



**The 3rd Belt and Road Teenager
Maker Camp & Teacher Workshop**

CREATIVE PROGRAMMING

SEPTEMBER 24-30, 2019
GUANGXI · CHINA



Brief History of Programming

Programming is the process of giving programs to solve specific problems and an important step in the process of software development. Programming often uses a programming language as a tool to give programs in this language. Programming process should include analysis, design, and coding, testing, debugging and other different stages.

Although what we usually refer to now is programming software for electronic computers. However, the use of mechanical devices, the preparation of a certain program, so that machines in accordance with the specified content of repetitive production, is much earlier than the emergence of electronic computers. In a sense, the emergence of programming even preceded the emergence of computers. Eda Leveres, daughter of Byron, a famous British poet, designed a program for calculating Bernoulli numbers on a Babbage analyzer. She even created the concepts of loops and subroutines. Because of her breakthrough in programming, Ida Lefles is known as the world's first programmer.



Jacquard loom is the earliest programmable production machine. The dot matrix on the right side of the picture is the paper that records the pattern codes.

What are we going to learn in this course?

What we will learn and experience in the following courses are:

- How to use SCRATCH programming software
- General skills and methods of programming

At the end of the course, we will work together to create a video game of our own.



Activity 1: The Metamorphose Game

A.Introduction

Metamorphose game usually means changes the shape, color of the role, or even change it into another role. Unexpected changes are more attractive. Speaking of metamorphose, the most powerful one is of course the Monkey King. The tale says that the Monkey King has 72 powers. Let's help him show his magical powers.

B.The game goal

In order to show his ability of transformation, the Monkey King turned himself into a dancing butterfly.

C.Task analysis

1. The background image



2. Role

(1) The Monkey King

Task description: Move the Monkey King from the top left corner to the center of the stage, gradually grow bigger in the process of moving, stop



moving to the destination, say: "change". Then the Monkey King disappears and becomes a butterfly.



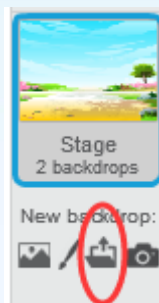
(2) The butterfly

Task description: move the butterfly across the stage, rebound when meeting the edge.

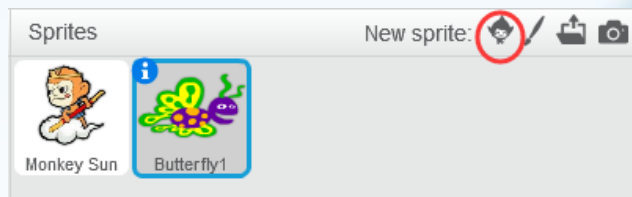


3. Write scripts

Step1: Add background image.



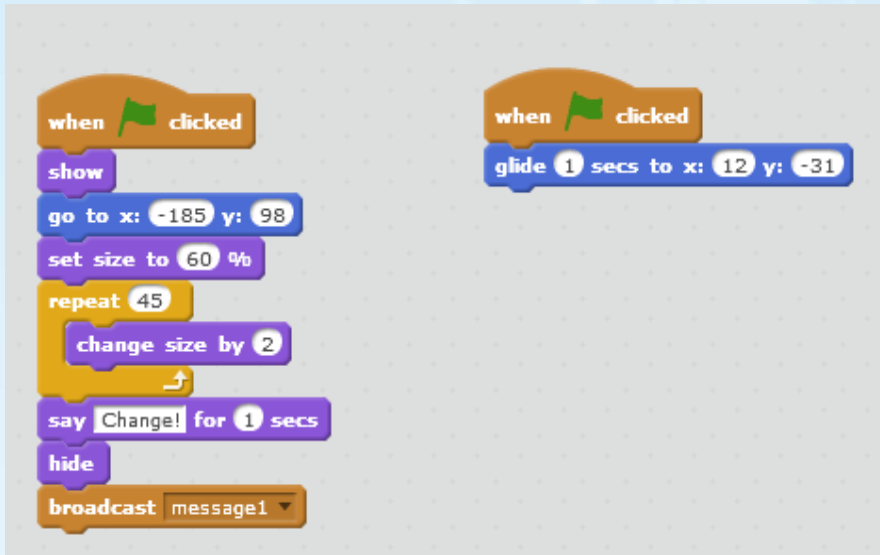
Step2: Add a role. (Click to choose the Monkey King from the folder, the butterfly from the material library)



