ECE 110/120 Parts Info Packet

Recommended Retailers:

www.sparkfun.com
www.digikey.com
www.adafruit.com
www.mouser.com

ECE 110 Kit Parts List:

https://www.sparkfun.com/wish_lists/100564

ECE Parts Shop List:

http://eshop.ece.illinois.edu/parts/Parts_List.txt

When deciding on parts, we recommend you use the four retailers above in order to receive your parts in a timely manner. However, if a part is on a different store we can order it but cannot promise it will arrive in time.

If the part is found naturally within your kit, use that part in order to become more familiar with it. It is a great learning experience and the TAs will be much more familiar with it.

For resisters, capacitors, wire and other common chips you can find them in the ECE parts shop and we can get those for free. Just ask a TA to take you there and show you.

Modules

I will list the various parts we recommend to accomplish certain tasks. By no means are the only parts you are allowed to purchase, however, we have seen a lot of students have success with these parts and have knowledge on troubleshooting these components.
Display: https://www.sparkfun.com/products/255
16x2 Display that Sparkfun provides documents in addition to various YouTube tutorials on how to program a display likes so.

RFID:

There are multiple methods of achieving RFID. We recommend using the Arduino and purchasing an Eval Shield that will sit on top of the Arduino (https://www.sparkfun.com/products/10406) and then a then a RFID module to go on top of the shield (https://www.sparkfun.com/products/10126). Also, you will need a tag that the system can read (https://www.sparkfun.com/products/10127).

There are other options on Sparkfun and if those work better for your project they will be successful as well. The design used above would also allow you to use an XBee, which you can use to talk to another device.

Bluetooth: (Wait for further document on the different in Bluetooth and how to implement it)

Temperature Sensor: There is a thermo-resistor in your kit. There are Sparkfun options if you are looking for a more accurate device.

Pressure Sensor: Any of the ones on Sparkfun will work fine. Make sure you look at the datasheet to ensure that it will do it accurately enough for your project

Ultrasonic Sensor: https://www.sparkfun.com/products/13959

Hall Effect Sensor: One in your kit.

Photo-resistor: One in your kit.

Speaker: Speaker in your kit. However, if you're looking for a louder speaker we can order you another one off of Sparkfun.

Flex Sensor: One in your kit.

Servos: Small one in your kit to start with, we can order a larger one from Sparkfun if you need it.

Logic Units

Here are some sample logical components you can implement into your circuit to satisfy your 120 requirements. I have listed various logical units that you will be taught later on in 120 and you can start to think about where you could fix one or more of these units in your circuit.

Most of these logical units come in chips, however, for the learning experience we want you to implement them with AND/OR/NOT Gates. We have these in the honors locked labeled by their component number so you will have to read the datasheet and figure out how to wire each of them.

You can start the implementation of these logical units by first creating a K-Map or a State Diagram for the Counter and Shift Register. These are taught in 120, however, here is a good resource to help:
https://www.facstaff.bucknell.edu/mastascu/eLessonsHTML/Logic/Logic3.html

MUX: "In electronics, a multiplexer (or mux) is a device that selects one of several signals and forwards the selected input into a single line. A multiplexer of 2^n inputs has *n* select lines, which are used to select which input line to send to the output." Wikipedia

Decoder: A decoder takes a signal in and then outputs to one of many outputs data lines you hook up to it. The decoder selects which data line gets the signal by using some logic to have a select signal.

Shift Register: A storage unit where it has a bunch of one bit memory locations that when the clock hits the circuit it shifts the output to the next one bit memory location. The Shift registers are built using flip-flops and have the available to parallel load and read the values as well.

ALU: An Arithmetic-Logic-Unit does logical operations such as AND, ADD, NOT, OR, XOR, etc on bits that come into it and outputs the final solution.

Comparator: It compares to values and output a value to tell you what is bigger or smaller depending on how you set it up.

Counters: This logic unit simply counts from 0-N where N is the highest number it can go up to with the number of bits it has. It usually counts up on every clock cycle and you are able to read the current number it is at in real-time.