CodeMonkey
LESSON PLANS

CodeMonkey Jr.

A PRE-CODING GAME FOR 4-6 YEAR OLDS

Advanced Sequencing & loops

Lesson plans
1-7

CodeMonkey
LESSON PLANS

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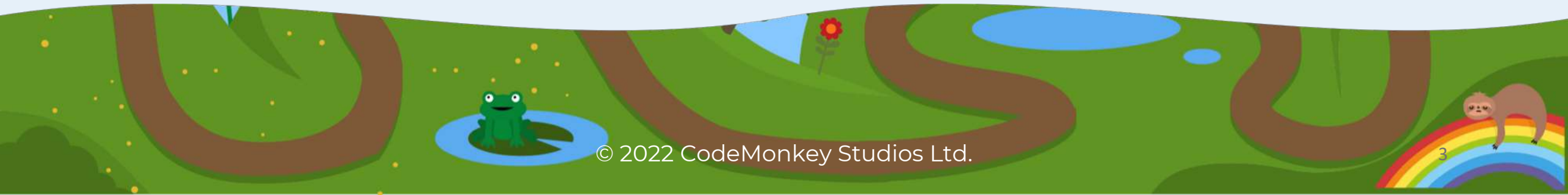
Introduction

Let's continue the adventure with CodeMonkey Jr.. The following 7 lessons will cover 2 chapters (advanced sequencing and advanced loops), which include a total of 30 challenges. These challenges will help students practice more the fundamental concepts and terms from the world of computers and programming.

Each lesson is set to be 35 minutes long and is made up of 3 parts: an Introduction, Playtime and Debriefing. If you think you need more time to complete a lesson, feel free to split it into 2 sessions. Most of the lessons are based upon playing the game itself, the first lesson is more theoretical and teach new concepts. All of the lessons are playful and designed for younger students.

Before you get into the lesson plans, we recommend reading CodeMonkey Jr.'s Teacher Guide. At the end of this file, you will find a Glossary that summarizes each coding concept. Please refer to it throughout the course. Feel free to email us with any questions or comments.

Good Luck!
The CodeMonkey Team

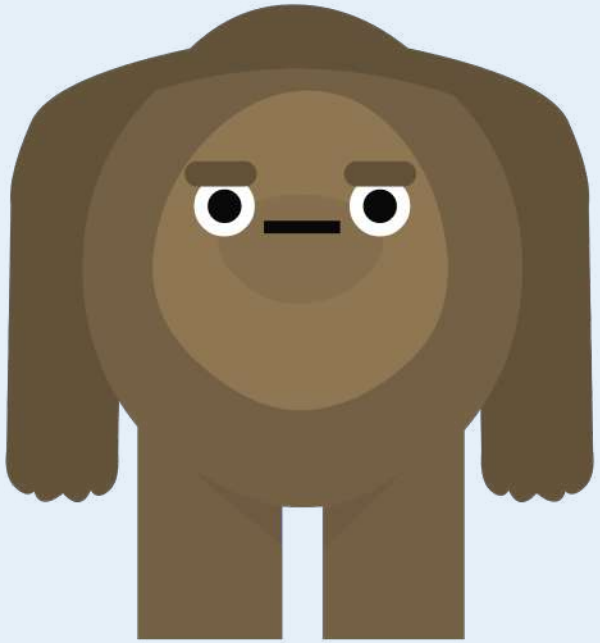


SOME NOTES ON TEACHING CODEMONKEY JR.

- **ALL Beginners are welcome!**
  - We will provide you with everything you need in order to learn the basics of coding and enjoy teaching the game. You do not need *any* background in Computer Science!
- **A love of learning is a plus**
  - A love of learning is key for learning new topics like programming, which may seem intimidating at first. Don't worry though, we will provide you all the information you need to successfully teach your students coding.
- **A love for playing is also a plus!**
  - We believe learning through playing is a joyful and engaging way to introduce concepts to your students. CodeMonkey Jr. will open up a new world for your students so give them time to replay the game if they want. Afterall, we want students to have fun.
- **Mistakes are OK!**
  - Mistakes are the best way to learn so use them to challenge and engage your class. You can even encourage students to play with wrong sequences to see where the monkey will go.

