

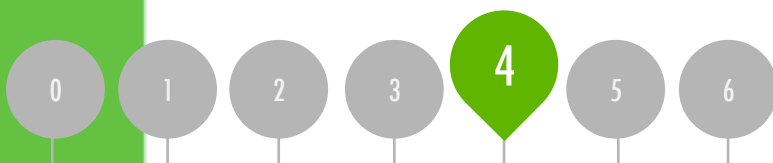
# UNIT 4

# GAMES



YOU ARE HERE

WHAT'S INCLUDED



DREAM GAME LIST  
STARTER GAMES  
SCORE  
EXTENSIONS  
INTERACTIONS  
DEBUG IT!

Chess

monopoly

Mario

Clue

football

candyland

Pac  
Man

Jump  
Rope

Baseball

Tennis

Flappy  
Bird

Wheel of  
Fortune

Four  
Square

# DREAM GAME LIST REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ Make a list of your favorite games.

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+ What do the games have in common?

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+ What features of their design make them a game?

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+ Create a list of design elements for your dream game.

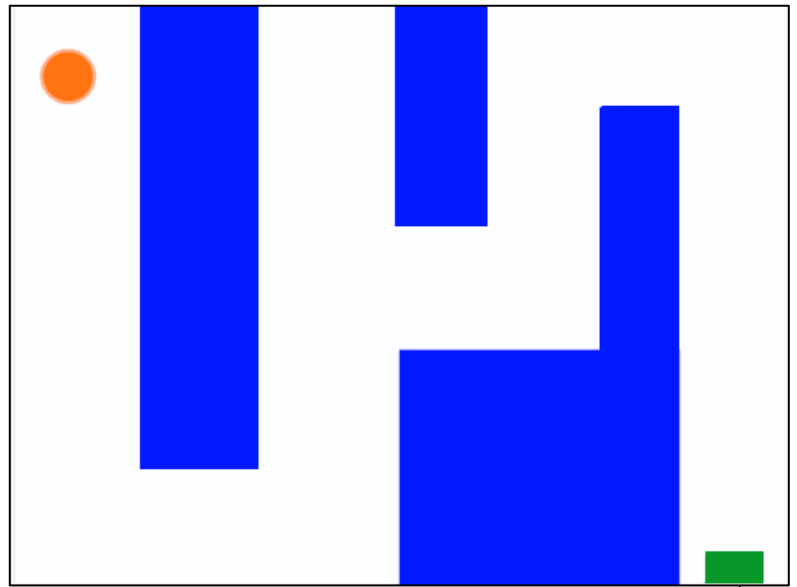
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# MAZE

HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

In this project, you will create a game. This game includes interactions between sprites, score, and levels. You move a sprite from the start of a maze to the end without touching the walls.



## START HERE

- ❑ Draw a maze-like background and use different colors for the walls and end-of-maze marker.
- ❑ Add a sprite.
- ❑ Make your game interactive!

## THINGS TO TRY

- ❑ Add multiple levels to your game! This can be done through the use of different backdrops and using broadcast blocks to trigger the next level.
- ❑ Use the make a variable block to keep score!
- ❑ Experiment with timer blocks to add new challenges to your maze!

```
when right arrow key pressed
  point in direction 90
  move 10 steps
```

```
when down arrow key pressed
  point in direction 180
  move 10 steps
```

```
when left arrow key pressed
  point in direction -90
  move 10 steps
```

```
when up arrow key pressed
  point in direction 0
  move 10 steps
```

These scripts give the player control over sprite movement in the maze.

```
when green flag clicked
  go to x: -205 y: 147
```

This tells your sprite where to begin and marks the start of the maze.

```
when green flag clicked
  forever
    if touching color ? then
      move -10 steps
```

This will cause your sprite to bounce off the blue walls of the maze.

```
when green flag clicked
  forever
    if touching Ball ? then
      say You win!
```

This tells the end-of-maze sprite that players win when the ball touches this sprite.

