ELECTRONICS PROJECT SYNOPSIS.

TITLE OF THE PROJECT: “The Smart House”

OBJECTIVE :

The main objective of our project is to develop a user-friendly automated house for the people with physical disability, elderly person and postpartum women. This application allows user to control electronic appliances by their mobile phone from anywhere in their house within 10 meter range(like turning on the lights, ceiling fan, television ETC).

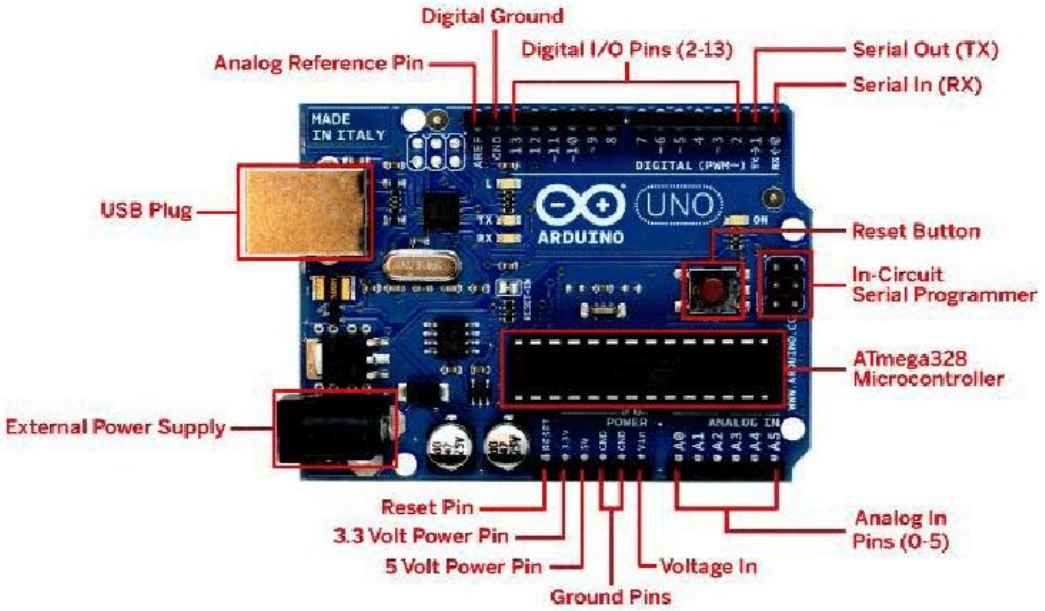
HARDWARE REQUIREMENTS:

1. Android device
2. Arduino UNO
3. Bluetooth Module HC05
4. 16×2 LCD Display
5. Servo motor and basic components

SOFTWARE REQUIREMENTS:

1. Arduino Bluetooth Control for Android (Inputs)
2. Arduino IDE (coding)
3. Fritzing (Circuit Design)
4. Proteus (Circuit stimulation)

ARDUINO UNO BOARD: (SOURCE GOOGLE)



Arduino UNO: The Arduino UNO is an open-source Microcontroller board based on the Microchip ATmega328P microcontroller. The board is equipped with sets of digital and analog input and output pins. Its operating voltage is 5 volts. Clock speed is 16MHz and Input voltage is 7 to 20 volts.

The board has 14 digital input and output pins. Pin 13 is connected to LED (in built). PIN-0 (Rx- serial IN) and PIN-1 (Tx- serial OUT) are used to receive and transmit TTL serial data (Rx terminal of Arduino is connected to the Tx terminal of the Bluetooth module HC05, Tx terminal of arduino is connected to the Rx terminal of the Bluetooth module HC05) .PIN2 and 3 are the external interrupts used to trigger an interrupt. AREF is to provide reference voltage for input voltage.

The board has 6 Analog pins A0 to A5 used to provide analog input in the range of 0 to 5 volts.

VIN : The input voltage to the Arduino board when it is using an external power source ,we can supply voltage through this pin or if supplying voltage via the power jack.

