Lesson 9 Wisdom of Circulation

Scene lead-in

American futurist Ray Kurzweil predicted: "Artificial intelligence will come to a 'singularity' around 2045. Across this critical point, artificial intelligence will surpass human intelligence, so people need to re-examine their relationship with machines." Today, let's see what impact is brought by artificial intelligence on our work and life at the primary stage of artificial intelligence.

First, repetitive assembly line work will be replaced at the primary stage of artificial intelligence.

In the assembly line, visual detection technology with artificial intelligence (instead of human labor) is used to strictly comply with work requirements and ensure almost no error; as long as the robot components are undamaged, they can work for 24 h without interruption.

Second，Work that may endanger the lives of people will be replaced.

For deep-sea exploration, robots can carry more detection equipment to get more detection results. During coal

operations, robots can sense the consistency of the surrounding gas and reduce the possibility of gas explosion.

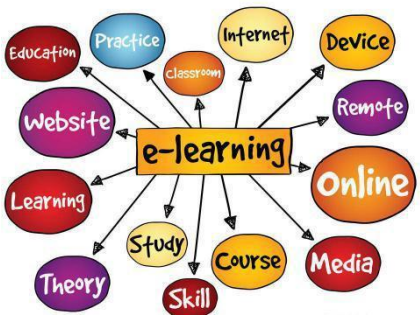
Third，Pattern recognition will be largely replaced by artificial intelligence robots.

By infrared scanning, even in the dark, it is also easy to find the intrusion of thieves, and security will be largely replaced. Metal detection scanning makes it easy to explore whether a criminal is carrying deadly weapons.

Activity: ubiquitous circulation

In some cases, robots can replace human labor to do a lot of repetitive things. Things move or change periodically, which is called "circulation". The circulation can be seen everywhere. The waxing and waning of the moon is an example of circulation in nature; the assembly line work in a workshop is circulation in the work; the process by which water on the earth reaches another place by changing its state is the circulation of materials...

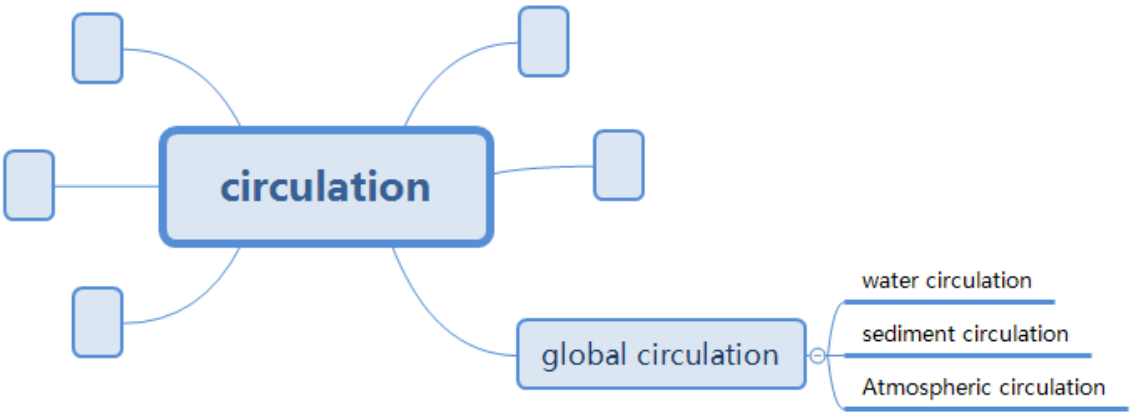
But the phenomena involving circulation are far more than just those mentioned above. If you want to summarize the circulation of life in detail, we need to take advantage of "mind mapping".



Through mind mapping, the hierarchical relationship of themes at all levels is clear at a glance, which can help us to perform brainstorming quickly and intuitively.

The brain is relatively sensitive to colors. When drawing mind mapping, different colors are used to indicate that different sub-themes can be distinguished from each other.