## BLOCKS TO PLAY WITH

when space key pressed	score	○ - ○	○ + ○	pick random 1 to 10
when up arrow key pressed	set score to 0	◻ < ◻	◻ = ◻	touching ?
when m key pressed	change score by 1	◻ > ◻	not	touching color ?
when I receive message1	show variable score	and		color is touching ?
	hide variable score	or		timer
				reset timer

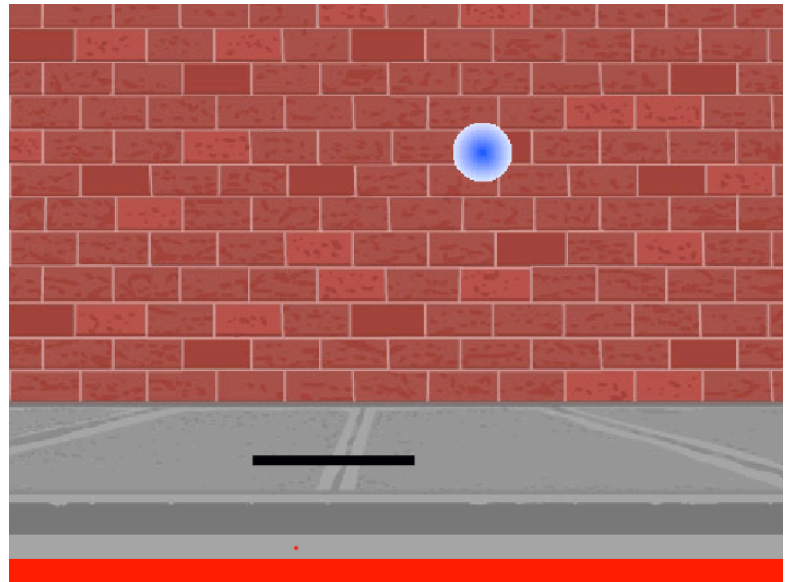
## FINISHED?

- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

# PONG

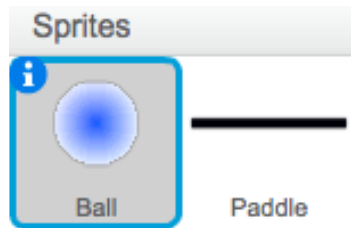
HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

In this project, you will create a game. This game includes interactions between sprites, score, and levels. The game is similar to the classic game of pong, where the goal is to keep the sprite from getting past you.



## START HERE

- Create two sprites: a paddle for the user to control and a ball the user will be playing with.
- Make your paddle sprite interactive.
- Bring your game to life!



```

when right arrow key pressed
  point in direction 90
  move 10 steps

when left arrow key pressed
  point in direction -90
  move 10 steps
  
```

## THINGS TO TRY

- How do you add difficulty to your game? Creating different levels, using a timer, or keeping score are a few examples of things you could do.
- Experiment with changing the look of your game by editing the backdrops!
- Explore using different key presses to control your sprites!

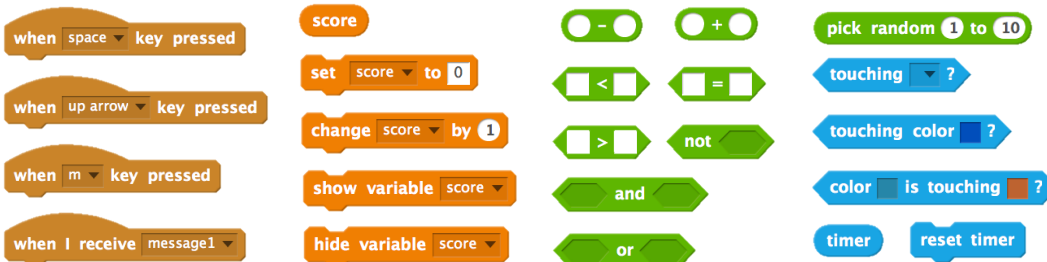
```

when green flag clicked
  forever
    if touching Paddle ? then
      play sound water_drop
      turn pick random 160 to 200 degrees
      move 10 steps
    if touching color red ? then
      stop all

when green flag clicked
  go to x: 20 y: 150
  point in direction 45
  forever
    if on edge, bounce
    move 10 steps
  
```

These control the ball - if touching the paddle or a wall, it continues moving. If touching red (meaning the ball moved past the paddle) the game ends.