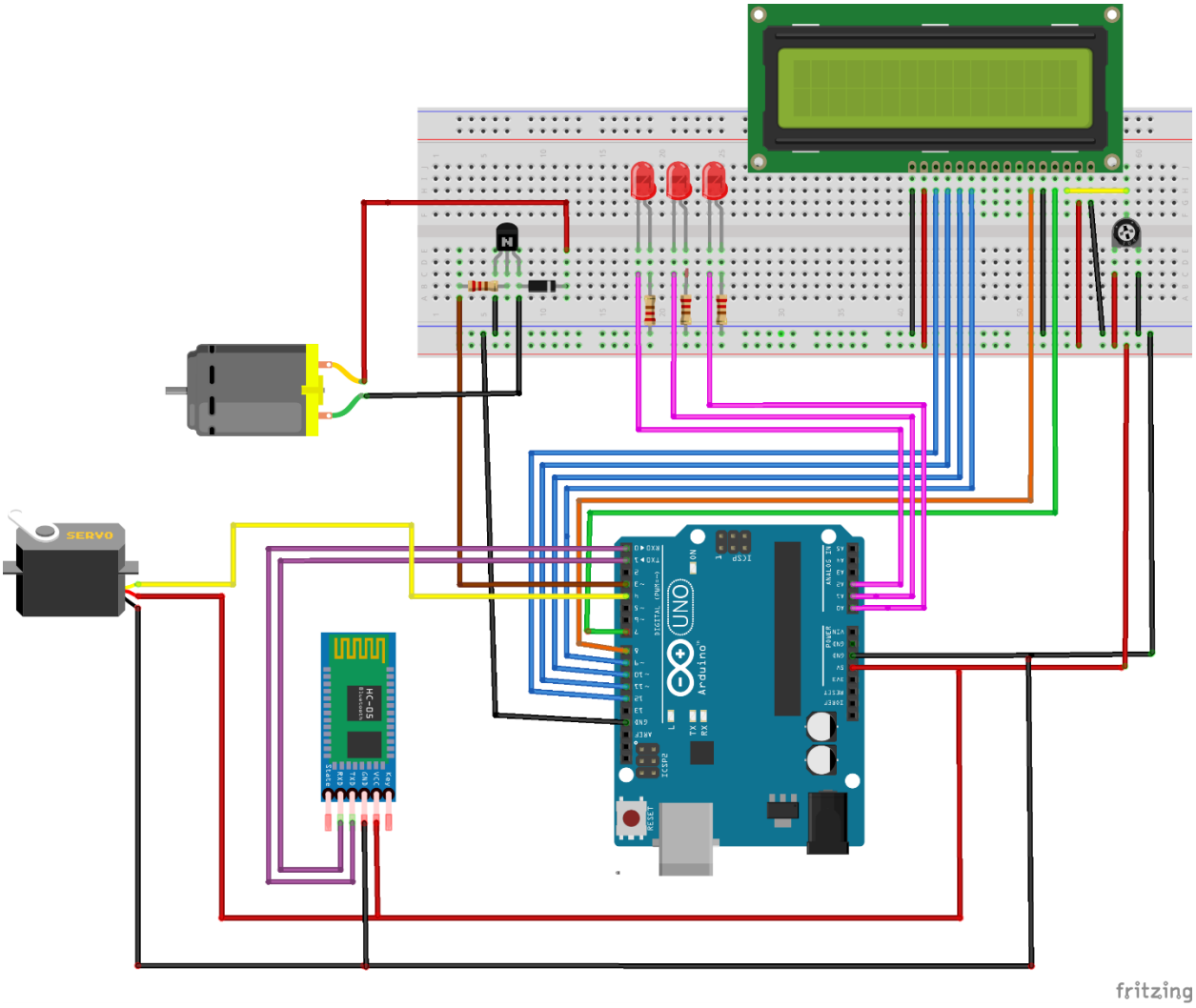
5 VOLTS: Regulated power supply used to power microcontroller and other components on the board.

3.3 VOLTS: 3.3 volts supply generated by on-board voltage regulator.

Ground: Ground pins are present on the digital and analog side of the Arduino UNO, which will be connected as common ground to the components used.

RESET: Resets the microcontroller.

CIRCUIT DIAGRAM:



PROJECT DESCRIPTION:

“The Smart house” is a simple, comprehensible and powerful application with the below mentioned features.

Home page of the Arduino Bluetooth application has a terminal section which is used for giving inputs to the Bluetooth module that sends the user data to the Arduino which controls the home appliances like Lights, Ceiling fan, Television, Water heater and Automatic door. Bluetooth module sends data in ASCII codes to the microcontroller.

- Turning ON the lights: Lights of the house that is connected to the analog pins(A0,A1,A2) of the Arduino UNO and the negative terminal of the light is given to the ground through resistors, can be turned ON by the user just by giving a command “A/B/C” by the terminal section. To turn OFF the respective light “a/b/c” command is given in the same way.
  (Different alphabet is given as a command to control the particular light).

