

小丑魚找朋友

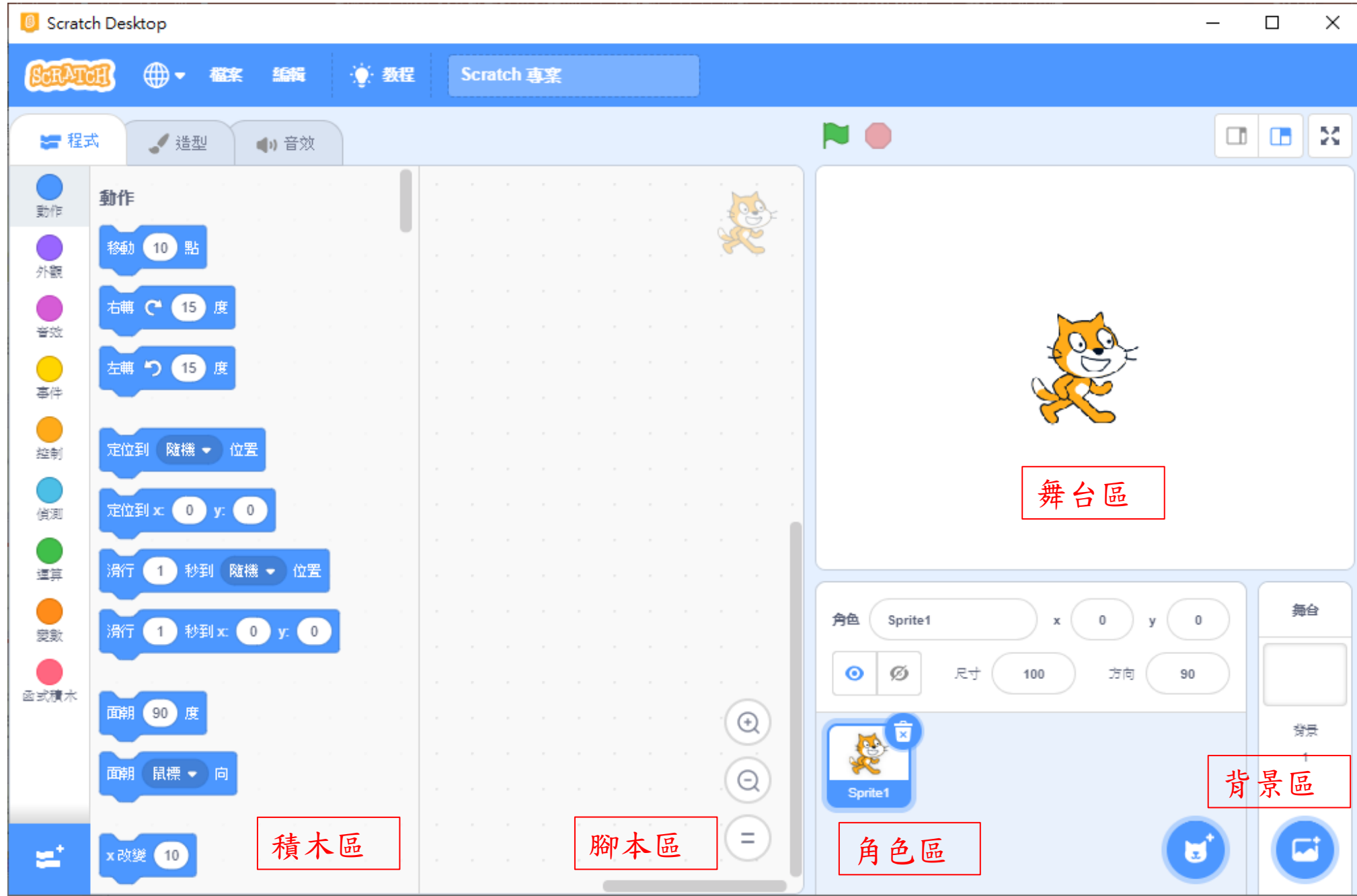
主角：小丑魚

運算思維

- 已經學過 Scratch 為何還要學一次。學習Scratch不是只有學習程式設計，還可以學習電腦科學家的思考方式。
- 遇到問題時，如何拆解與分析問題。並進而解決問題。
- 運算思維有分成那些向度。如何分析問題。