## BLOCKS TO PLAY WITH



## FINISHED?

- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

# SCROLLING

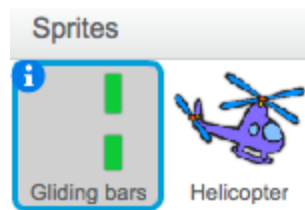
HOW CAN YOU USE SCRATCH TO BUILD AN INTERACTIVE GAME?

In this project, you will create a game. This game includes interactions between sprites, score, and levels. The game is similar to Flappy Bird, where the goal is to keep an object from falling to the ground or touching certain objects.



## START HERE

- ❑ Create two sprites: one for the player to control (helicopter) and one to avoid (gliding bars).
- ❑ Make the helicopter interactive.
- ❑ Bring your game to life by adding scripts to make the gliding bars scroll across the stage!



```
when space key pressed
  change y by 20
```

Controls sprite movement

```
when green flag clicked
  go to x: 0 y: 0
  set size to 30 %
  wait 2 secs
  forever
    change y by -2
```

Causes sprite to constantly fall downward

## THINGS TO TRY

- ❑ How do you add difficulty to your game? Creating different levels, using a timer, or keeping score are a few examples of things you could do.
- ❑ Experiment with changing the look of your game by editing the backdrops!
- ❑ Explore using different key presses to control your sprites!

```
when green flag clicked
  hide
  forever
    wait 5 secs
    create clone of myself
```

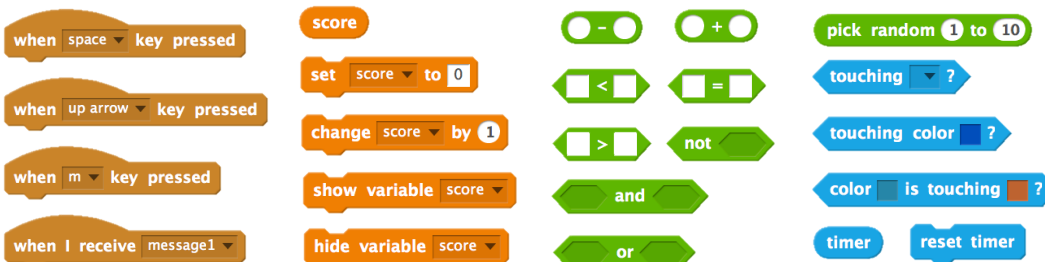
This creates clones, which are used in the script below to make the bars scroll across the screen:

```
when I start as a clone
  switch costume to pick random 1 to 3
  go to x: 240 y: 0
  show
  glide 8 secs to x: -240 y: 0
  delete this clone
```

```
when green flag clicked
  forever
    if touching color ? then
      stop all
```

Specifies when the game ends

## BLOCKS TO PLAY WITH



## FINISHED?

- + Add your project to the Games Studio: <http://scratch.mit.edu/studios/487504>
- + Swap games with a partner and walk each other through your creations.

# STARTER GAMES REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ What was challenging about designing your game?

---

+ What are you proud of?

---

# SCORE

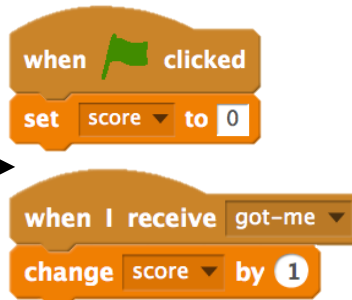
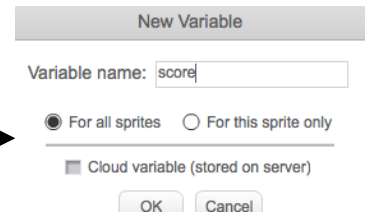
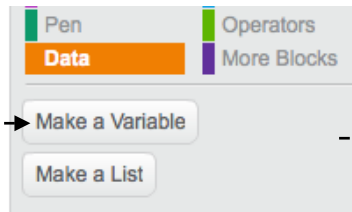
HOW CAN YOU KEEP SCORE IN A SCRATCH PROJECT?

Fish Chomp is a game where players try to catch as many fish as they can by guiding a sprite with the mouse. In this activity, you will remix Fish Chomp by adding a score with variables.