Now, find things related to “circulation” with the help of divergent thinking, and draw mind mapping.



Everyone can scan the left QR Code to learn more knowledge relevant to mind mapping through this video!

https://www.youtube.com/watch?v=u5Y4plsXTV0

Creative design

Project practice: circulating seal with robotic arm

Project requirements: implement circulating seal with robotic arm through DOBOT Blockly

Project score:

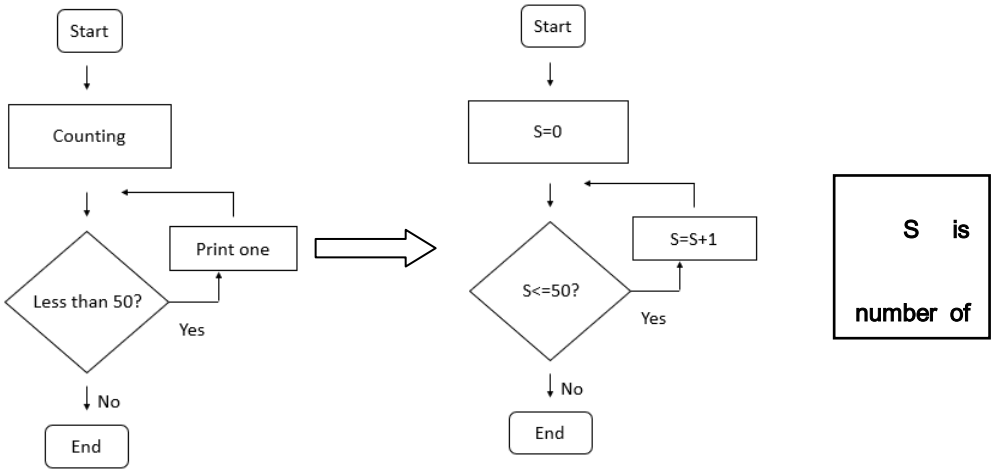
1、Project completeness (70%)

2、Project completion time (15%)

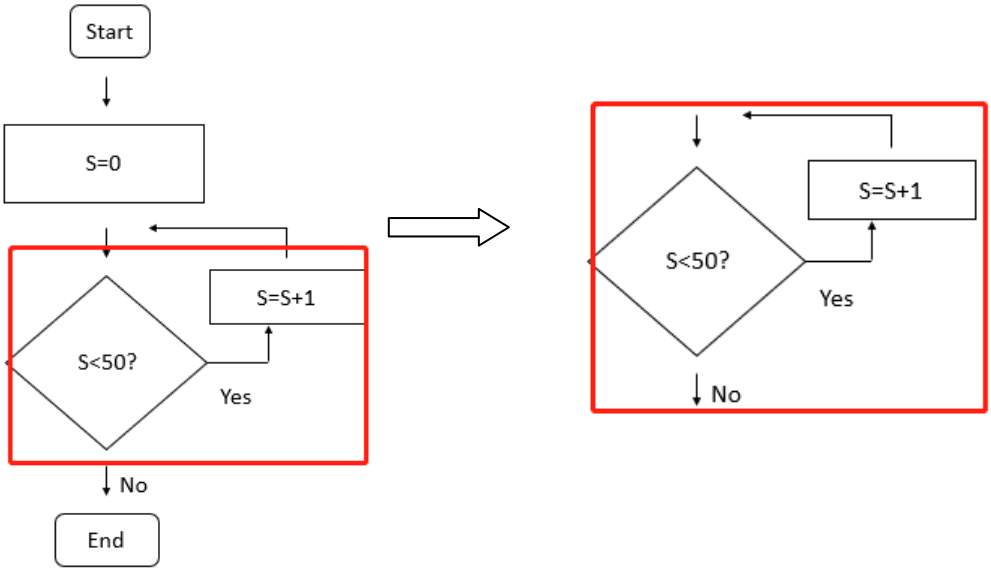
3、Independent study and team cooperation (15%)