Scratch 3.0

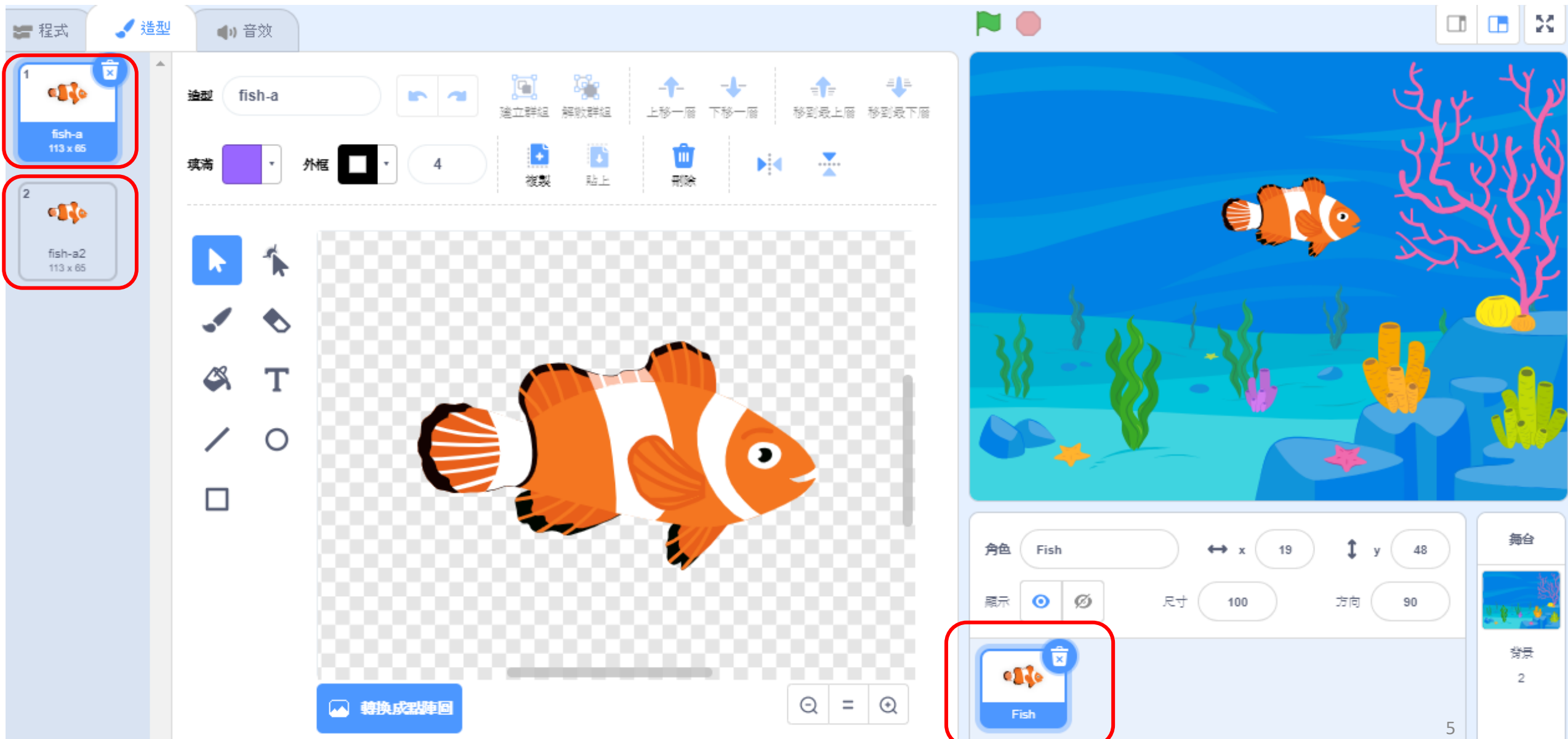
- 角色區
- 積木區
- 腳本區
- 舞台區
- 背景區



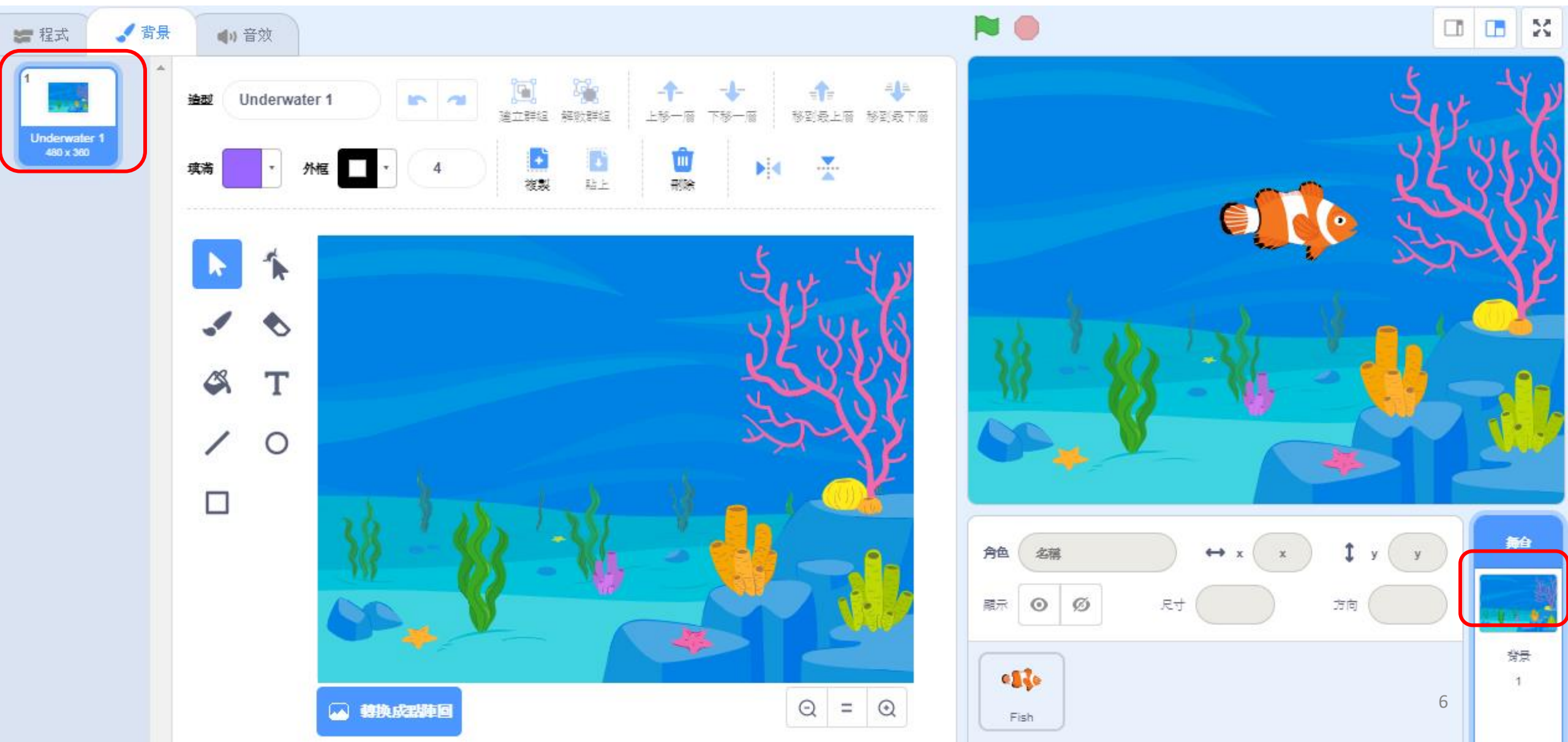
故事提要

- 幫助小丑魚尋找朋友，遊戲設計也可以以此延伸。

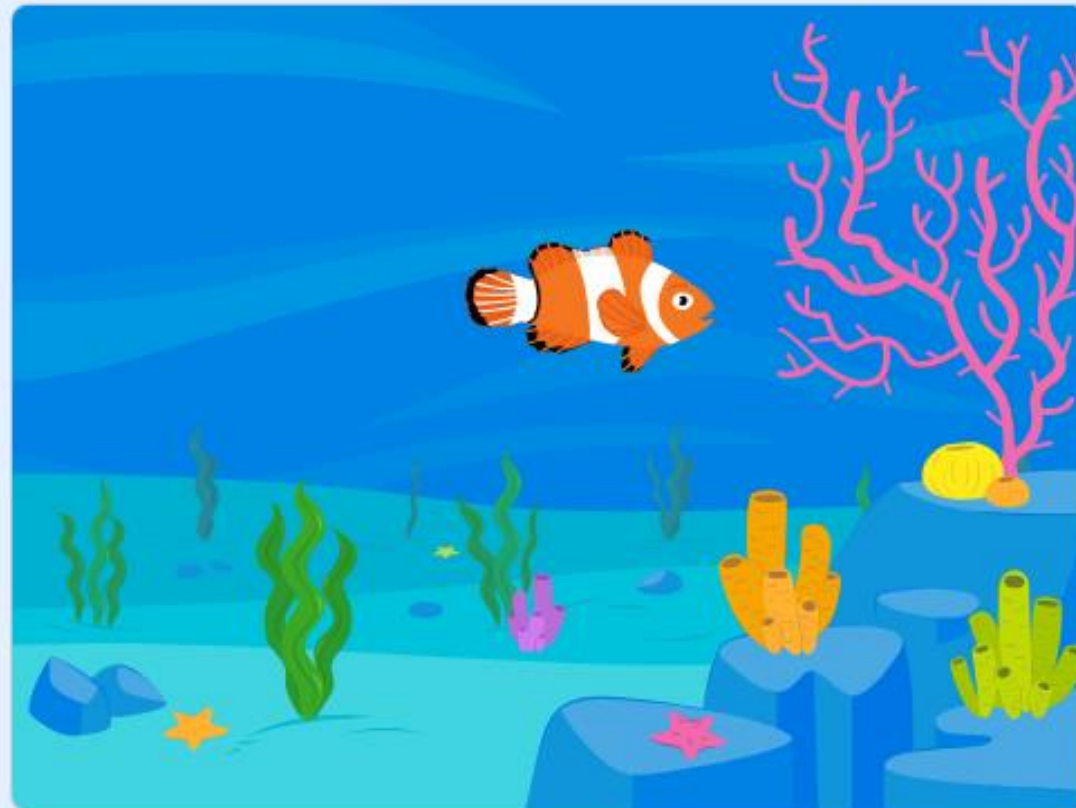
加入小丑魚角色與下一個造型