## START HERE

- ❑ Go to the Fish Chomp project page:  
<http://scratch.mit.edu/projects/10859244>
- ❑ Click on the Make a Variable button in the Data category to create and name a variable for score.
- ❑ Experiment with your new variable blocks to incorporate score into your project!



FEELING STUCK?

THAT'S OKAY! TRY THESE THINGS...

- ❑ Not sure how to work with variables? Check out this project for more information: <http://scratch.mit.edu/projects/2042755>
- ❑ Or take a look at this video: <http://youtu.be/uXq379XkhVw>
- ❑ Explore and study code in games that use score to learn more about creating variables and incorporating score into a project.

FINISHED?

- + Add your project to the Fish Chomp Remix studio: <http://scratch.mit.edu/studios/475615>
- + Challenge yourself to do more! How can you use score to add difficulty to your game design?
- + Find a game you are inspired by and remix it!



# SCORE REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ How would you explain variables to someone else?

---

+ What are variables good for?

---

# EXTENSIONS

HOW CAN YOU EXTEND AND REIMAGINE GAMES IN SCRATCH?

Get into game design by adding extended features within your Scratch project! Choose at least one (or more!) of the following extensions and add it to your previously started maze, pong, or scrolling games.

## START HERE

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- Go to the Extensions studio:  
<http://scratch.mit.edu/studios/475619>
- Choose one (or more) of the extensions to explore.
- Incorporate your choice into your previously started game projects!

- + **SCORE** <http://scratch.mit.edu/projects/1940443>  
Demonstrates how to set and change a score. Receive 10 points every time the Scratch cat is clicked.
- + **LEVELS** <http://scratch.mit.edu/projects/1940453>  
Demonstrates how to change levels. Score increases by 1 every time the space bar is pressed. Level increases by 1 for every 10 points.
- + **TIMER** <http://scratch.mit.edu/projects/1940445>  
Demonstrates how to use a timer. Use the mouse to navigate the Scratch cat to Gobo.
- + **ENEMIES** <http://scratch.mit.edu/projects/1940450>  
Demonstrates how to add an enemy. Avoid the tennis ball by using the up and down arrow keys.
- + **REWARDS** <http://scratch.mit.edu/projects/1940456>  
Demonstrates how to collect items. Use the arrow keys to move the Scratch cat around to collect quest items.
- + **MOUSE** <http://scratch.mit.edu/projects/25192659>  
Demonstrates how to program the mouse to control game play. Move the mouse to move the paddle.
- + **RESTART** <http://scratch.mit.edu/projects/25192935>  
Demonstrates how to make a button to restart the game. Click on the RESTART button to restart.
- + **MENU** <http://scratch.mit.edu/projects/25192991>  
Demonstrates how to display a menu screen at the beginning of the game. Click START or DIRECTIONS on the menu screen.
- + **MULTIPLAYER** <http://scratch.mit.edu/projects/25192711>  
Demonstrates how to add another player to the game. Player 1 uses the arrow keys to navigate Pico through the maze, and player 2 uses the W, A, S, D keys to navigate Nano through the maze.

## THINGS TO TRY

- + The backpack can be an extremely useful tool while programming in Scratch. It can store everything from lines of code, to music files, to sprites, and more. Try using it to incorporate extensions into your game projects.
- + Alternatively, sketching out ideas and bits of code in your design journal is another great method for planning how to incorporate your extensions.

## FINISHED?

- + Add another extension to your maze, pong, or scrolling game.
- + Challenge yourself to do more! Continue going through each of the extensions and add them to your games.
- + Help a neighbor!
- + Share your project with a neighbor and give each other feedback on your games.

# EXTENSIONS REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ What are different ways of increasing difficulty in a game?

---

+ Which extensions did you add to your game project?

---

+ Describe your process for including the extension(s) in your game?

---

# INTERACTIONS

WHAT DIFFERENTIATES A SCRATCH PROJECT FROM A STILL IMAGE OR A VIDEO?

Tackle these nine puzzles that engage some of the more advanced concepts in Scratch related to interactivity. Each of these challenges has several possible solutions.

## START HERE

- ❑ Create a Scratch program for each of the nine interactivity puzzles.

FEELING  
STUCK?

THAT'S OKAY! TRY THESE THINGS...