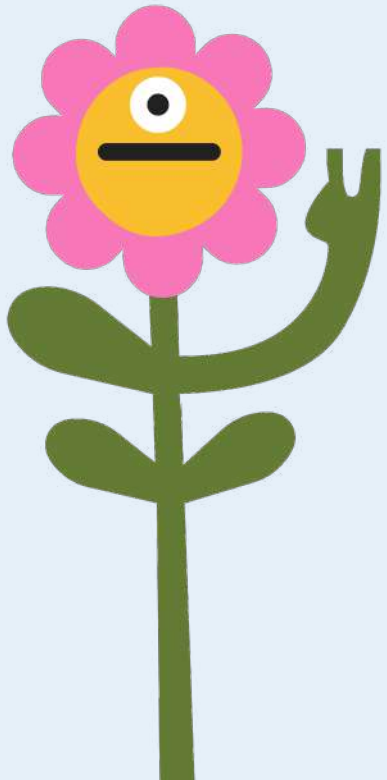
Guidelines

- We recommend going over the Teacher Guide and the entire lesson plans before starting the course
- The following lesson plans are only suggestions so feel free to change, edit and adjust them to your class. At the end of the day, only you know what is best for your students!



Technical Requirements

- You will need tablets or desktops for students. You can use 1 device per 2 students.
- It is best if your computer is connected to a projector or screen so that you can present challenges
- An Internet connection is required



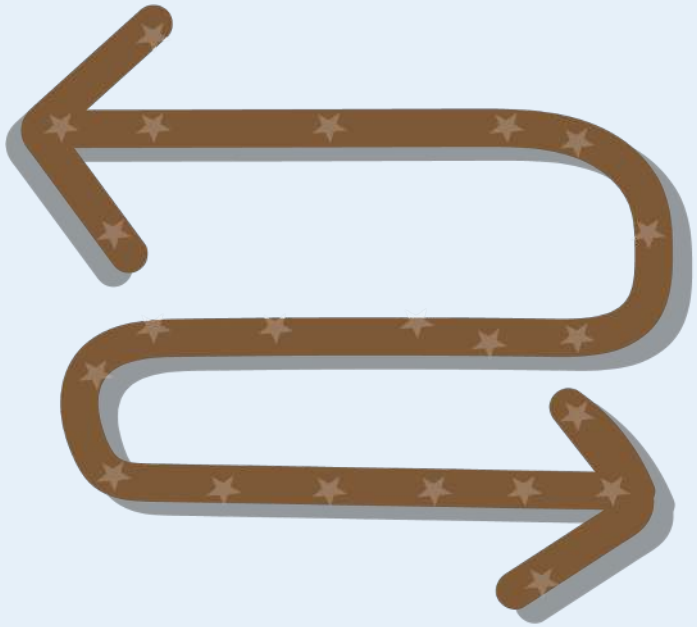
LESSON PLANS

Table of Contents

NOTE: The type of lesson can be either theoretical or practical. **Theoretical** signifies lessons that take place without playing CodeMonkey Jr.. They serve to introduce concepts to your students and help them understand them through offline activities. **Practical** lessons take place online, using the CodeMonkey Jr. platform. In these lessons students will solve challenges on CodeMonkey Jr..
Looking at the type of lesson in advance can help you know when you need to reserve devices for your class.

Lesson 1 – Back & Forth

This lesson is based on improving the counting capabilities required for moving back and forth. It will also practice adding and subtracting.



PART 1: 10 MINUTES
PRESENT

Discussion	**10 mins.**

Start the lesson by telling a story that represents a challenge you faced. The level of complexity of the challenge can vary depending on your class.
The story could be:
“At my house, there is a basement downstairs, a living room and kitchen are on the first floor and bedrooms on the second. Ask students how many floors you have.

- 3

Tell your class that that between each floor are 5 stairs. Ask them how many stairs you have.

- 10 (two flights of stairs in a 3-story house)

Tell them that yesterday, you were in the kitchen when your younger son called you from the basement to fix something and your older son asked for help with homework from upstairs. Tell them that you would like to do both.
Ask them how many stairs you need to climb in order to be able to help both of them?

- 3

Ask students what they would do.

- Have they ever been in such a conflict?
- Speak about order of actions/activities. What should you do first? Is there any advantage for choosing one path over the other?
- Mention that sometimes one path will be more efficient, this should be analyzed when defining the solution.

PREPARE IN ADVANCE:

- Take 2 cards and write a different symbol on each (i.e. heart and flower)

PART 2: 20 MINUTES
PLAYTIME #1

Instructions	**10 mins.**

This lesson is about practicing counting, adding and subtracting.

