



# Avr-GCC Assignment

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## I. ABSTRACT

The information bit sequence 111010101 is to be transmitted by encoding with Cyclic Redundancy Check 4 ( $CRC-4$ ) code, for which the generator polynomial is  $C(x) = x^4 + x + 1$ . The encoded sequence of bits is:

## II. COMPONENTS

The required components list is given in Table: I. The pin out diagram of LCD is:

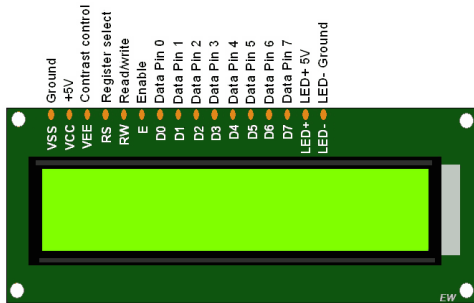


Fig. 1.

Components	Value	Quantity
LCD	16 × 2	1
Arduino	UNO	1
Jumper Wires		20
Breadboard		1

TABLE I

## III. PROCEDURE

To execute avr-gcc in Termux and display the output on an LCD via Arduino, first install the AVR toolchain using 'pkg install avr-gcc'. Write your Arduino code in a '.c' or '.cpp' file, ensuring it initializes the LCD (using the `LiquidCrystal` library). Compile the program using `avr-gcc -mmcu=atmega328p -DF_CPU=16000000UL -`

`oprogram.elfprogram.c'`, then convert it to a hex file using 'avr-objcopy -O ihex program.elf program.hex'. To upload the hex file, connect Arduino to Termux using an OTG cable, and run 'avrdude -c arduino -p m328p -P /dev/ttyUSB0 -b 115200 -U flash:w:program.hex'. Once uploaded, connect the LCD to Arduino as per the LiquidCrystal library's pin configuration. Power the setup to see the output on the LCD, confirming the program's execution.

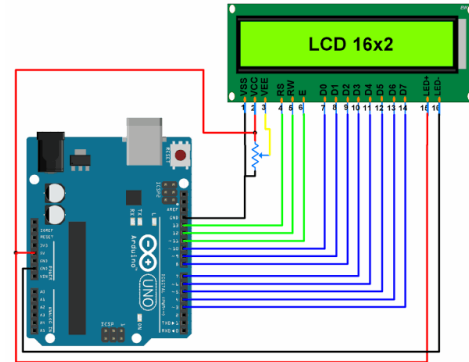


Fig. 2.

## IV. RESULTS

Download the avr-gcc code given in the link below and execute them to see the output as shown in Fig.3, where the output is displayed on the LCD screen.

<https://github.com/salad-12/FWC-INTERNSHIP/blob/main/avr-gcc/codes/avr.cpp>

## V. CONCLUSION

In conclusion, CRC-4 (Cyclic Redundancy Check) is a robust error-detection method commonly used in digital networks to ensure data integrity by generating a 4-bit checksum. It efficiently detects errors in transmitted data, making it crucial in communication systems. On the other hand, AVR-GCC is a powerful toolchain that allows the development and

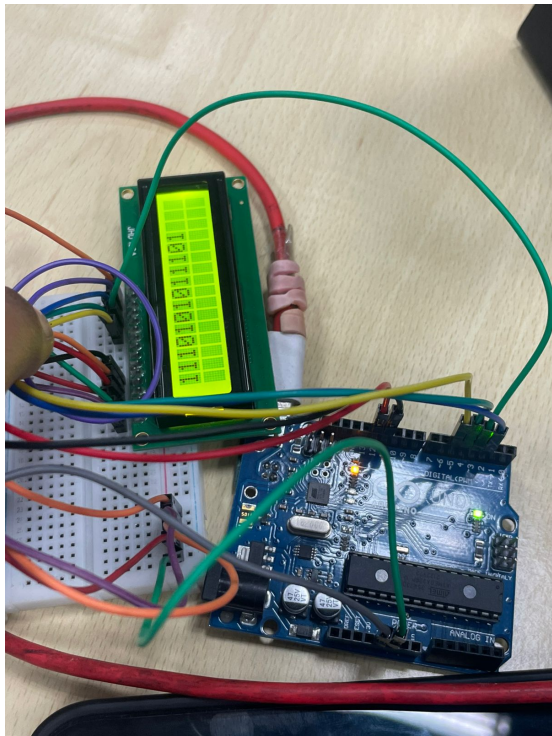


Fig. 3.

compilation of programs for AVR microcontrollers, such as those used in Arduino. The combination of CRC techniques and AVR-GCC enables the creation of reliable, error-checked embedded systems, ensuring accurate data transmission and robust microcontroller programming for various applications.