Xi'an Jiaotong-Liverpool University
西交利物浦大学

Department of Electrical and Electronic Engineering

MEC104(S2) Experimental, Computer Skills and Sustainability

Lab 1： Digital clock report

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Catalogue

1.Schematic diagram

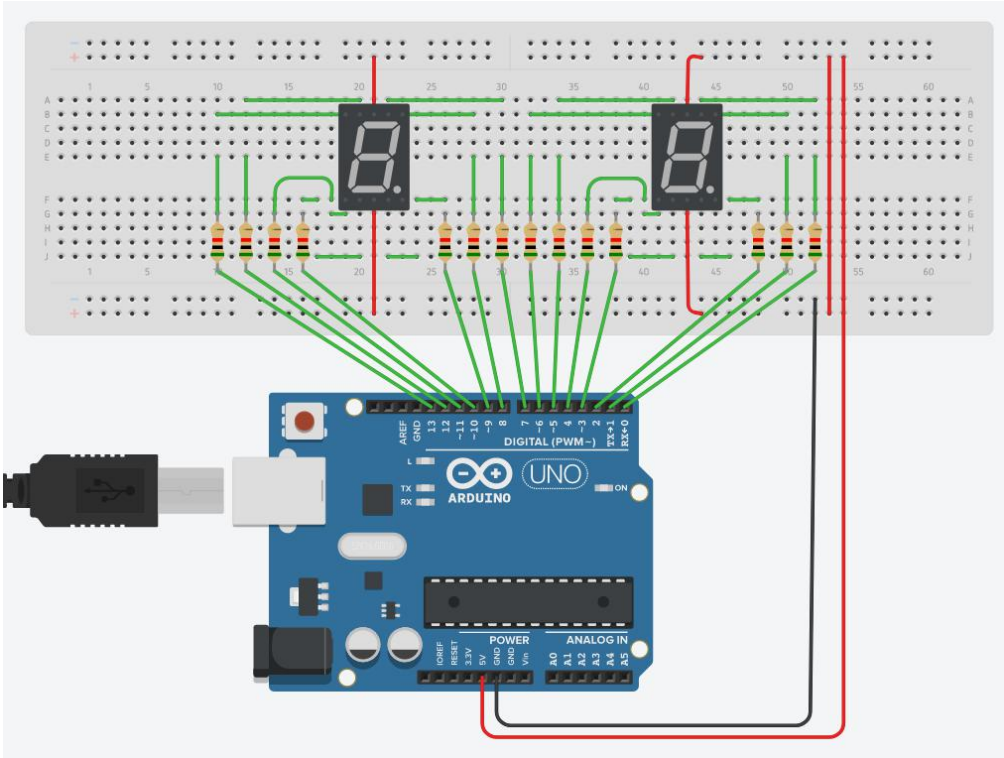


Figure 1: Schematic diagram of the 7-bit digital tube controlled by UNO

We chose two common anode 7-bit digital tubes in this experiment.Therefore, the VCC pin was connected to the UNO 5V power supply. Since the upper and lower pins are both VCC which had the same effect.Therefore, we connect the upper VCC and lower Vcc pin to the power supply(5V).

1.1 Analog instrument

Arduino UNO test board, 14 resistor value of 1K Ω, bread board, two 7-bit digital tube, wiring

1.2.Operating Principle of Diodes

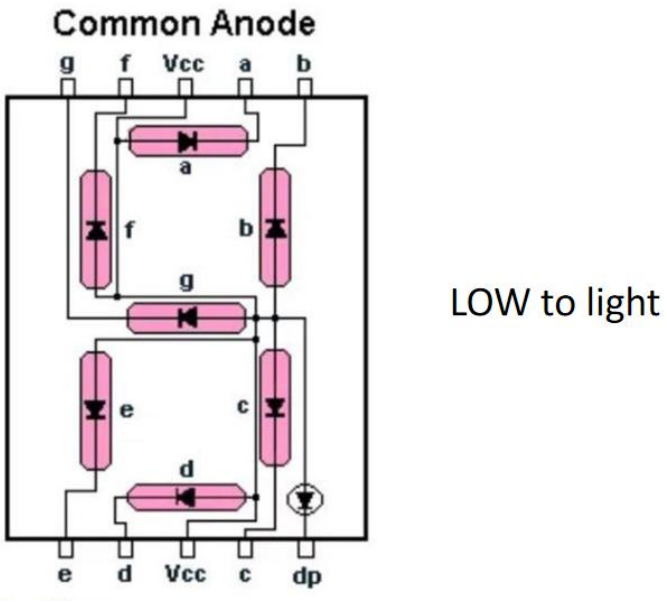


Figure 2：Schematic diagram of common cathode seven-bit digital tube [1]

In the simulation experiment, we chose the common anode seven digit digital tube. According to the teacher's explanation, two seven digit digital tube and 14 different pins of UNO are connected together, only the line is connected correctly, the diode will work normally. When the input level is low, the diode will light. To control the current, we also connected a 1KΩ resistor below each diode. The connection diagram is shown in Figure 1.