Preparation:

1. Seat students in a row, circle or semicircle depending on class size
2. Choose a student to be Student A (make sure Student A is not on either end)
3. Hand the two cards that you have prepared to the two students seated on either side of Student A
    a. During the first round, be sure to choose students seated close to Student A
    b. Increase the distance between the two students and Student A with each round
4. Choose a volunteer to count the steps of each game round

Game:

1. Ask Student A to collect both cards and return to his/her spot
2. Have the volunteer count and write on the board the steps taken (1 step = 1 student)
3. Be sure to then play the game several times with the following alterations:
    b. Play a few rounds where Student A does not return to their spot
    c. Play a few times with various growing distances between Student A and the two students on either side

Discussion:

- How many steps did the student take? How many students did the student cross on his /her path?
- Which students did the student go through once and which twice?
- Is there a difference in the number of steps taken depending on which direction you chose to go first?
- Is there a difference in the number of steps when Student A returns and does not return to their place and does it affect which direction to start with?

PART 2: 20 MINUTES
PLAYTIME #2

Instructions	**10 mins.**

The following are ideas for questions to ask the class. Use this structure to build similar questions. Try to make the questions visual with objects or drawings.

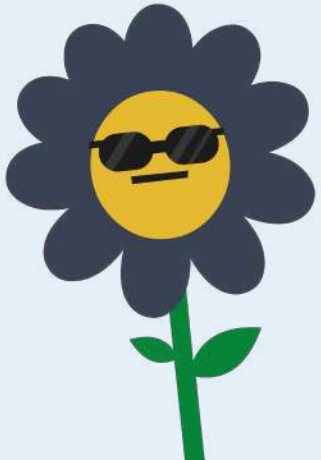
1. I have 3 apples, I gave my friend 1 apple - how many I have now?
    a. my mom gave me additional 4 apples - how many apples I have?
2. There are 3 kangaroos, 1 hops away. How many kangaroos are left?
    a. 2 kangaroos
3. The kangaroos came back with a friend, how many kangaroos are there?
    a. 3 kangaroos
4. I have 3 friends and 2 snacks, how many snacks are missing?
    a. 1 snack
5. I gave one of the friends a snack, how many snack are missing now?
    a. 2 snacks
6. Now, 1 new friend has joined, how many snacks are missing?
    a. 3 snacks
7. I'm standing on the 2nd level of a ladder. I need to go down to pick up my tools and go up to the 4th challenge. How many steps do I need to take?
    a. 6 steps

PART 3: 5 MINUTES
DEBRIEFING

Discussion	**5 mins.**

Discuss the following with your class:

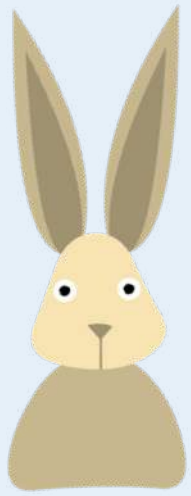
- This lesson was in preparation for our next class, where we will help the monkey step back and forth (as you remember, until now he only stepped forward)
- Before we complete the lesson, I'd like you to think about our first discussion. Remember when I told you about the conflict I was having at home with my sons? Do you remember the game we played at the beginning where [insert student name] had to choose how to collect the cards?
    - Summarize the common theme where both scenarios required counting and planning
    - Counting the steps required planning and solving two different problems:
        1. Going from the Point A to Point B
        2. From Point B to Point C
    - It is important to understand that the total number of steps will be a sum of both.



Lesson 2 – Practice makes Perfect

In this lesson, students will start a new chapter of CodeMonkey Jr., which focuses on advanced sequencing. In the scope of this game, Advanced Sequencing is when students need to plan their journey as they will need to go one direction first and then return to get to the treasure chest.
By end of this lesson, students will complete challenges 1-5.

Note: you might get to this chapter after completing the Loops chapter. We do not have the loop block here, as in most challenges there is no pattern to get the bananas and treasure chest. We will get back to loops in the next chapter.



Please note that the minimum class time required for this lesson is 35 minutes. If you are rushed for time, please skip to Part 2.

U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14

Part 1: 5 Minutes
Present

Discussion	**5 mins.**

What happens when the banana is on your left but the treasure chest is on your right?
How can you solve this problem?