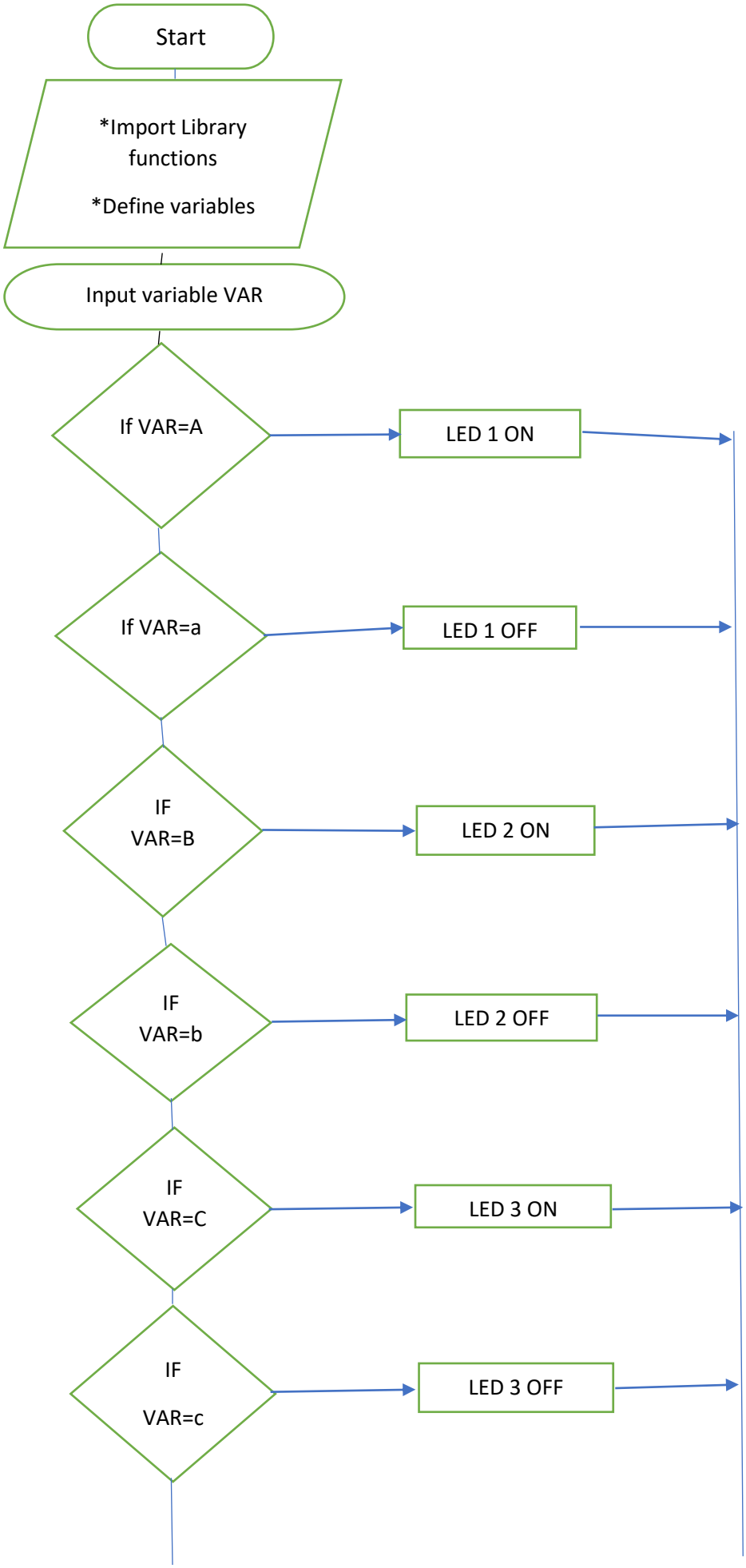
- Turning ON the Fan: Fan (DC motor) that is connected to the NPN transistor and a diode for amplifying purpose to the Arduino digital pin-3. It can be controlled by the user just by giving a command “D” to turn ON and “d” to turn off.