2.Working Principles

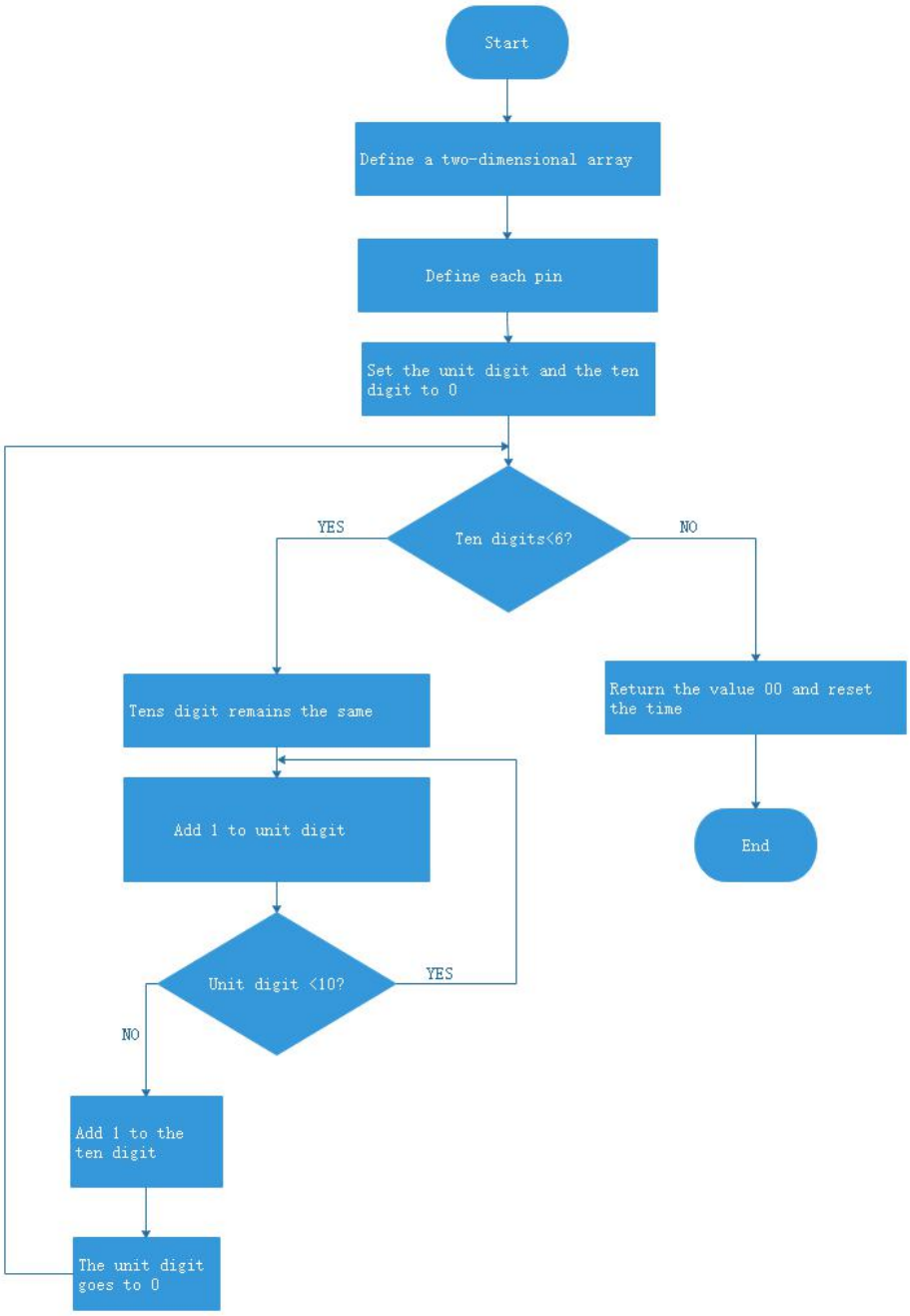
2.1 Define an array

We first define a two-dimensional array where each line represents a number. In this code , we use a high level to indicate that the diode LED is not on and low level represents diode light.

2.2 A brief introduction of the function

We use **three for loops** to control the two digital tubes. The inner two for loops are used to control the transformation of the unit digit. An external for loop controls the transformation of the ten digit, while ensuring that the ten digit remains the same during the transformation of the unit digit.

2.3 Flow chart



3.Contribution

In this experiment, I was responsible for optimizing the design of connecting and part of the code. I came up with a two-dimensional array to represent the method of each light on and off. Each row of the array represents a number.I gained a lot from this experiment, letting me deepen the understanding of UNO. At the same time, I also have improved my ability to design code.

Team member: Yuhang.Jiang was responsible for the operating logic of the code in this experiment. He came up with three for loops and solved the problem that the unit digit changed and the ten digit remained unchanged.

Team member: Zhuoyuan.Liu was responsible for understanding the internal logic of digital tube in this experiment, and came up with the method of connecting digital cubes with UNO, which provided a great help to our group.

4. Reference list：

[1] Department of Electrical and Electronic Engineering, “Week 3’, [Online]. Available:https://learningmall.xjtlu.edu.cn/pluginfile.php/109035/mod_resource/content/3/Week%203.pdf