1. Go directly to the treasure chest → but you will not get the highest score
2. Go the the treasure chest first and then go to the banana → the challenge ends up when you reach the treasure chest, hence this is impossible
3. Go to pick up the bananas first and then go to the treasure chest

Part 2: 25 Minutes
Playtime

Instructions	**TIME: 25 min**
Remember to count the steps to and from the banana and not from the point the monkey is at in the beginning. Encourage the students to get all the bananas and get 3 stars in each challenge.	

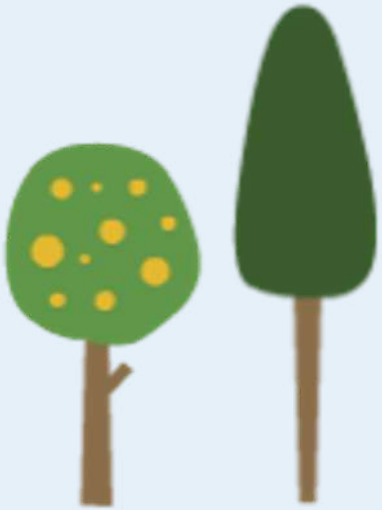
Challenge	**Scope**
1	Pick up banana on the left and go to the treasure chest on the right (ML-MR-MR)
2	The banana is on the right and treasure chest is on the left. (MR-MR-ML-ML-ML)
3	Jump left and then walk right (JL-MR-MR-MR)
4	Jump right on the way to the banana and jump left on the way back (JR-MR-JL-ML-ML-ML)
5	Long path - make sure to plan the full path based on the 2 sub-paths (JR-JR-MR-MR-JL-JL-ML-ML-ML-ML)

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**
There are many ways to solve a problem. Each way may differ in quality, effort and outcome. In this lesson, we saw that you can code different paths to the treasure chest, but not all will collect the bananas. This indicates that you can complete a challenge successfully, however you will not receive the highest score. Attaining the highest score requires planning as well as a different type of counting method since you need to plan two paths, one to the banana and then going from the banana to the treasure chest.	

Lesson 3 – where to first?

In this lesson, students will continue practicing solving challenges by planning their journey. They will need to decide where to move first to get all the bananas.
By end of this lesson, students will complete challenges 6-10.



U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14

Part 1: 5 Minutes
Present

Discussion	**5 mins.**

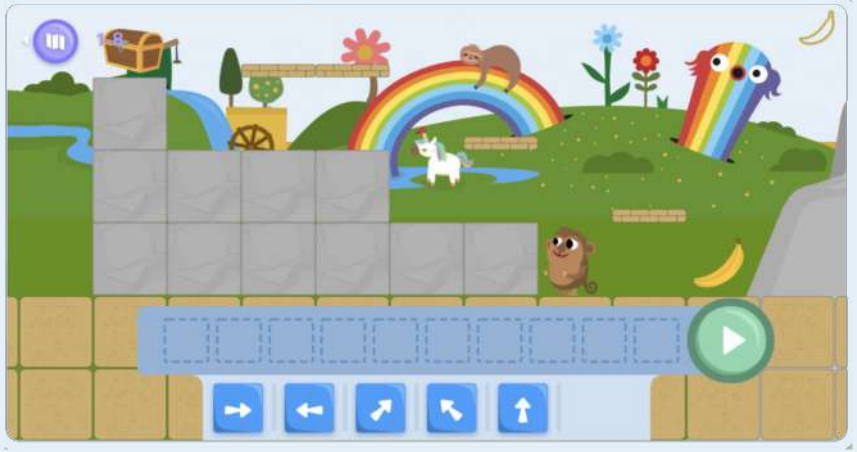
Open challenge #5. Let's go over how to build the solution for this challenge.
The solution to get to the treasure chest is very simple – just two moves left. Emphasize again to the students that we want to collect all bananas before reaching the treasure chest.
Ask the students from where to start?

- They should say by moving right to get to the banana

Count with the students how far is the banana – four moves. But can the monkey jump right four times? No because the bricks are blocking the monkey. So, to get to the banana – the monkey needs to jump right twice and then move right twice.
Great – we have that banana.
Now we need to plan the journey back to the treasure chest. Usually, the journey back will be the same blocks in opposite directions. Here, the monkey needs to jump twice left and then move left. Again, only jumping left will not work because the bricks are blocking the monkey.
Once you pass the bricks, you can choose if you want to use the move left block or the jump left block.