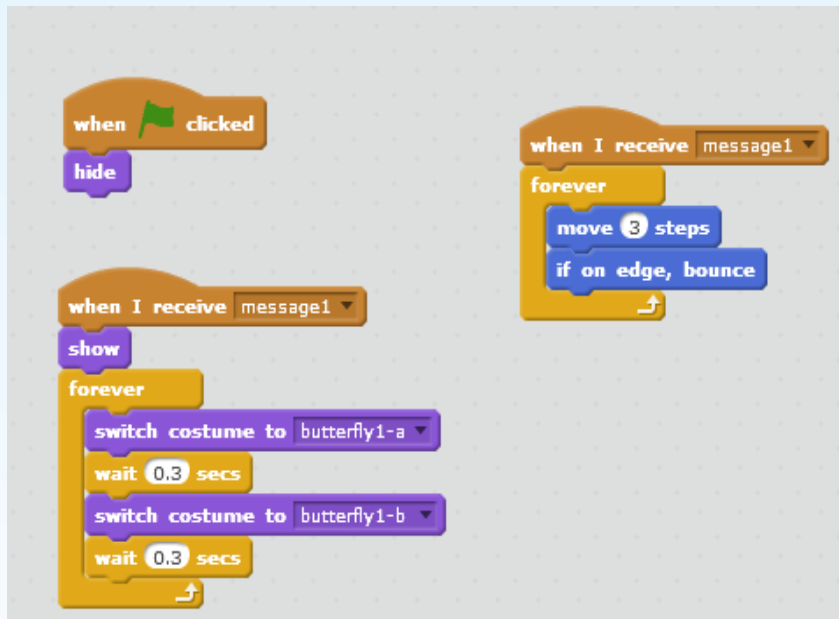


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Step3: Move the Monkey King and enlarge it.



Step4: Move the butterfly and make it rebound when meeting the edge.



D.Task expanded

Learn how to set to make the butterfly follow the mouse.



Activity 2: The Maze Game

A.The Origin of Games

Humans have been building mazes for 5,000 years. Throughout the different cultural periods of the world, these strange buildings have always attracted people to trudge down winding and difficult paths in search of the truth. Maze type of small game came into being. Can you help the kitten out of the maze?

B.The game goal

The cat is controlled by the player's direction keys. It should cross the maze from the entrance of the maze. It can't touch the black wall of the maze in the process of crossing. Otherwise, it will go backwards until it meets the red flowers. When the cat says "win", the game is over.

C. Task analysis

1. Background image



2. Role

The kitten

Task description: Keyboard direction keys are used to control the position of the cat, so that the cat moves up and down from left to right to reach the end of the safflower position through the maze.



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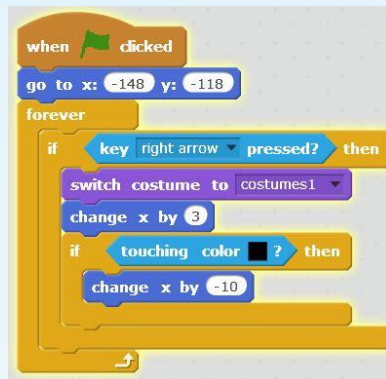


3. Write scripts

Step1: Add background image. Select the maze background image from the folder.

Step2: Add roles.

Step3: Move the cat through the keyboard direction key and step backward when touching black.



Think about this: How to write codes in the other directions and where to add them?

Step4: At the end of the journey, he meets the red and says "WIN". The following modules can be placed behind the four directional key control modules in the repetitive cycle.



D. Task expanded

1. Add background music.
2. Increase the difficulty of the game: If you want to achieve the goal that cat can back to the starting point as soon as you touch the black during walking. How should you set up?
3. Attempt to countdown.



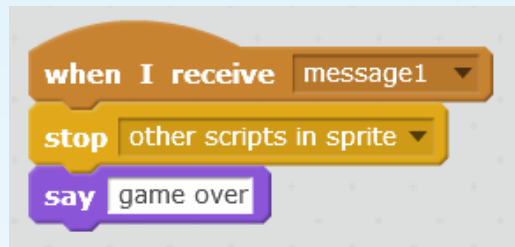
- (1) In the data module, create a new variable named: Countdown. In the data module, create a new variable named: Countdown.
- (2) Select the Background image and add the following scripts:



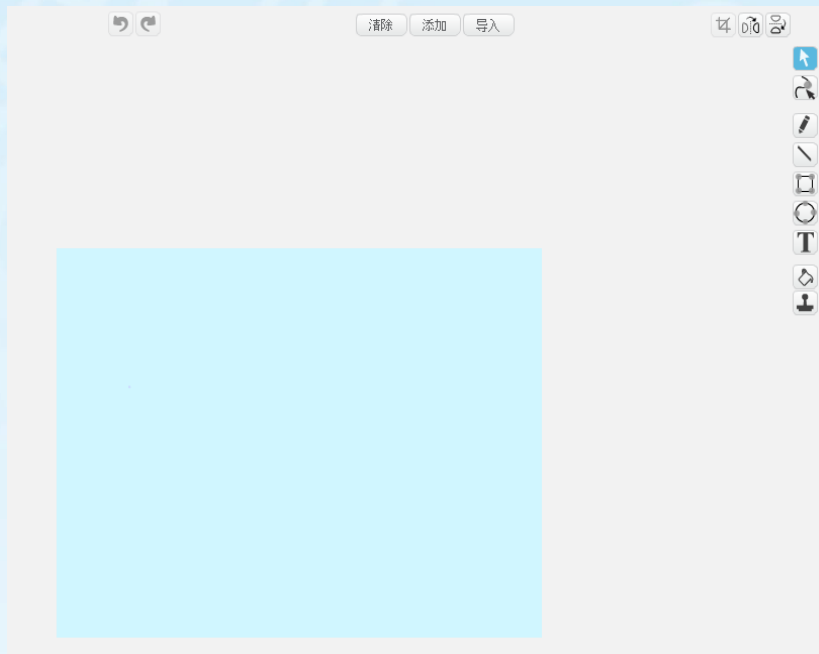
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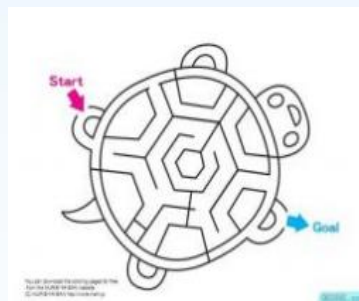
(3) Select the cat role and add the following script:



4. Choose a solid color background in the background gallery and draw your own maze with brush.



The reference diagram to the creative maze:





Acitivity 3: The Capture Game

A. Introduction

Capture game usually requires players to catch scoring items. In order to increase the challenge, there are many obstacles in capturing scoring items at the same time. This game requires players to avoid octopuses and collect stars as many as you can.

B. The game goal

Players need to collect as many golden stars as possible. Please use hippos as your star hunter. Every star you collect can add one point,.Be careful of the octopus. Once the hippo touches the octopus, the game is over.

C. Task analysis

1. Background image



2. Role

(1)Hippos

Task description: Let the hippo follow the mouse and move to touch the stars to get points.



(2) Octopus

Task description: Octopus cruises around the sea. Once Octopus touch a hippo, the game is over.



(3) Stars

Task description: Stars appear randomly. Hippos can get one point when they meet a star.



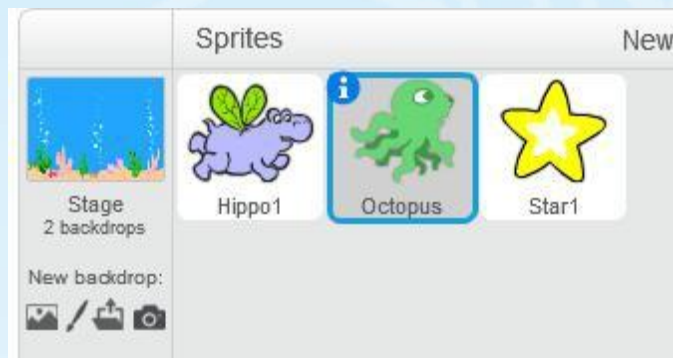
3. Write scripts

Step1: Add the background image. Select a seabed map from the background database.

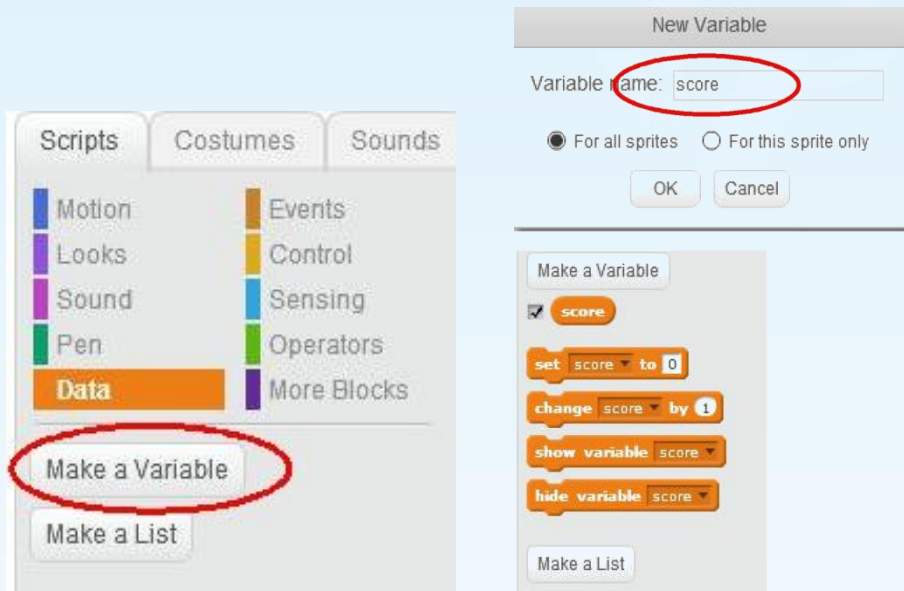
Step2: Add roles. Add Hippos, Octopuses and Stars from the material library.



