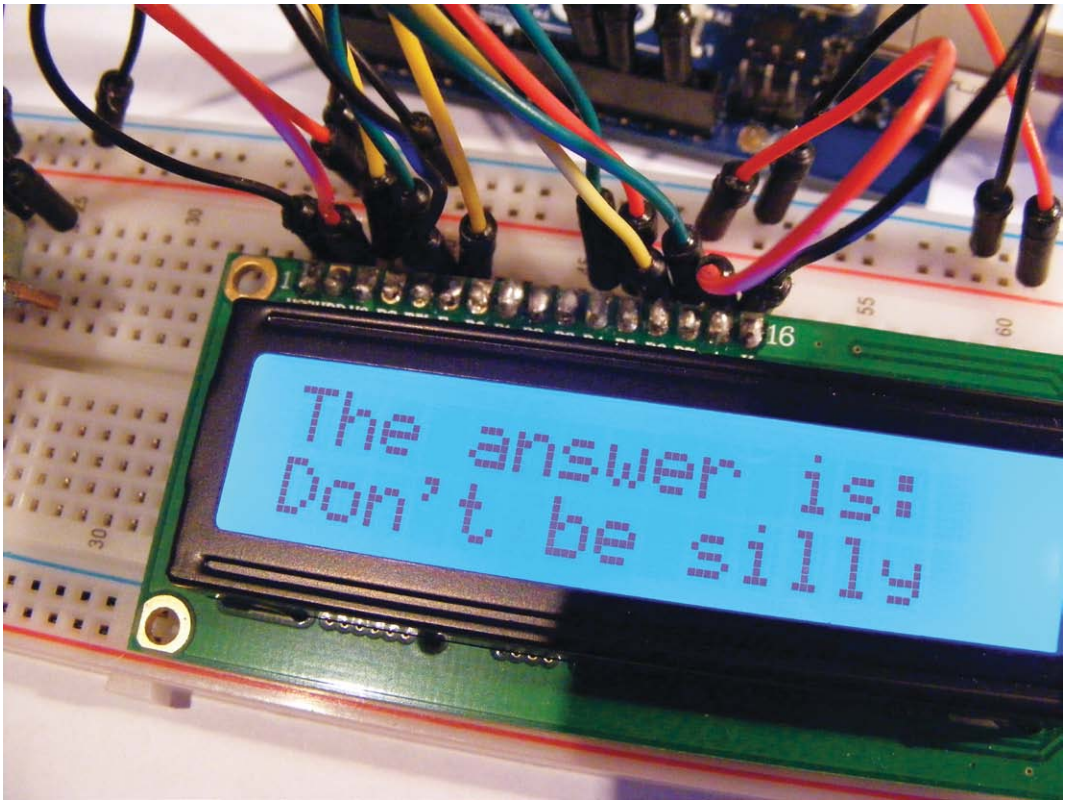
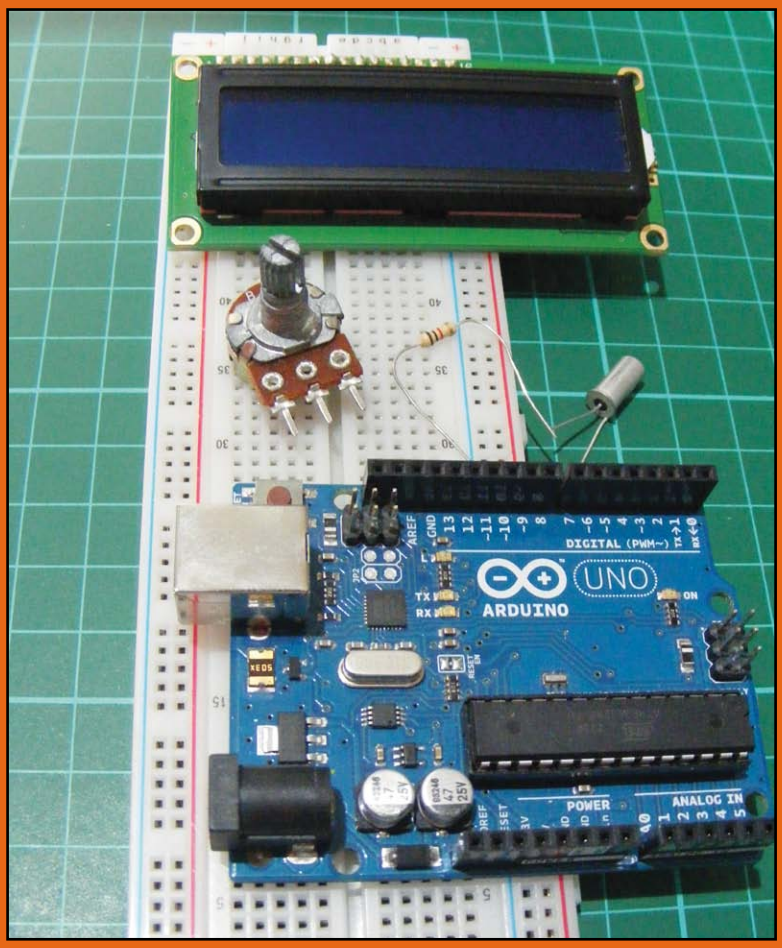
PROJECT 14: FORTUNE TELLER