Part 2: 25 Minutes
Playtime

Instructions	TIME: 25 min
Remember to count the steps to and from the bananas and not from the point the monkey is at in the beginning. Encourage the students to get all the bananas and get 3 stars in each challenge.	



Challenge	Scope
6	Jump right to get all the bananas (JR-JR-JR-JR-ML-ML-ML-ML-ML)
7	Move left to get the banana on the left (ML-ML-JR-MR-MR-MR-MR)
8	Start by moving right to get the banana on the right (MR-MR-ML-ML-JL-ML-JL-ML-ML-JL)
9	Move down two tiles to get the banana and then jump up to the treasure chest (MR-MR-JL-JL-JL-JL)
10	Notice: jump right to the first and jump up to the second (JR-JR-JR-ML-ML-ML-JL-JU-ML-ML)

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**

In this lesson, the students had to plan their moves in order to get the banana as well as the treasure chest.
Open challenge #10.
In this challenge there are two bananas that need to be collected:

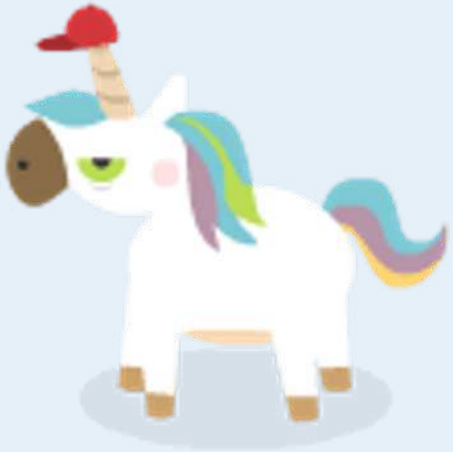
1. The banana on the right - the monkey needs to jump right to get it
2. The second banana is up – the monkey needs to jump up to get it

Solve it with the students by breaking the tasks into sections:

1. Get the upper banana
2. Get back to the second banana
3. Jump to get the banana
4. Move to the treasure chest

Lesson 4 – Behind You Monkey

Upon completing this lesson, the students will complete challenges 11-15 and complete the chapter for advanced sequencing.
Use the teacher dashboard to make sure the students completed the challenges with 3 stars. If not, encourage them to solve again and earn 3 stars for each challenge.



U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14

PREPARE IN ADVANCE:

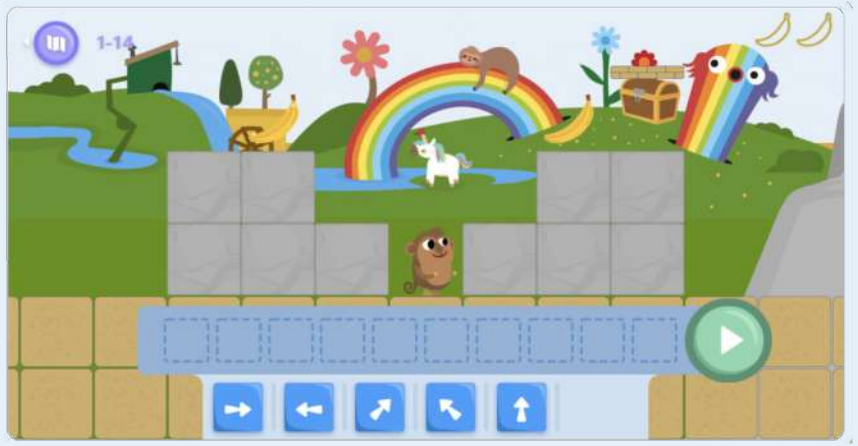
- Bring few objects to class – banana, teddy bear, apple, book, etc.

PART 1: 5 MINUTES
PRESENT

Game	**5 mins.**
The purpose of the game is to show that if we have two items on each side, sometimes it matters which side we start with and sometimes it does not matter. Line up 10 students (let's think of them as student #1, student #2, etc.). Ask another student to be the Mover. Place the Mover at student #4 and hand student #6 and student #2 each an object. Ask the students which side should the Mover start with? In this case, since the number of moves to each object is the same, it does not matter. Ask the Mover to get the two objects. Count together the number of moves. Then, ask them to do it again, this time starting from the other side. Again, count the moves and see that it is the same. Replay this game, but now place the objects in different distances. For example, at student #2 and student #8. Show the students that this time it matters from which direction to start. You can also add to the game the need for the Mover to return to their starting position or to a student next to their starting position and see how that impacts the number of moves.	

