

HW WK 05: make a decision

1. Our group wants to make a smart lamp by using Arduino Uno R4. We discussed the microcontroller.
2. Decision Matrix:

	Arduino Uno R4	ESP32	STM32 Blue Pill	NodeMCU
Price				
Development Ecosystem				
Connectivity				
Processing Power				
Difficulty of development				
score				

3. Decision Matrix and use AHP

For our group, price is not a very important criterion. We hope to find a microcontroller with moderate development difficulty, more comprehensive supporting resources, wider applicability and higher data processing ability to improve the success rate of our works.

we use these formula to calculate each criteria:

$$Geometric\ Mean = \sqrt[n]{\prod_{i=1}^n x_i}$$

$$Weight_{row} = \frac{Geometric\ Mean_{row}}{\sum_{r=1}^n Mean_r}$$

Calculate the weight:

	Price	Development Ecosystem	Connectivity	Processing Power	Difficulty of development	Geometric Mean	Weight
Price	1	1/5	1/3	1/3	1/7	0.32	0.04
Development Ecosystem	5	1	1/2	1/3	1/7	1.34	0.17
Connectivity	3	2	1	1/5	1/7	1.01	0.13
Processing Power	3	3	5	1	1/7	0.49	0.06
Difficulty of development	7	7	7	7	1	4.74	0.6

AHP analysis:

		Arduino Uno R4	ESP32	STM32 Blue Pill	NodeMCU
Price	0.04	0.12	0.23	0.26	0.39
Development Ecosystem	0.17	0.29	0.26	0.21	0.24
Connectivity	0.13	0.19	0.31	0.22	0.28
Processing Power	0.06	0.19	0.32	0.26	0.23
Difficulty of development	0.6	0.32	0.23	0.19	0.26
score		0.2822	0.2509	0.2043	0.2626

4. Yes, the Arduino Uno R4 has the best score. It's got the same final result. Because the score after AHP methodologies Arduino Uno R4 was the highest, we chose Arduino Uno R4.