加入海底世界背景與下一個造型



1. 資料：使用「移動」10點來找朋友

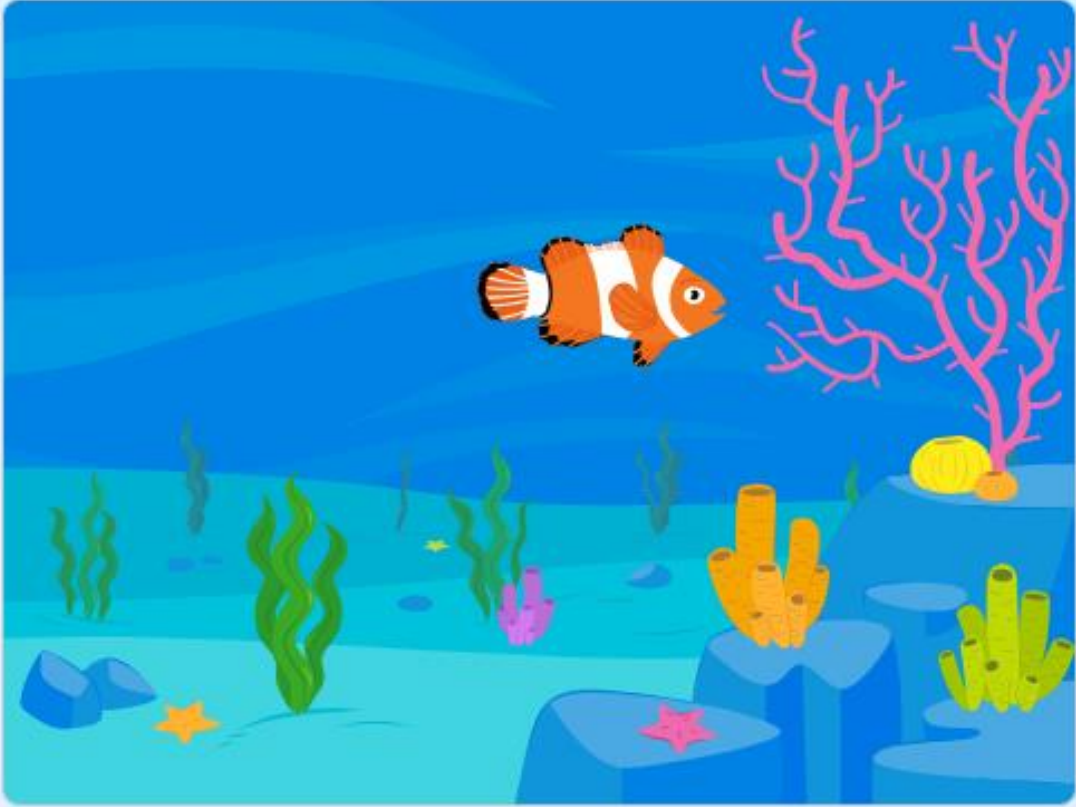


Level up	Level
Flow control	
Data representation	1/3
Abstraction	
User interactivity	
Synchronization	
Parallelism	
Logic	