Part 2: 25 Minutes
Playtime

Instructions	**TIME: 25 min**
Remember to count the steps to and from the bananas and not from the point the monkey is at in the beginning. Encourage the students to get all the bananas and get 3 stars in each challenge.	



Challenge	**Scope**
11	Jump to the banana before moving right (JU-MR-MR-JR-JR-JR-JR-MR-JU)
12	Right before left (MR-MR-ML-ML-JL-JL-JL-JL)
13	Notice you don't have the Jump Right and Left blocks – use Jump Up (JU-ML-ML-JU-ML-JU-MR-MR-JU)
14	Left before right (JL-JL-MR-MR-JR-JR-MR)
15	This is tricky – need to get the bananas on the right first, then the left and then back to the treasure (MR-JR-ML-ML-ML-ML-ML-MR-MR-JU)

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**

Open challenge #15. This challenge is a little tricky.
Count with the students the move to get all three bananas:

1. If starting with the banana on the left: 3 + 5 = 8
2. If starting the the bananas on the right: 2 + 5 = 7

Now, let's review how many move to get to the treasure chest:

1. If starting with the banana on the left: 3 (from the right banana)
2. If starting with the banana on the right: 2

And once we get to the treasure chest we also need to jump up once.

So, if we sum it all up:

1. Option 1 – 8 + 3 + 1 = 12 blocks
2. Option 2 – 7 + 2+ 1 = 10 blocks

By planning the journey ahead, we can determine which option is best.

Lesson 5 -loops again

In this lesson, students will start the Advanced Loops chapter.
By end of this lesson, students will complete challenges 1-5.

Up until now, the students solved the challenges using a loop and blocks inside the loop. In this lesson, students will add blocks before the loop. They will need to see the pattern in order to use a loop. They will need to identify where the loop starts and how to get the monkey to the starting point.

U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14 • 1A-AP-15

Part 1: 5 Minutes
Present

Discussion	**5 mins.**

The loop repeats the blocks inside it over and over again. In order to use a loop, the students need to find the pattern that should be repeated. You can go back to the Loop chapter and remind them how we found the pattern. For example, challenge #9 – the patten is [MR-JU-MR].

Sometimes, the pattern does not start from the beginning, and you need to move the monkey to the starting position of the repeated pattern.

Write on the board the following sequences and ask the students to identify the patterns:

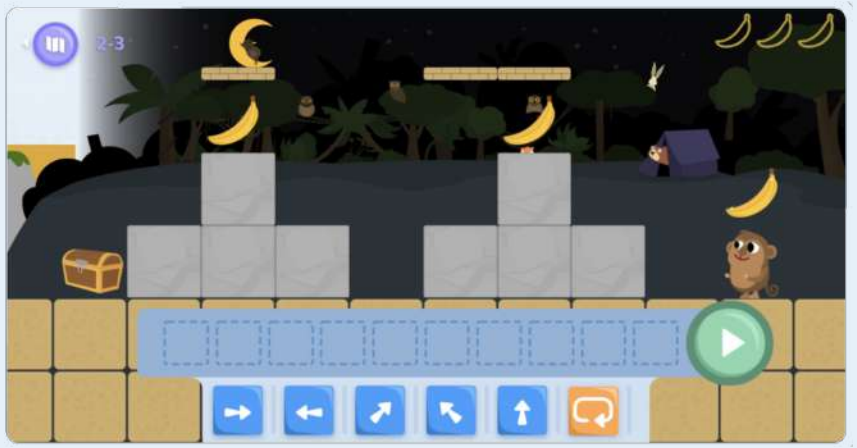
1. MR-MR-JR-JR-JR-JR-JR (Answer: JR; repeat 5 times)
2. JU-JL-ML-ML-JU-ML-ML-JU-ML-ML-JU-ML-ML-JU (Answer: ML-ML-JU; repeat 4 times)
3. MR-JU-MR-JR-MR-JU-MR-JR-MR-JU-MR-JR-MR-JU-MR-JR-MR-JU-MR (Answer: JR-MR-JU-MR; repeated 4 times)

Ask your students to write the same code using loops.

1. MR-Loop[JR]
2. JU-JL-Loop[ML-ML-JU]
3. MR-JU-MR-Loop[JR-MR-JU-MR]

Draw the students' attention to the blocks before the loop. Ask them how many times will these blocks be repeated? Once, because they are not part of the loop.