IN THIS PROJECT, WE'LL CREATE AN ELECTRONIC VERSION OF A CLASSIC FORTUNE-TELLING DEVICE: THE MAGIC 8 BALL.





PARTS REQUIRED

- Arduino board
- Breadboard
- Jumper wires
- 16x2 LCD screen (Hitachi HD44780 compatible)
- Tilt ball switch
- 50k-ohm potentiometer
- 1k-ohm resistor

LIBRARIES REQUIRED

- LiquidCrystal

HOW IT WORKS

The Magic 8 Ball, a novelty toy created in the 1950s, is made of a hollow sphere in which a 20-sided die floated in alcohol. When you ask the ball a question and shake it, one side of the die floats up and displays your answer in the ball's window.

For this project, you'll use a tilt ball switch, shown in Figure 14-1. The tilt ball switch is composed of a metal ball inside a metal casing that makes a connection when the switch is in an upright position. If you tilt the switch, the ball shifts and the connection is broken. There are lots of tilt switches available, and all do the same job. In this project, you'll ask a question and shake the switch. When the switch settles upright again, it connects to the Arduino, which then randomly selects a response from eight preset answers and displays it on the LCD screen.

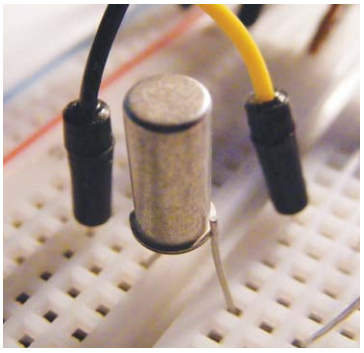


FIGURE 14-1:
Tilt ball switch inserted in the breadboard

The potentiometer controls the contrast of the LCD screen.

THE BUILD

1. Prepare the LCD screen as per the soldering instructions in "Preparing the LCD Screen" on page 104.
2. Place your LCD screen in the breadboard, inserting the header pins into the breadboard holes. Also place the potentiometer in the breadboard, and use the breadboard and jumper wires to connect your LCD screen, Arduino, and potentiometer.

LCD SCREEN	ARDUINO
1 VSS	GND
2 VDD	+5V
3 VO contrast	Potentiometer center pin

LCD SCREEN	ARDUINO
4 RS	Pin 12
5 R/W	GND
6 Enable	Pin 11
7 D0	Not used
8 D1	Not used
9 D2	Not used
10 D3	Not used
11 D4	Pin 5
12 D5	Pin 4
13 D6	Pin 3
14 D7	Pin 2
15 A BcL +	+5V
16 K BcL –	GND