2. 流程：出發前「說出」 Go 「持續」 0.5 「秒」，讓其他小丑魚聽到


說出 Go 持續 0.5 秒

移動 10 點




角色 Fish x 29 y 48

顯示 尺寸 100 方向 90

 Fish

舞台



2

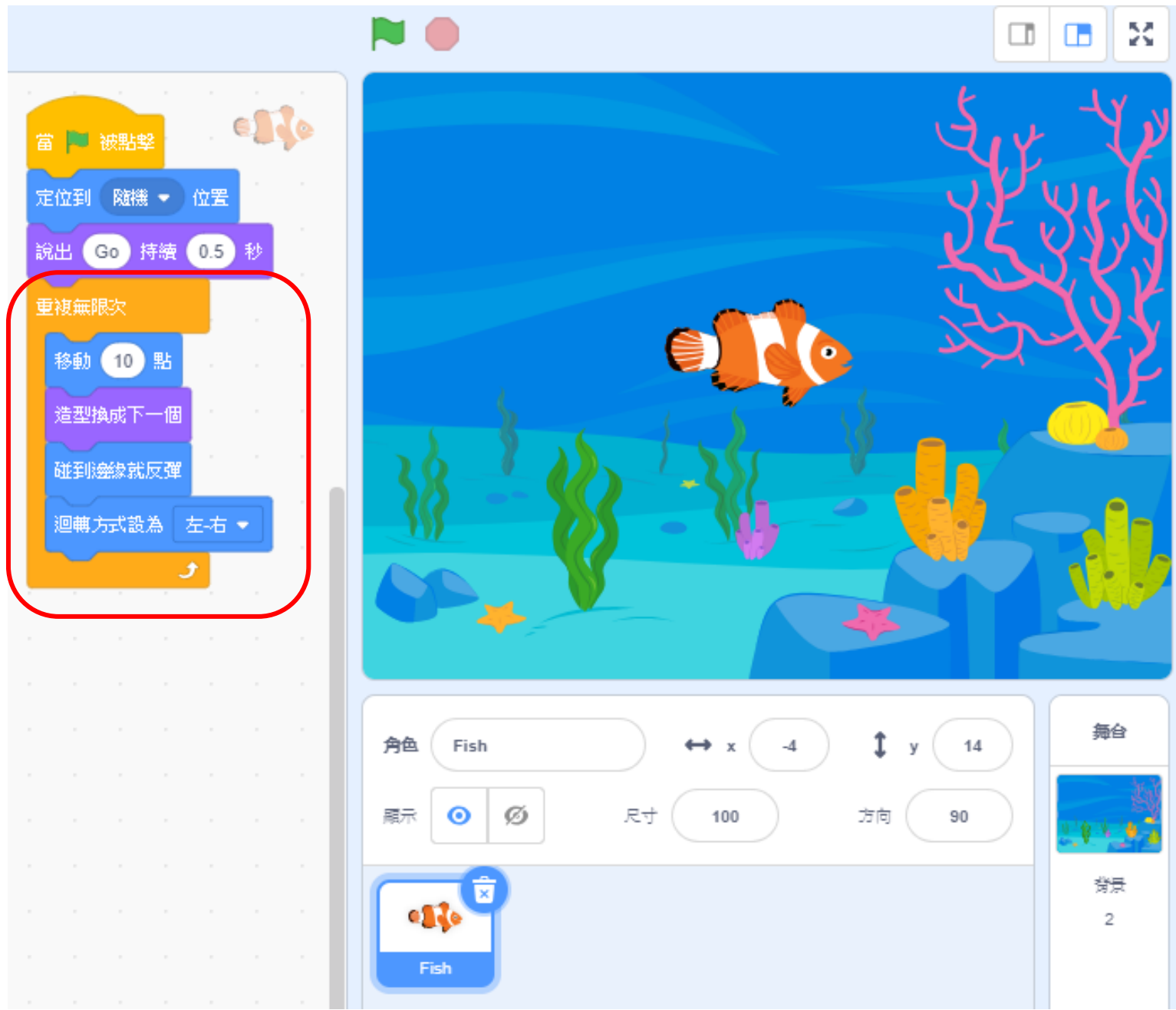
Level up	Level
Flow control	1/3
Data representation	1/3
Abstraction	0/3
User interactivity	0/3
Synchronization	0/3
Parallelism	0/3
Logic	0/3

3. ♡ 人性：加入「當綠旗被點擊」，方便玩家操作

The image shows a Scratch-like programming environment. On the left, a script area contains a yellow 'When green flag clicked' block, followed by a purple 'Say Go for 0.5 seconds' block, and a blue 'Move 10 points' block. The main stage displays a clownfish swimming in an underwater scene with coral and rocks. Below the stage, a 'Character' panel shows the 'Fish' sprite at coordinates (39, 48) with a size of 100 and a direction of 90. A 'Stage' panel on the right shows the background image and a label '1'.

Level up	Level
🌟 Flow control	1/3
🌟 Data representation	1/3
🌟 Abstraction	0/3
🌟 User interactivity	1/3
🌟 Synchronization	0/3
🌟 Parallelism	0/3
🌟 Logic	0/3

4. 流程：加入「重複無限次」等相關積木，讓小丑魚一直游



The image shows the Scratch code editor with a script for a clownfish character. The script is as follows:

- 當綠旗被點擊
- 定位到 隨機 位置
- 說出 Go 持續 0.5 秒
- 重複無限次
 - 移動 10 點
 - 造型換成下一個
 - 碰到邊緣就反彈
 - 迴轉方式設為 左右

The background is an underwater scene with a clownfish, coral, and seaweed. The character is named "Fish" and is currently at x: -4, y: 14, with a size of 100 and a direction of 90.