1 Acquaintance of loop structure

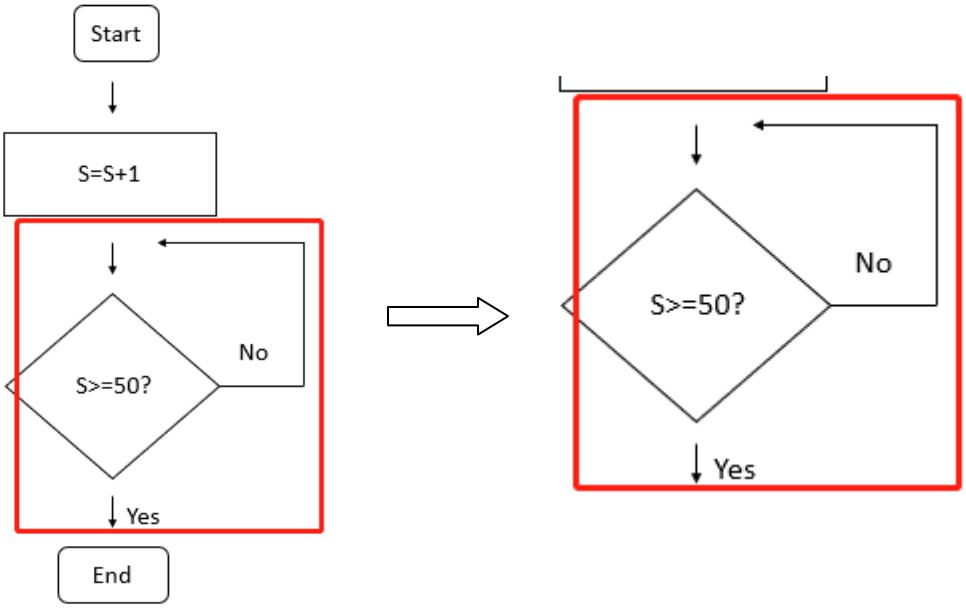
The appearance of the photocopier frees humans from cumbersome and repetitive work. People just put the documents to be copied into the copier and enter the number of copies to be made. But how does the machine judge if the work has been completed? We can use the loop structure to understand this process.



The loop structure, that is, in the algorithm, a situation where you often start somewhere, follow certain conditions, and repeat a step. The loop structure generally includes “while” and “until”.
The steps repeatedly performed are referred to as “loop body”.
Note: The loop structure cannot be an "endless circulation". It must be terminated under certain conditions, which requires a case structure to make a determination. Therefore, a case structure



The loop structure in the above figure is “while”. The initiative is to judge whether condition P is valid. If valid, A shall be executed; otherwise, nothing shall be executed.