3. Remember to use a breadboard rail to make the multiple connections to the Arduino GND pin, as shown in Figure 14-2.

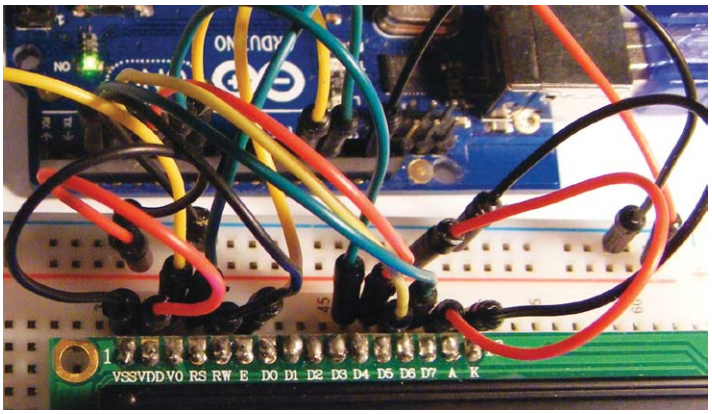


FIGURE 14-2: The LCD screen is connected to the Arduino.

4. You should have already connected the center pin of the 10k-ohm potentiometer to LCD pin 3 (VO). Now connect one of the outer pins to GND and the other to +5V. This controls the contrast of your LCD screen.
5. Insert the tilt switch into your breadboard and attach one side to Arduino pin 6 via a 1k-ohm resistor and the other side to GND.

TILT BALL SWITCH	ARDUINO
Leg 1	Pin 6 via 1k-ohm resistor
Leg 2	GND

6. Connect your breadboard rails to the Arduino +5V and GND for power.
7. Confirm that your setup matches Figure 14-3, and upload the code in “The Sketch” on page 122.

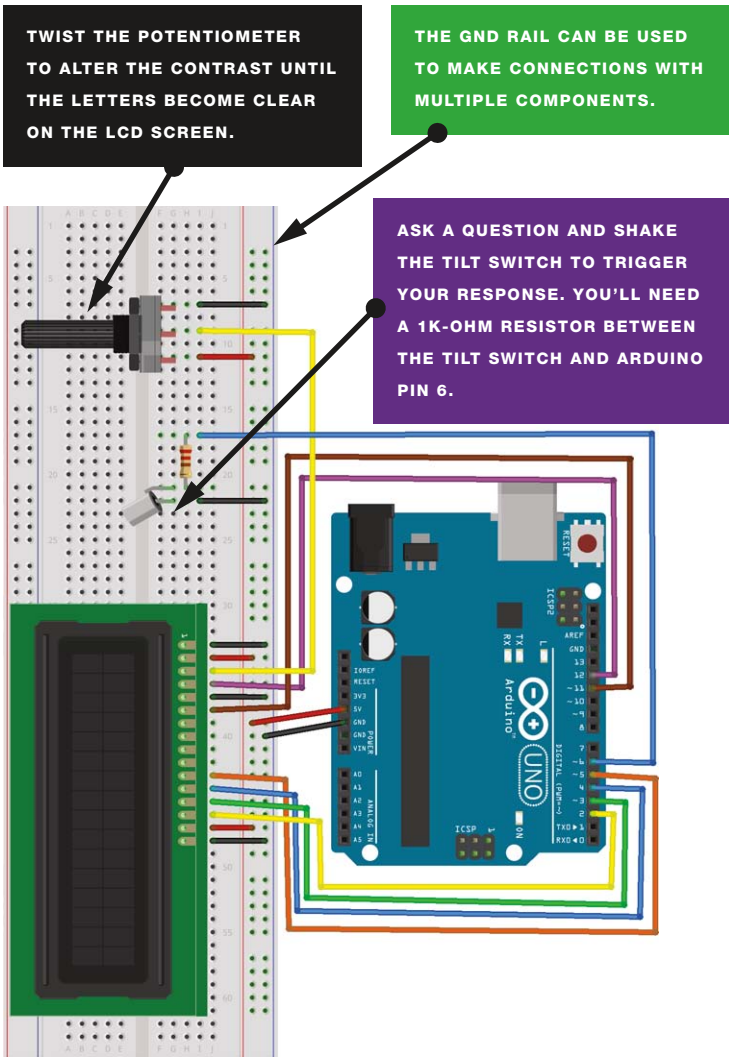


FIGURE 14-3:
The circuit diagram for the fortune teller