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Step3: Establish a variable named Score for recording and displaying scores.

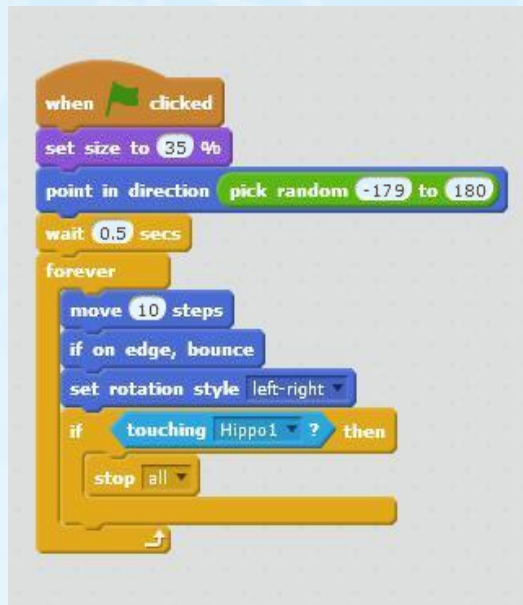


Step4: Write scripts for hippos.

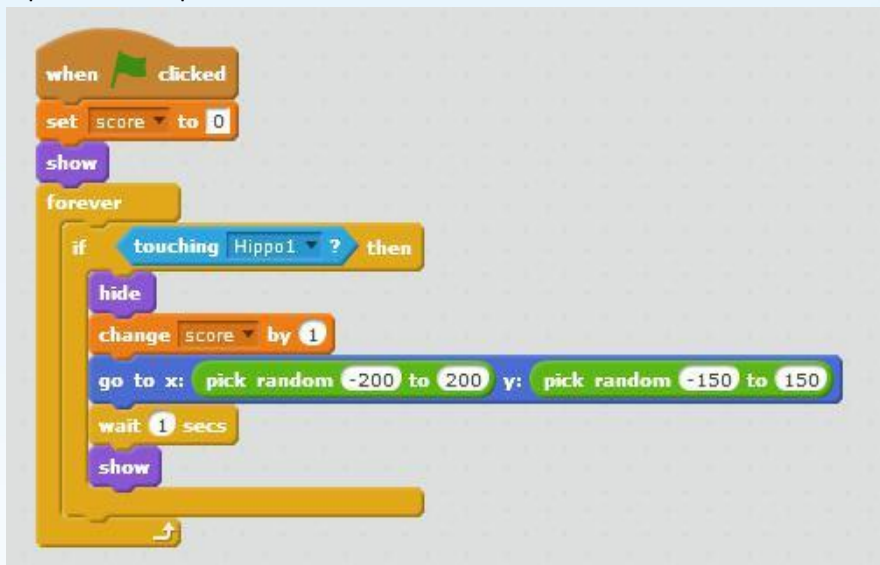




Step5: Write scripts for octopus.



Step6: Write scripts for stars.





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D. Task expanded

1. Add another code to the octopus when the green flag is clicked. Run it to see the effects.



2. Move the octopus towards the hippo, making the game more difficult.



3. Add a few more octopus roles. The game is much harder now.



STEM Project: Our Game

Let's make our own game! Discuss with your groupmate what kind of game you're going to design.

Evaluative Dimension	
Scientificity	The process of project design and making should be scientific and reliable.
Creativity	In one or more aspects of project design and making, etc. the team should show strong creativity.
Teamwork	Task allocation should be clear and cooperation should be in order.
Practicability	Projects should be of use in reality.
Expression	1.The presentation should be clear and brief; 2.Understanding the basic scientific principles related to the project; 3.The extent to which work is carried out independently; 4. Answering questions clearly and briefly.

Project Sheet

(Only one sheet needed for each group)

Name of your group	
Member of your group	
The Name of the Game	



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Game Design	<p>A.Introduction</p> <p>B.The game goal</p> <p>C.Task analysis</p> <p>1.Background image</p> <p>2.Role</p> <p>Role 1:</p> <p>Role 1-Task Description:</p> <p>Role 2:</p> <p>Role 2-Task Description:</p> <p>.....</p>
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<p>Scripts</p>	
<p>Personnel division (List the division of work for each person in your group. Note that one of them needs to act as a spokesperson to speak on behalf of your group.)</p>	