- ❑ Before getting started in Scratch, write down ideas in your design journal for possible ways of programming each of the interactivity puzzles.
- ❑ Work with a neighbor. Collaborating with a partner can be a great way to solve problems and gain new perspectives on ways of programming in Scratch!

❑ **PUZZLE 1:** Whenever you press the B key, the sprite gets a little bigger. Whenever you press the S key, the sprite gets a little smaller.

❑ **PUZZLE 2:** Whenever the sprite hears a loud sound, it changes color.

❑ **PUZZLE 3:** Whenever the sprite is in the top 25% of the screen, it says "I like it up here."

❑ **PUZZLE 4:** When the sprite touches something blue, it plays a high note. When the sprite touches something red, it plays a low note.

❑ **PUZZLE 5:** Whenever two sprites collide, one of them says: "Excuse me."

❑ **PUZZLE 6:** Whenever the cat sprite gets near the dog sprite, the dog turns and runs from the cat.

❑ **PUZZLE 7:** Whenever you click on the background, a flower appears at that spot.

❑ **PUZZLE 8:** Whenever you click on a sprite, all other sprites do a dance.

❑ **PUZZLE 9:** Whenever you move the mouse-pointer, the sprite follows but doesn't touch the mouse-pointer.

## FINISHED?

- + Add each of the projects you create to the Interaction Studio: <http://scratch.mit.edu/studios/487213>
- + Help a neighbor!
- + Discuss your strategies for approaching each puzzle with a partner. Take notes about the similarities and differences in your methods.



# INTERACTIONS REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ Which puzzles did you work on?

---

+ What was your strategy for solving the puzzles?

---

+ Which puzzles helped you think about your game project?

---

# DEBUG IT!

HELP! CAN YOU DEBUG THESE FIVE SCRATCH PROGRAMS?

In this activity, you will investigate what is going awry and find a solution for each of the five Debug It! challenges.

## START HERE

- Go to the Unit 4 Debug It! Studio:  
<http://scratch.mit.edu/studios/475634/>
- Test and debug each of the five debugging challenges in the studio.
- Write down your solution or remix the buggy program with your solution.

**FEELING  
STUCK?**

THAT'S OKAY! TRY THESE THINGS...

- Make a list of possible bugs in the program.
- Keep track of your work! This can be a useful reminder of what you have already tried and point you toward what to try next.
- Share and compare your problem finding and problem solving approaches with a neighbor until you find something that works for you!

### **DEBUG IT! 4.1** <http://scratch.mit.edu/projects/24271192>

In this project, the "Inventory" list should be updated every time Scratch Cat picks up a new item. But Scratch Cat can only pick up the laptop. How do we fix the program?

### **DEBUG IT! 4.2** <http://scratch.mit.edu/projects/24271303>

In this project, Scratch Cat gets 10 points for collecting Yellow Gobos and loses 10 points for colliding with Pink Gobos. But something isn't working. How do we fix the program?

### **DEBUG IT! 4.3** <http://scratch.mit.edu/projects/24271446>

In this project, Scratch Cat is thinking of a number between 1 and 10. But something is wrong with the guess checking – it doesn't work consistently. How do we fix the program?

### **DEBUG IT! 4.4** <http://scratch.mit.edu/projects/24271475>

In this project, the "# of hits" display should increase by 1 every time the Scratch Cat is hit by a tennis ball. But the "# of hits" increases by more than 1 when Scratch Cat is hit. How do we fix the program?

### **DEBUG IT! 4.5** <http://scratch.mit.edu/projects/24271560>

In this project, Scratch Cat is navigating a maze to get to the yellow rectangle. But Scratch Cat can walk through walls. How do we fix the program?

## FINISHED?

- + Add code commentary by right clicking on blocks in your scripts. This can help others understand different parts of your program!
- + Discuss your testing and debugging practices with a partner. Make note of the similarities and differences in your strategies.
- + Help a neighbor!

# DEBUG IT! REFLECTIONS

NAME:

RESPOND TO THE FOLLOWING REFLECTION  
PROMPTS USING THE SPACE PROVIDED  
BELOW OR IN YOUR DESIGN JOURNAL.

+ What was the problem?

---

+ How did you identify the problem?

---

+ How did you fix the problem?

---

+ Did others have alternative approaches to fixing the problem?

---