Category	Level
Control	2/3
Representation	1/3
Interaction	0/3
Interactivity	1/3
Chronization	0/3
Parallelism	0/3
Complexity	0/3

5. 🐢 同步：加入「等待」0.5秒。慢慢游，仔細找朋友

當綠旗被點擊

說出 Go 持續 0.5 秒

重複無限次

移動 10 點

造型換成下一個

碰到邊緣就反彈

迴轉方式設為 左-右

等待 0.5 秒

角色 Fish

顯示

尺寸 100

方向 90

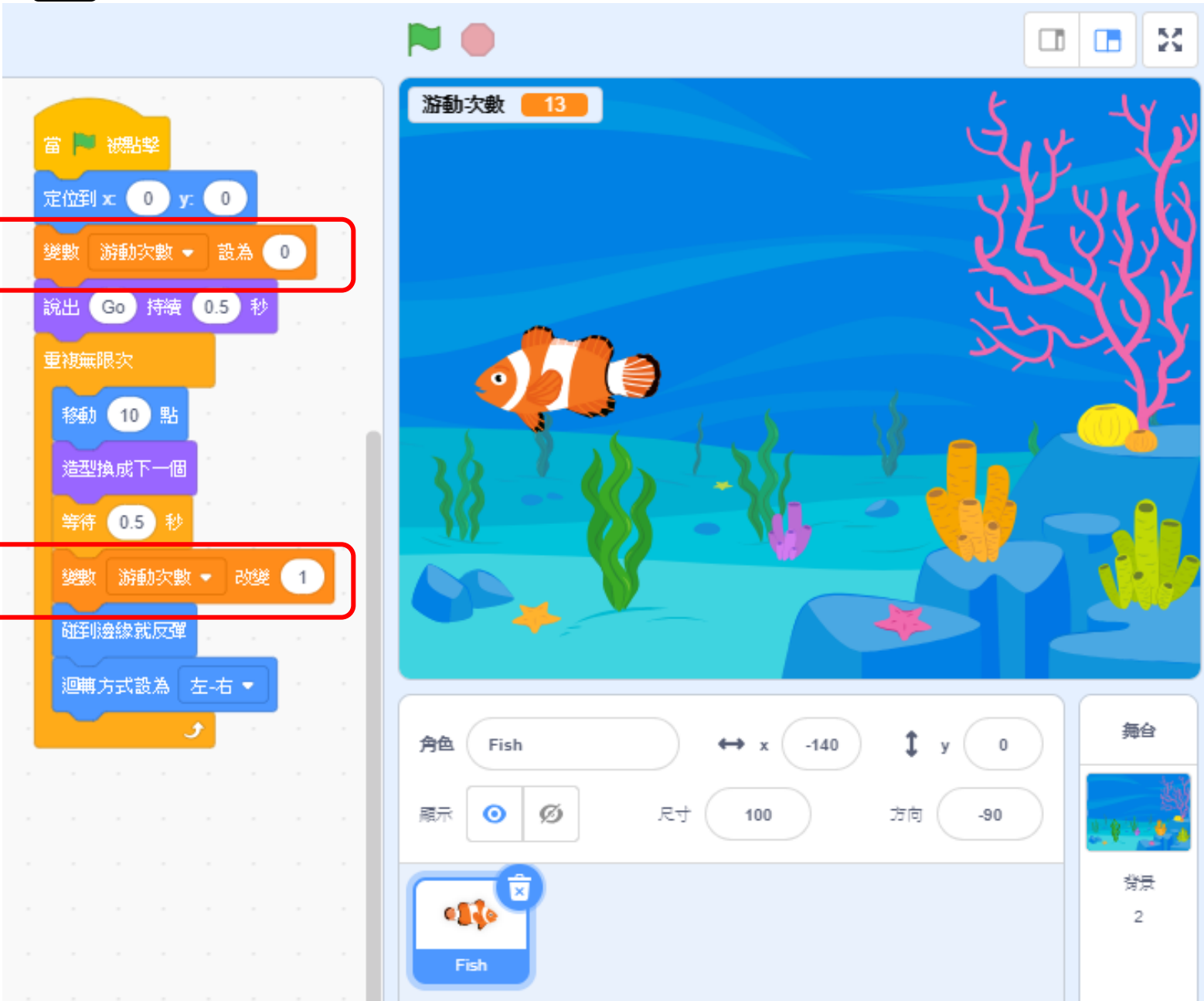
舞台

背景

Level

Category	Progress
Control	2/3
Representation	1/3
Interaction	0/3
Interactivity	1/3
Localization	1/3
Animation	0/3
Sound	0/3

6. 資料：加入「變數」移動次數，來計算游動次數



The image shows a Scratch project with a fish character in an underwater scene. The script on the left is as follows:

- 當綠旗被點擊
- 定位到 x: 0 y: 0
- 變數 游動次數 設為 0
- 說出 Go 持續 0.5 秒
- 重複無限次
 - 移動 10 點
 - 造型換成下一個
 - 等待 0.5 秒
 - 變數 游動次數 改變 1
- 碰到邊緣就反彈
- 迴轉方式設為 左-右

The stage shows a fish character with a score of 13. The character's properties are set to Fish, x: -140, y: 0, size: 100, and direction: -90.

Level up	Level
Flow control	2/3
Data representation	2/3
Abstraction	
User interactivity	1/3
Synchronization	1/3
Parallelism	
Logic	

7. 抽象與小丑魚平行：使用兩個以上的「綠旗」，讓背景與小丑魚同時開始

The image displays a Scratch-like programming environment. On the left, the script editor shows a sequence of blocks: a 'When green flag clicked' block, followed by a 'Repeat' block containing 'Change background to next' and 'Wait 1 second'. The central stage features a clownfish swimming in an aquarium with coral and rocks. On the right, a 'Level up' progress bar shows progress for various skills. The 'Abstraction' and 'Parallelism' skills are highlighted with red boxes, each showing a progress of 1/3. The 'Logic' skill shows 0/3 progress.

