SYSTEM INTEGRATION AND ARCHITECTURE II

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ACTIVITY NO. 7 – LIGHT HARP

- This activity uses two light sensors (LDRs): one that controls the pitch of the sound, the other to control the volume.

- This activity produces a sound more like a bagpipe than a harp.

COMPONENTS

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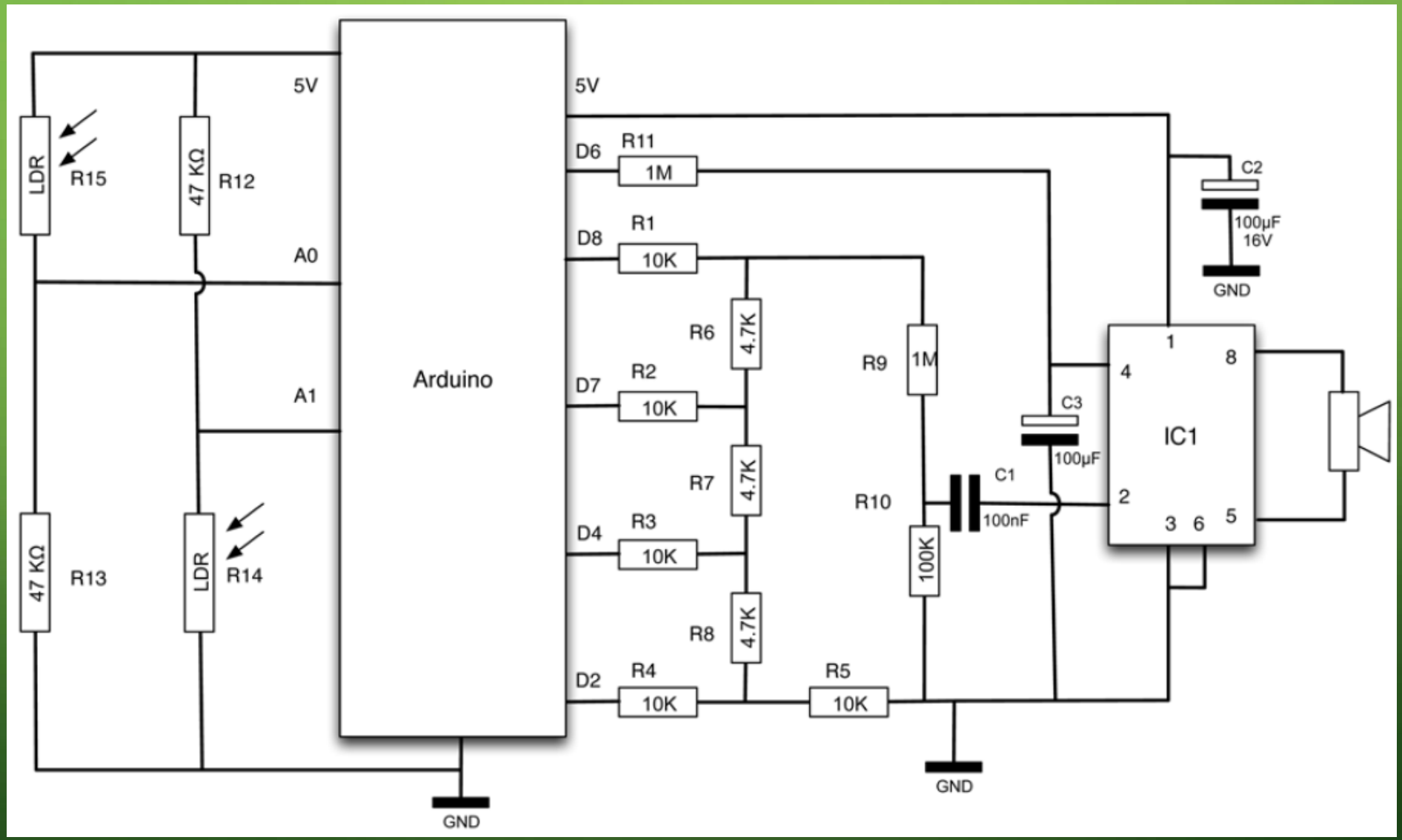
Arduino Uno	1 Pc.
100 nF Un-Polarized Capacitor	1 Pc.
100 µF Electrolytic Capacitor	2 Pcs.
10 K Ω Resistor	5 Pcs.
4.7 K Ω Resistor	3 Pcs.
1 M Ω Resistor	2 Pcs.
100 K Ω Resistor	1 Pc.
47 K Ω Resistor	2 Pcs.
LDR / Photoresistor	2 Pcs.
TDA7052 1W Audio Amplifier	1 Pc.
Miniature 8 Ω Loudspeaker	1 Pc.

HARDWARE

- The volume of the sound will be controlled using a PWM output (D6) connected to the volume control input of the TDA7052.

- Eliminate all traces of the PWM pulses to pass the output through a low-pass filter consisting of R11 and C3. This allows only slow changes in the signal to get past.

SCHEMATIC DIAGRAM



SOFTWARE

- The software for this activity has a lot in common with activity 6. The main differences are that the pitchDelay period is set by the value of the analog input 0.

- This is then scaled to the right range using the map function. Similarly, the volume voltage is set by reading the value of analog input 1, scaling it using map, and then writing it out to PWM output 6.

SOFTWARE

- It would be possible to just use the LDR R14 to directly control the output of the resistor ladder, but this way gives us more control over scaling and offsetting the output, and we wanted to illustrate smoothing a PWM signal to use it for generating a steady output.

PUTTING IT ALL TOGETHER

- Load the completed sketch for Project 20 from your Arduino Sketchbook and download it to the board.
- To play the "instrument," use the right hand over one LDR to control the volume of the sound and the left hand over the other LDR to control the pitch.
- Interesting effects can be achieved by waving your hands over the LDRs.
- Note that you may need to tweak the values in

PUTTING IT ALL TOGETHER

- Note that you may need to tweak the values in the map functions in the sketch, depending on the ambient light.

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