Engineering clinics

VIT® UNIVERSITY

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TEAM

➤ GUIDE PROF. GANESH LAKSHMAN MOGANTI.

R.RASAGNA 21MIC7025

S.AMRUTHA 21MIC7048

K.L.BHARADWAJ 21MIC7050

T.SREE 21MIC7058

A.MADHU 21MIS7022

P.NIKHILESH 21MIS7087

ELEVATOR USING ARDUINO

OBJECTIVE

In this prototype, the Arduino will be responsible for activating the elevator motor driver, controlled according to the desired floor by the buttons.

Each button installed in the structure corresponds to the desired floor, which when pressed, the motor will run until the destination is reached.

In this review, you will understand the assembly of the didactic elevator, as well as know its mechanical structure, working

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MATERIALS & HARDWARE

➤ **Materials**

- An Arduino Mega2560
- Buttons with separate light
- An 8×8 LED matrix to show arrows
- A seven-segment display to show the floor numbers
- A stepper motor and driver board to move the car
- A Mega2560 protoboard, to connect our wires
- Screw terminals (10×2)

➤ **Hardware**

- Thread spool
- Fiberboard and 3/4 sq in moulding for the elevator and car.
- Aluminum angle bracket to hold the motor
- Assorted screws
- Hose to act as bushing inside spool
- String (we used heavy-duty nylon kite string)

APPARATUS

➤ Arduino

The Arduino Mega 2560 is a microcontroller board based on the AT mega 2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started

Stepper Motor

STEPPER MOTORS :

Steppper motors are very valuable devices that can be used in a number of different applications

they are very good when you need a high torque motor

Bipolar stepper motor consists of two sets of coils and usualy has four wires, two wires per coil.

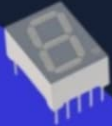Have higher torque, slower max speed and advanced controller circuit.
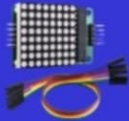
▶ Budget

ARDUINO MEGA 2560 - 1,500/-

STEPPER MOTOR W/ DRIVER - 400/-

8X8 LED MATRIX DISPLAY - 300/-

SEVEN SEGMENT DISPLAY - 100/-

BUTTONS W/ SEPERATE LIGHTS (8PCS) - 1400/-

Budget

MEGA 2560 PROTOBOARD - 400/-

SCREW TERMINALS (10X2) - 150/-

THREAD SPOOL - 50/-

FIBER BOARD - N/A

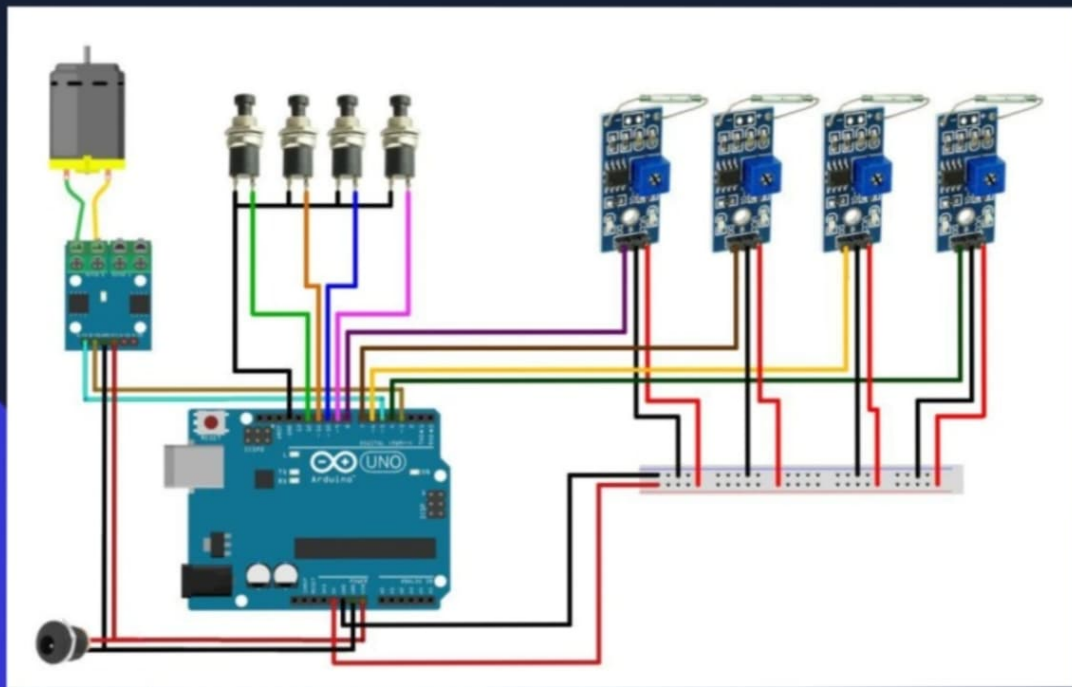ANGLE BRACKETS , ASSORTED SCREWS & OTHER ESSENTIALS LIKE GLUE/TAPE - 300/-

TOTAL BUDGET - 4,900

APROX. - 5,000

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► Procedure

1.We started with the elevator shaft. We cut 3 pieces of fiberboard to 36"x8" for the sides and rear (the front is open). Then using 4 pieces of 3/4" square moulding, 36" long, we screwed the fiberboard together to make a vertical shaft. Square pieces of fiberboard on the top and bottom holds everything square.The elevator car is next.

2.The motor sits on top of the elevator. We attached a regular wood spool (from sewing thread) to the shaft on the motor. The motor shaft has a flat edge but of course the hole in the spool is round.

3.The hole in the spool is larger than the motor shaft. To act as a bushing to take up the space, we have to use a very short piece of appropriately sized rubber hose.

4.Then we have to mounted the motor to a piece of angle aluminum and screwed that to the top of the shaft. To support the other side of the spool, we put a screw through a second piece of angle aluminum.

5.We used more fiberboard to make the button panels. On the left, we used a board the height of the shaft for the call buttons. We used alternating red and green buttons. Finally,We have mounted 4 screwboxes. Two on the call panel, and two on the side next to the "inside-"elevator panel.
Buttons Recongisation:
 Red for down, green for up. The top floor has only a red and the bottom has only a green. Our "in elevator" panel is on the right. We have to cut holes for the LED matrix and seven-segment display in addition to the 5 holes for the buttons.

6. we were concerned that something would inevitably become disconnected if we just used the standard Arduino pin connections. With the prototyping shield, we could solder wires directly and avoid that risk. In addition, it gave us a convenient place to put things like resistors, which are necessary for our 7-segment display.

7. So every wire has some sort of removable end on it. We used screw blocks between the switch panels and the Arduino, and for the 7-segment and LED matrix, one end of the wire are still quick-disconnect pins.

8. For make it easy them all together with a nice custom wiring harness. The signal pins (one for the switch and one for the light on each button) are all separate, running to the screw blocks.

9. we have to use solid-core wire to solder to the prototyping shield, but we used stranded wire for the crimp-on connectors to the backs of the buttons. The screw blocks gave us a place to switch from one to the other without soldering.

TIMELINE-60-75DAYS

Working Principle

- The working priciple of Arduino is an open-source electronics platform based on easy to use hardware and software. And it is also low cost, flexible open source microcontroller.

- The working principle of stepper motor By energizing one or more of the stator phases , a magnetic field is generated by the current flowing in the coil and the rotor aligns with this field.

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Thank You