Level up	Level
Flow control	2/3
Data representation	1/3
Abstraction	1/3
User interactivity	1/3
Synchronization	1/3
Parallelism	1/3
Logic	0/3

8. ✂️ 抽象：使用「函式積木」。預先精簡程式碼

當綠旗被點擊

定位到 x: 0 y: 0

說出 Go 持續 0.5 秒

重複無限次

游來游去

定義 游來游去

移動 10 點

造型換成下一個

等待 0.5 秒

碰到邊緣就反彈

迴轉方式設為 左-右

角色 Fish

顯示

尺寸 100

方向 -90

舞台

背景 2

Level up	Level
Flow control	2/3
Data representation	1/3
Abstraction	2/3
User interactivity	1/3
Synchronization	1/3
Parallelism	1/3
Logic	

9. ✂️ 抽象：找到同伴 - 當「分身」產生，有的往上有的有下

The image displays a Scratch project with a clownfish character named "馬林父子" (Mr. Marlin) in an underwater scene. The script for the character is as follows:

- 當分身產生** (When clone created)
- 重複無限次** (Repeat forever loop)
 - 右轉 15 度** (Turn right 15 degrees)
 - 等待 隨機取數 1 到 10 秒** (Wait random number from 1 to 10 seconds)
- 當被點擊** (When clicked)
- 顯示** (Show)
- 重複 2 次** (Repeat 2 times)
 - 建立 自己 的分身** (Create my clone)
- 隱藏** (Hide)

Below the main script, there is a **定義 游來游去** (Define swim) block with the following steps:

- 移動 10 點** (Move 10 points)
- 碰到邊緣就反彈** (Bounce when hit edge)
- 迴轉方式設為 左-右** (Set turn mode to left-right)
- 等待 0.2 秒** (Wait 0.2 seconds)

The stage features a background of an underwater scene with coral and rocks. A red box highlights a yellow fish icon on the stage. To the right, a **Level** progress bar shows the following status:

Level	Progress
2/3	1/3
3/3	3/3
4/3	1/3
5/3	1/3
6/3	1/3
7/3	0/3

The bottom of the interface shows the character's position (x: 172, y: -137), size (120), and direction (0). A red box highlights the "馬林父子" character in the bottom left corner.

10. 邏輯：多莉出現，「如果」碰到小丑魚

當 被點擊

重複無限次

如果 碰到 尼莫 ? 那麼

定位到 隨機 位置

當 被點擊

定位到 隨機 位置

顯示

角色 多莉 x -3 y 33

顯示 尺寸 100 方向 90

尼莫 多莉

level up

Level

Flow control	2/3
Data representation	1/3
Abstraction	3/3
User interactivity	1/3
Synchronization	1/3
Parallelism	1/3
Logic	1/3

11. ♡ 人性：如果「按鍵按下」，方向改變

當 旗幟被點擊

重複無限次

如果 向上 鍵被按下? 那麼

y 改變 10

造型換成下一個

當 旗幟被點擊

重複無限次

如果 向右 鍵被按下? 那麼

x 改變 10

造型換成下一個

當 旗幟被點擊

重複無限次

如果 向下 鍵被按下? 那麼

y 改變 -10

造型換成下一個

當 旗幟被點擊



重複無限次

如果 向左 鍵被按下? 那麼

x 改變 -10

造型換成下一個

角色 多莉

顯示  

尺寸 100

方向 -90

尼莫

多莉

Level

2/3

1/3

3/3


2/3

1/3

1/3

1/3

舞台



背景 2

17

12. 資料：遊戲得分

當 被點擊

變數 馬林得分 設為 0

變數 多利得分 設為 0

定位到 隨機 位置

顯示

重複無限次

如果 碰到 尼莫 ? 那麼

變數 馬林得分 改變 1

隱藏

如果 碰到 多莉 ? 那麼

變數 多利得分 改變 1

隱藏

馬林得分 0

多利得分 1



角色 Apple x -208 y 78

顯示 尺寸 100 方向 90

尼莫 多莉 Apple

Level

Control 2/3

Representation 2/3

Animation 3/3

Activity 2/3

Localization 1/3

Localization 1/3

Localization 1/3

13. 🐢 同步：停止全部，遊戲結束

馬林得分 0

多莉得分 1

當綠旗被點擊

變數 馬林得分 設為 0

變數 多莉得分 設為 0

定位到 隨機 位置

顯示

重複無限次

如果 碰到 尼莫 ? 那麼

變數 馬林得分 改變 1

隱藏

停止 全部

如果 碰到 多莉 ? 那麼

變數 多莉得分 改變 1

隱藏

停止 全部

角色 Apple x 33 y 136 尺寸 100 方向 90

舞台

Level up

Category	Progress
Control	2/3
Representation	2/3
Interaction	3/3
Interactivity	2/3
Synchronization	2/3
Allelism	1/3
Logic	1/3

14. 🐶 邏輯：如果-否則 找出勝利者

The screenshot displays the Scratch 3.0 interface for a game project. The script area on the left contains the following code:

- When green flag clicked:
 - Set score '馬林父子得分' to 0.
 - Set score '多莉得分' to 0.
 - Set '勝利者' to an empty text box.
 - Go to random position.
 - Show.
 - Repeat loop:
 - If '碰到 馬林父子' then:
 - Change '馬林父子得分' by 1.
 - Set '勝利者' to '馬林父子'.
 - If '碰到 多莉' then:
 - Change '多莉得分' by 1.
 - Set '勝利者' to '多莉'.

The stage area on the right shows a fish character (馬林父子) and a food item (食物, an apple). The score display shows '馬林父子得分' 0 and '多莉得分' 1. The '勝利者' is currently empty. The 'Stage' area on the right shows a background image of an underwater scene.

