, division)
- Trigonometric functions (sin, cos, tan) using differential equations
- Logarithmic and exponential functions

Remark: *Code sourced from Akshara EE24BTECH11003*

6 Limitations and Observations

During the experiment, it was observed that the resistance of certain components, particularly the resistors used in the LCD and button circuits, varied with temperature. As a result, the output of the scientific calculator exhibited slight fluctuations under different environmental conditions. This variation affected the accuracy of calculations, particularly in prolonged usage. To mitigate this issue, using temperature-stable resistors or compensating for resistance variations in software could be considered.

7 Execution :

1. To compile main.c file : avr-gcc -mmcu=atmega328p -Os -o main.elf main.c

2. To convert main.elf file to main.hex : avr-objcopy -O ihex -R .eeprom main.elf main.hex

3. Moving the Compiled File to ArduinoDroid : mv main.hex /sdcard/ArduinoDroid/precompiled