Part 2: 25 Minutes
Playtime



Instructions	25 mins.
Tell the students that the first two challenges should be solved with just a loop and blocks inside the loop. Starting from challenge #3, they should have blocks before the loop as well. Remind them to find the pattern in order to know which blocks should be before the loop and which are part of the loop.	

Challenge	Scope
1	Loop[ML,ML,JL,JU]
2	Loop[ML,JL,JU,ML,JU]
3	JU, ML, Loop[JL, JL, ML, ML]
4	JR,JR, MR, MR, JL,JL,Loop[ML]
5	JU,MR,MR,JU,Loop[MR]

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**

Open challenge #3 and solve it without a loop (as shown on the top right).
The code is:

- JU-ML-JL-JL-ML-ML-JL-JL-ML-ML

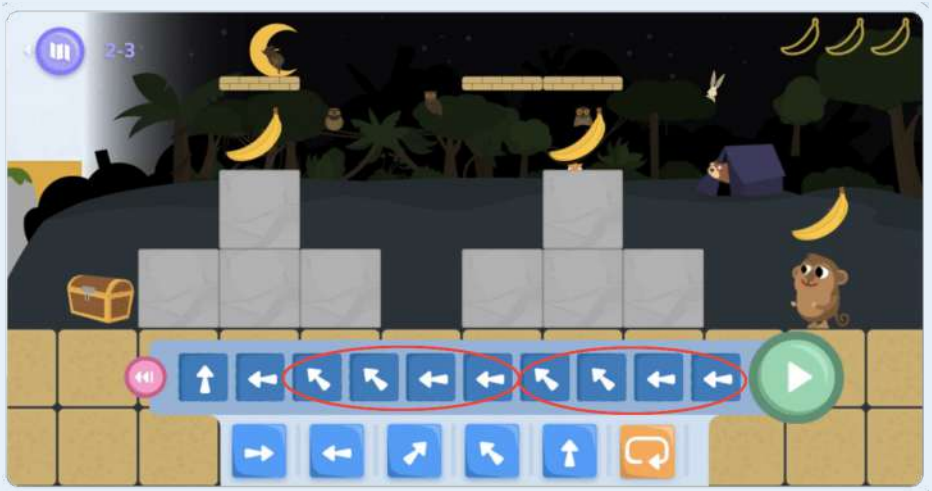
Ask the student to find the pattern here (it is repeated only twice).

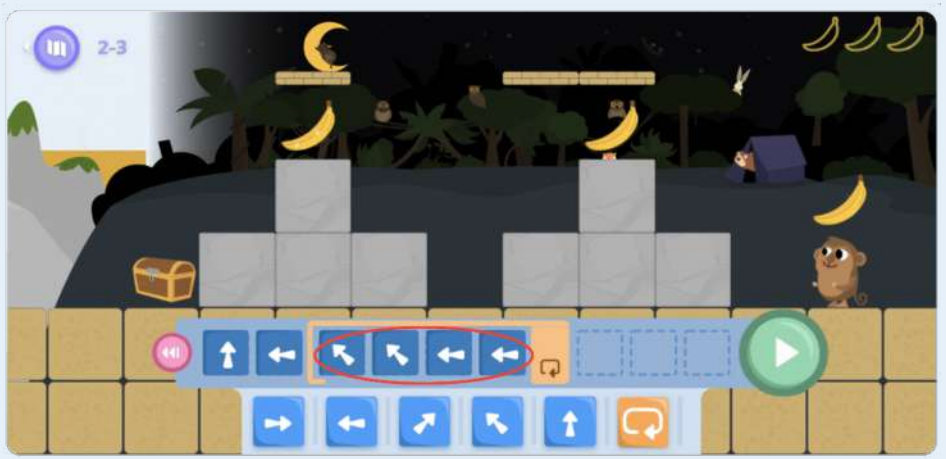
- JL-JL-ML-ML

Ask the students what blocks are not part of the pattern

- JU-ML

Now solve the challenge again, this time using a loop. Show the students that the pattern that they identified before is the code inside the loop.





Lesson 6 – until when?

In this lesson, students will continue solving challenges using loops. They will need to identify the repetitive pattern and the blocks that should be before the loop.
By end of this lesson, students will complete challenges 6-10.