15. 平行：當角色被點擊，讓得分項目隨機出現

Parallelism
(Level 2)



16. 🐙 平行: 廣播訊息

Level up	Level
🌟 Flow control	2/3
🌟 Data representation	2/3
🌟 Abstraction	3/3
🌟 User interactivity	2/3
🌟 Synchronization	2/3
🌟 Parallelism	3/3
🌟 Logic	2/3

Parallelism (Level 3)

The script starts with a 'When green flag is clicked' event. It initializes three variables: '結果' (Result) to 0, '馬林得分' (Mallin Score) to 0, and '多利得分' (Dolly Score) to 0. A 'Show' block is followed by a 'Repeat forever' loop. Inside the loop, there are two 'If' blocks. The first 'If' block checks '碰到 尼莫?' (Touched Nemo?). If true, it increments '馬林得分' by 1 and shows '顯示輸贏' (Show Win/Loss). The second 'If' block checks '碰到 多利?' (Touched Dolly?). If true, it increments '多利得分' by 1 and shows '顯示輸贏'. A 'Broadcast message: Show Love' block is also present, which is highlighted with a red box. The script ends with a 'Show Win/Loss' block.

The stage shows an underwater scene with a blue fish (Mallin) and a red apple (Apple). The score display shows '馬林得分 1' (Mallin Score 1), '多利得分 0' (Dolly Score 0), and '結果 馬林 贏' (Result: Mallin Wins). The sprite area shows three sprites: Nemo, Dolly, and Apple. The Apple sprite is highlighted with a red box.

The stage shows the same underwater scene, but now a heart (Heart Face) is visible. The score display shows '馬林得分 1' (Mallin Score 1), '多利得分 0' (Dolly Score 0), and '結果 馬林 贏' (Result: Mallin Wins). The sprite area shows three sprites: Nemo, Dolly, and Apple. The Heart Face sprite is highlighted with a red box.

17. 流程：重複直到



Level up	Level
★ Flow control	3/3
★ Data representation	2/3
★ Abstraction	3/3
★ User interactivity	2/3
★ Synchronization	2/3
★ Parallelism	3/3
★ Logic	2/3

18. 🐢 同步：重複直到-愛心次數 > 5

Synchronization

The image shows a Scratch project interface. On the left, a script is being edited. It starts with a 'When green flag is clicked' event, followed by a 'Set love count to 1' block. Then, there is a 'Repeat until' loop with the condition 'love count > 5'. Inside the loop, the 'love count' is increased by 1. The loop is highlighted with a red box. The stage shows a blue ocean background with coral and rocks. A heart character is visible on the stage. The score display shows '馬林得分 0', '多利父子 1', and '最後結果 多利贏'.

Level up	Level
★ Flow control	3/3
★ Data representation	2/3
★ Abstraction	3/3
★ User interactivity	2/3
★ Synchronization	3/3
★ Parallelism	3/3
★ Logic	2/3

診斷評量 (cont.)

- Level 19: 數據呈現 Level 3 (清單/陣列)

Data representation
(level 3)

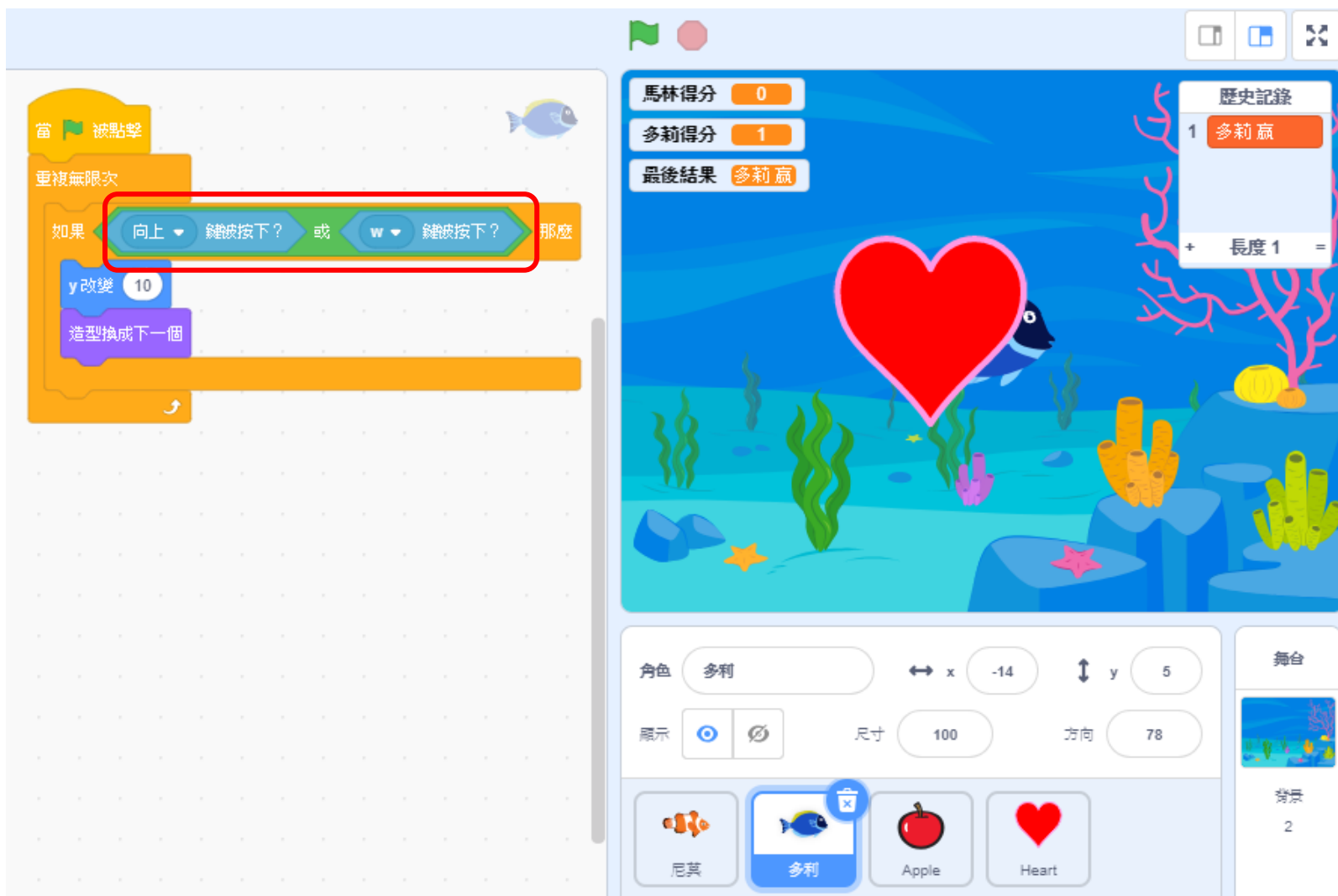
The image shows a Scratch project interface. On the left, a script is visible with several blocks. A red box highlights the 'Add to list' blocks in the 'If-Then' logic, which are used to record game results. The script includes variables for 'Final Result', 'Mali's Score', and 'Doli's Score'. The stage on the right shows a game scene with a background of an underwater world. A 'History Record' window is open, displaying a list of game results: 1. Mali Win, 2. Doli Win, 3. Doli Win. The window also shows a length of 3. The 'Apple' character is visible in the bottom right corner of the stage.

