EE 40 Final Project – Basic Circuit
Part II: Creation Portion

2. Creation (Bonus up to 16 pt)

For each question, you have to provide a circuit diagram with components’ values, design analysis (including function analysis and value selection), and measured results similar to your analysis required in the basic lab.

Please address all the important issues or difficulties you encounter in your design and experiment. Please indicate if you realize the required function. Even if you didn’t realize the function completely, partial credit will be given if you provide good detailed measurements and explanations and can explain what problems you ran into. (Since the final project is 30% of your lab grade, this will be like 48 “normal” bonus lab points!)

(1). Maintaining the basic function of the circuit, add a buzzer to it to make it buzzing with the red LED in phase. When the red LED is on, the buzzer buzzing, when the red LED is off, the buzzer should keep silent. Note – the buzzer will not work powered with just a DC voltage. It is like a speaker and requires some AC signal within the range of human hearing (a good range to try would be around 200Hz to 1kHz, which is close to human speech). (3 pt)

(2). Make the LED flashing speed adjustable. Or if you’ve already added in the buzzer (see part 1), you can try to make the buzzer pitch adjustable (higher or lower tone). (2 pt)

(3). Maintaining the basic function of the circuit, add another yellow LED flashing together with the green one, but out of phase (or with π phase shift), which means when green is on, yellow is off and vise versa. However, when the red LED is on, both green and yellow should be off. (2 pt)

(4). Maintaining the basic function of the circuit, add another light sensor and make the flashing speed or the speaker frequency change depending on light intensity. (3 pt)

(5) Open question. Be creative and make your own modifications to the circuit. For instance, modify the circuit so you can play a song on it. Or make the speaker pitch or flashing speed of the diode change based on the light intensity. (Up to 5 pt)