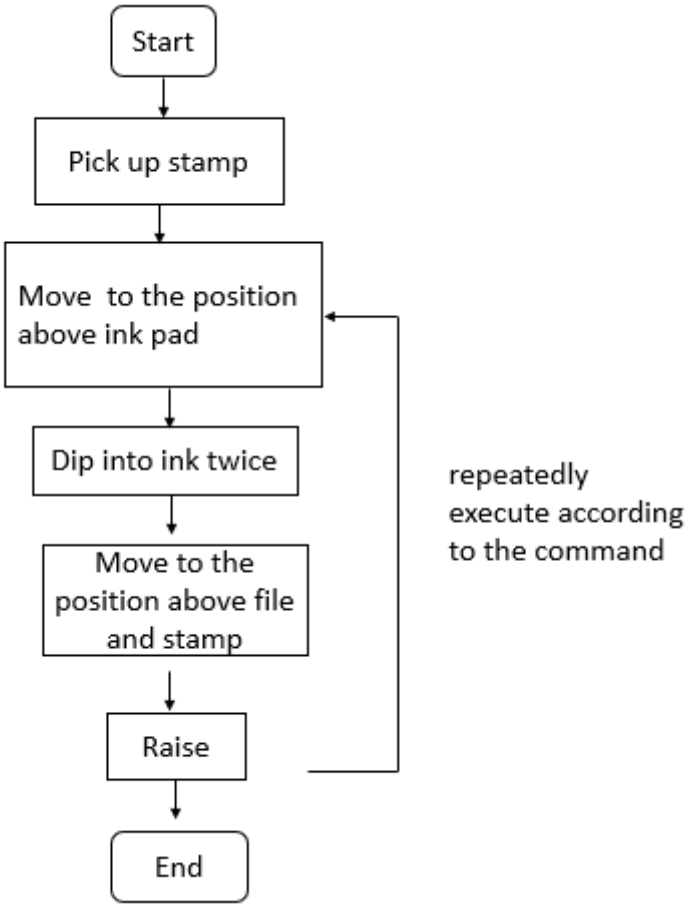


The above process can also be expressed in “until”. To be specific, A shall be initially executed; condition P shall be judged whether valid; if not, A shall be repeatedly executed until condition P is valid, and the process ends.

If we want to seal three documents, how should this process be represented by a flow chart?

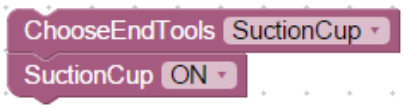
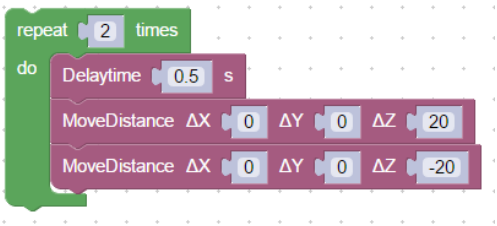
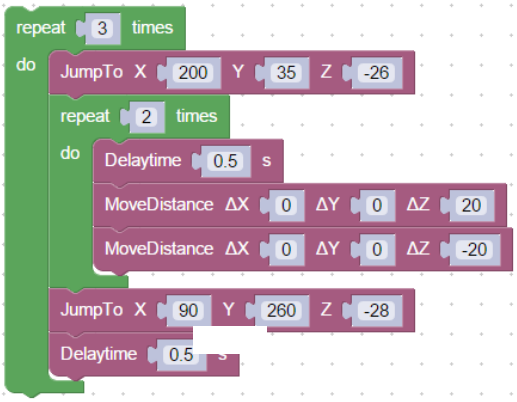
2 Movement of the robotic arm

We can write programs to accomplish the automatic circulating seal of the robotic arm, and to use the air pump of the robotic arm to suck and move the seal. At the time of debugging a program, we write the program by taking sealing three documents as an example. The steps are as follows:



3 Setup of basic modules

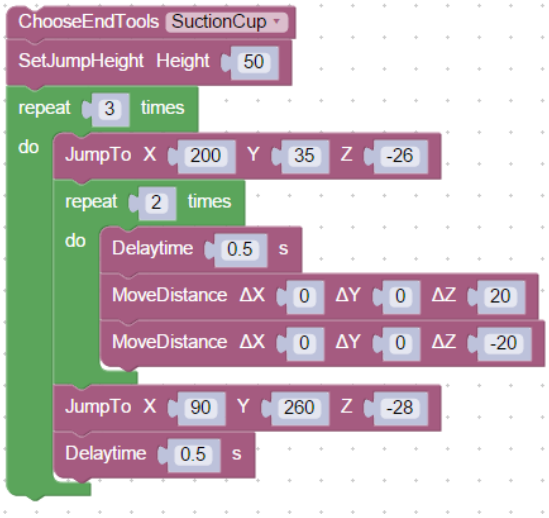
Steps	Graphic description

1) Seal sucking During automatic sealing, the air pump keeps working and sucks the seal, so that the operation of seal sucking only needs to be carried out once at the beginning of the program, and the seal is always sucked by the gripper. The position of the seal can be placed and adjusted before designing the program, and the robotic arm can be firmly sucked. Then adjust the inkpad and document table according to the placement position of the current seal.	
2) Inkpad dipping In order to fully and evenly dip the seal into the inkpad, it is generally necessary to repeat dipping twice or three times, so the implementation of repeating the same operation for specified times requires using the loop structure with specified times in programming. Find out a "specified loop" module in the loop classification, enter the number of repeated executions 2 in the input box, and then put the function modules that need to be executed into the execution area below, so that the corresponding times of repeated execution of the function modules can be achieved.	
3) Circulating sealing The copies of the documents that need to be sealed are determined, and the "specified loop" module is also adopted. Considering the repeated dipping of the inkpad and then sealing on the document, multiple documents are sealed and required to be executed circularly, so the loop structure here is nested. One loop (inner loop) is responsible for inkpad dipping two times, and the other loop (outer loop) controls the number of copies of documents to be sealed. The nesting of loops is very important in programming, and it can solve a lot of programming problems.	

4) Program running

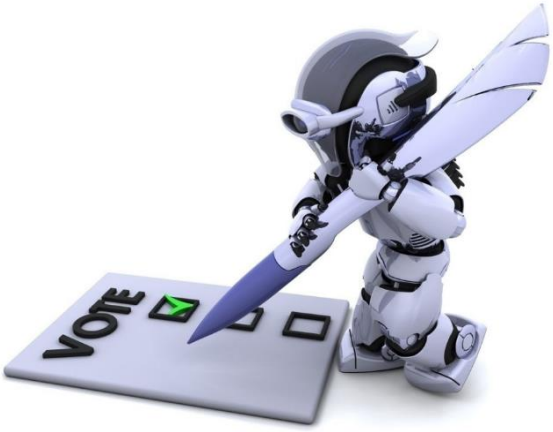
Combine the program module of seal sucking with the circulating sealing module, click "Start" and run the program.

If the program runs smoothly, you can change the "3" times in the outer loop into the number of copies of documents that are actually required to be sealed!



Assemble the gripper kit on the robotic arm, use the program to control the robotic arm, observe the final seal result, paste your results below and communicate with other groups.

Further reading



The Internet has brought about an explosion of information, which imperceptibly increases the workload of editors. The daily work involves repeating the repetitive work of integrating, processing, processing pictures, reviewing, publishing and so on, which is complicated and boring. Based on this market situation, Giiso has developed the first intelligent processing system for information in China – the Giiso information robot.

In the age of pure manpower operations, it is already rare to track dozens of local data sources, content materials are easy to be singled out for different habits, and the number of daily article posts is limited. However, since the invention of the Giiso information robot, AI will help you to track thousands of data sources and automatically update more than 500 articles every day. In addition to being able to cover all Internet materials, it can complete the content aggregation in 3 s...

Think about it combined with the cases of this chapter and daily life. What changes will artificial intelligence bring to life in the future? And can humans be replaced by AI completely?

Knowledge sharing

(1) What are the characteristics of the “while” loop and “until” loop respectively? Which two modules in Blockly are corresponding respectively?
(2) Please communicate with each other concerning program modules to see

Comprehensive evaluation

Evaluation method	Evaluation phase	Evaluation contents	Evaluation criteria		
			3 Excellent	2 Good	1 General
Self-evaluation	**Scene lead-in**	• Understand the concept of loop and the role of artificial intelligence in repetitive labor • Master the application of mind mapping			
	Creativity	• Cooperate with classmates and actively communicate with each other			
	Ability to solve problems	• Express the algorithm idea with a flow chart • Understand while loop and until loop, and perform sealing with the loop			
	Engagement	• Actively participate in group activities and undertake one's group tasks.			
	Team collaboration	• Be able to collaborate with each other in project practice			

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Et toujours la possibilité d'établir des devis, de commander et de suivre vos commandes/factures en ligne.