Level up	Level
★ Flow control	3/3
★ Data representation	3/3
★ Abstraction	3/3
★ User interactivity	2/3
★ Synchronization	3/3
★ Parallelism	3/3
★ Logic	2/3

診斷評量 (cont.)

- Level 20: 邏輯判斷 Level 3 (按下向上鍵或w鍵，按鍵的多重偵測)

Logic (level 3)

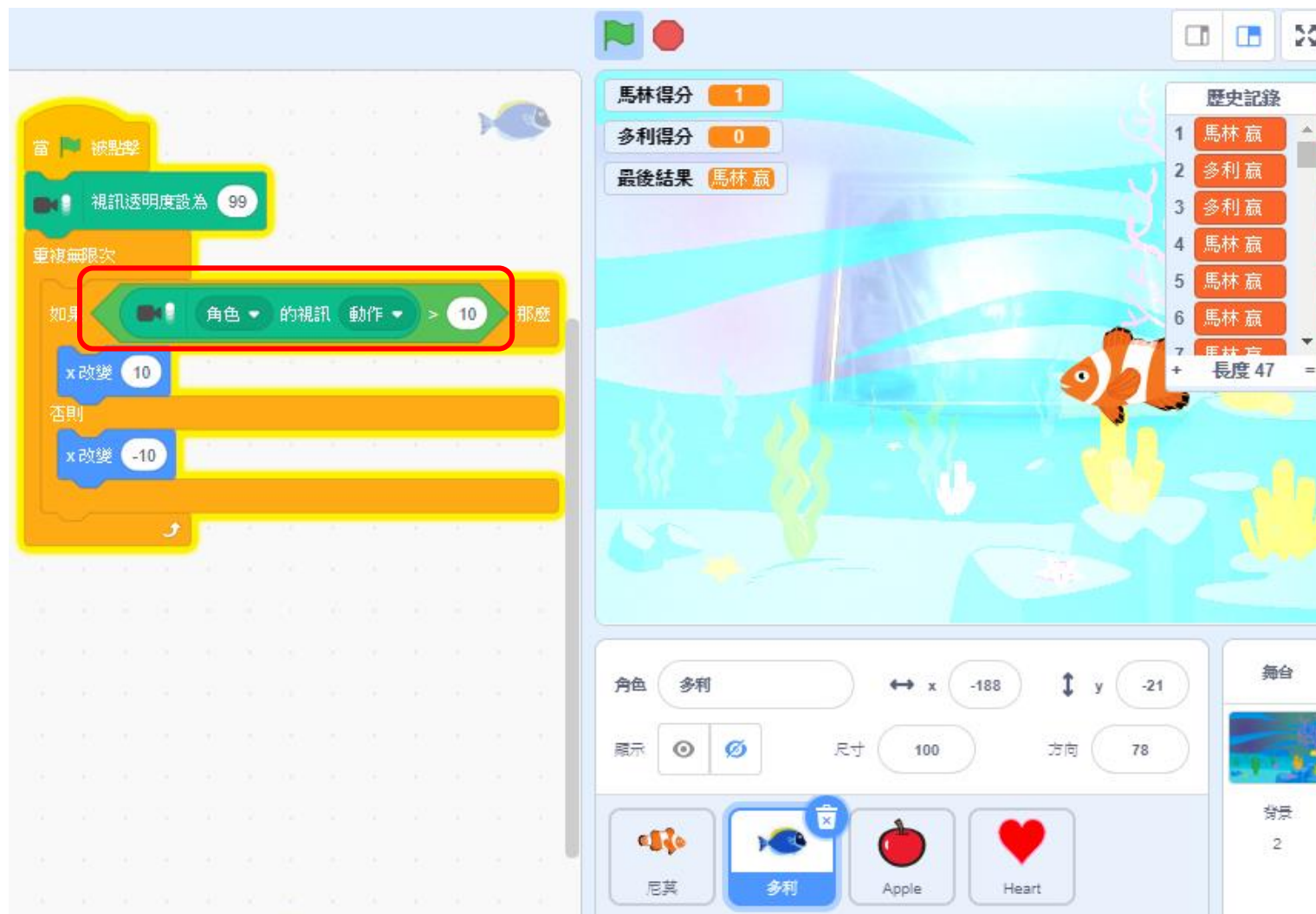


Level up	Level
★ Flow control	3/3
★ Data representation	3/3
★ Abstraction	3/3
★ User interactivity	2/3
★ Synchronization	3/3
★ Parallelism	3/3
★ Logic	3/3

診斷評量 (cont.)

- Level 21: 互動性 Level 3 (偵測視訊動作)

User interactivity
(level 3)



Level up	Level
★ Flow control	3/3
★ Data representation	3/3
★ Abstraction	3/3
★ User interactivity	3/3
★ Synchronization	3/3
★ Parallelism	3/3
★ Logic	3/3