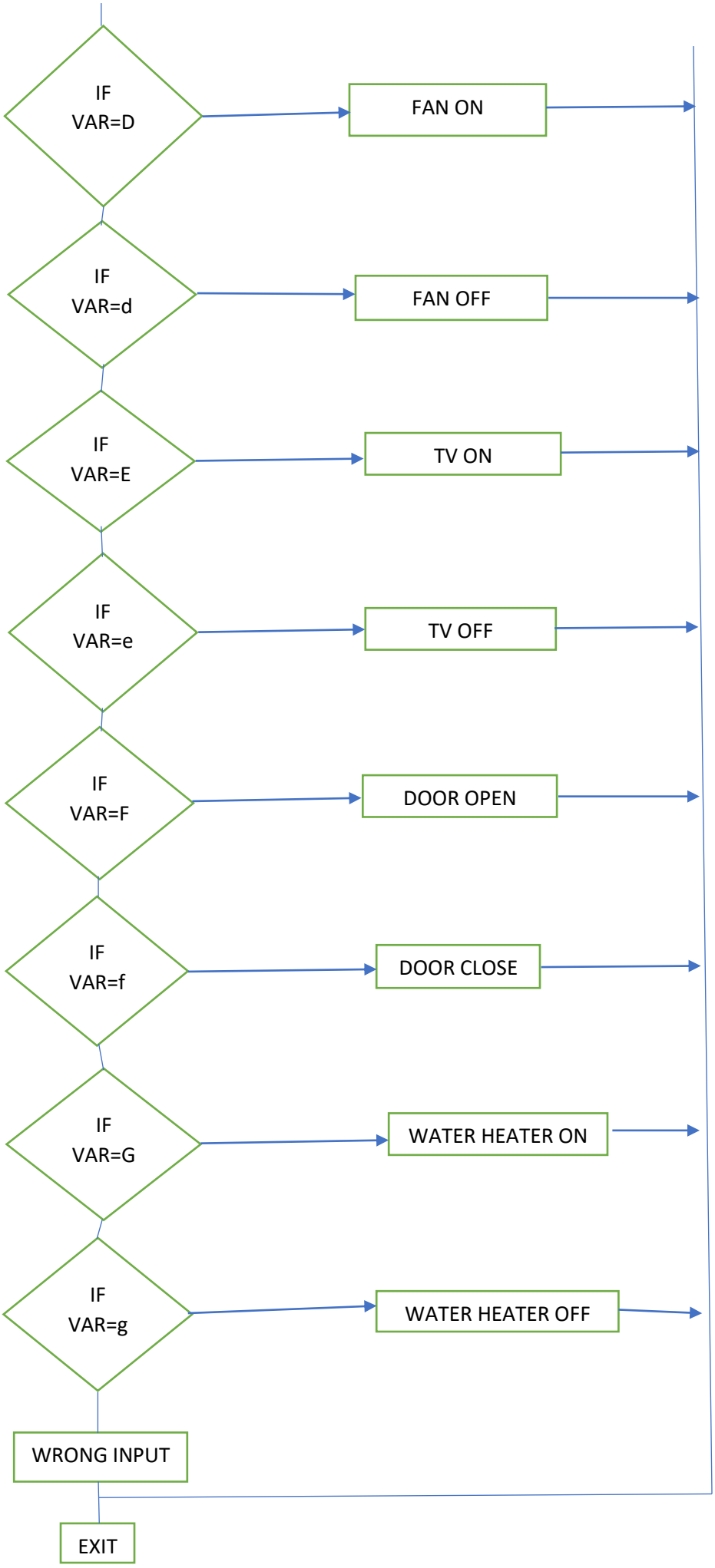
- Turning ON Television: Television (16×2 LCD Display) which is controlled by the arduino displaying the respective text messages given by the user on the screen. It can be turned ON or OFF by the user giving a command “E” or “e”. LCD display is connected to the digital pins-8,9,10,11,12 of the Arduino UNO. Intensity of the LCD display is controlled by potentiometer which is connected to the 3rd pin of the LCD display. PIN-1 and 16 are connected to ground terminal, PIN-2 and 15 are connected to 5 volts terminals.
  (We using 16×2 LCD display which only display text messages as a television , LCD display is one of the important application of the Arduino. Text messages that has to be displayed are mentioned in the code in Arduino IDE).

- Controlling Automated Door: Door that is influenced by the Servomotor is driven by the Arduino connected to the digital pin-4 and ground pin is connected to ground terminal of Arduino and power pin is connected to 5 volts terminal of the Arduino .A Servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. The Smart house door can be controlled by the user by giving a command ”F” to open and “f” to close.

- Turning ON the Water heater: The switch(Push button) of the water heater connected to the digital pin-5 of the Arduino UNO can be turned On or OFF by the user giving the command “G” or “g” respectively.

FLOW CHART:


Start
*Import Library functions
*Define variables
Input variable VAR
If VAR=A
LED 1 ON
If VAR=a
LED 1 OFF
IF VAR=B
LED 2 ON
IF VAR=b
LED 2 OFF
IF VAR=C
LED 3 ON
IF VAR=c
LED 3 OFF


IF
VAR=D
FAN ON
IF
VAR=d
FAN OFF
IF
VAR=E
TV ON
IF
VAR=e
TV OFF
IF
VAR=F
DOOR OPEN
IF
VAR=f
DOOR CLOSE
IF
VAR=G
WATER HEATER ON
IF
VAR=g
WATER HEATER OFF
WRONG INPUT
EXIT

FUTURE SCOPE:

Our future intent is add voice command to the applications ,making it easier for the user to control their appliance. We can also add appliance like refrigerator, air conditioner, music system, water level indicator, automatic water sprinkler for gardens ,LPG detector and security systems.

CONCLUSION:

“The Smart house” allows user to control the home appliances through the mobile app and help the disabled person to have a comfort. It alleviates the users to have independent an easy experience.

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