U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14 • 1A-AP-15

Part 1: 5 Minutes
Present

Discussion	**5 mins.**

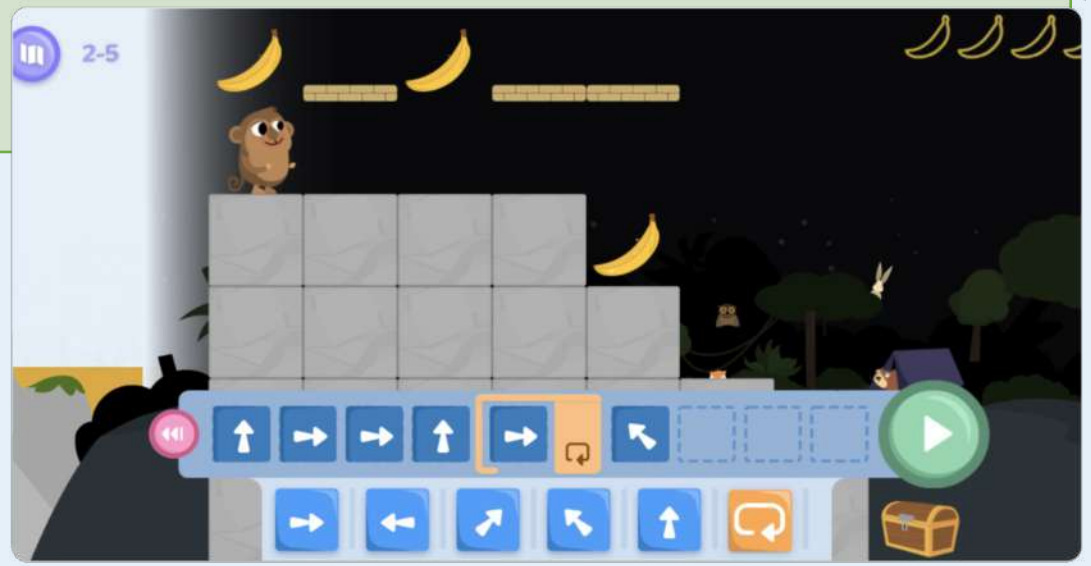
Let's recap again which loop we use in these challenges. If you feel that your students understand this, you can go straight to the playtime section.

In programming there are several types of loops. Some can run for a predefined number of times. Others can run until a condition is met.

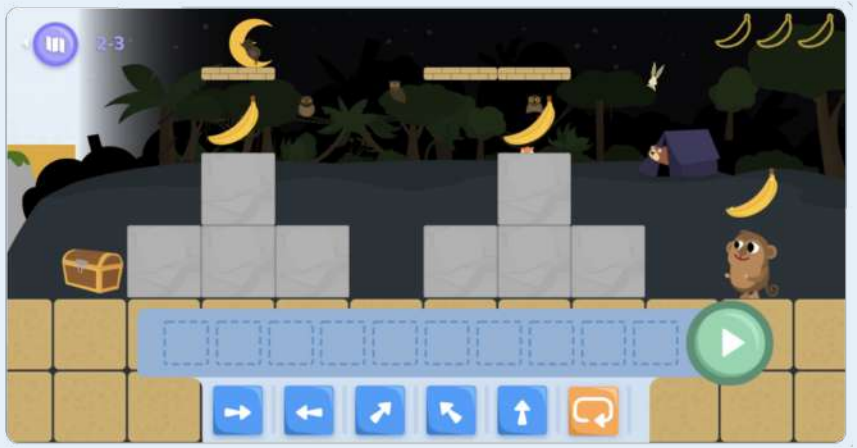
Did you notice that the loop is always the last section of the code. Do you know why?

Open challenge #5. Solve it and add another block or two after the loop and run the challenge.
The code can be JU-ML-ML-JU-Loop[MR]-JL-JL
Make sure to show the students that the code after the loop does not run.

Here, the loop is an Until loop, for example "until you reach the treasure chest."
In CodeMonkey Jr., the loop signifies the end of the challenge.
Note: in real life, the loop is not always the last block.



Part 2: 25 Minutes
Playtime



Instructions	25 mins.
Remind the students to find the pattern in order to know which blocks should be before the loop and which are part of the loop.	

Challenge	Scope
6	MR-JL-JL-Loop[ML]
7	JU-ML-ML-Loop[JL]
8	ML-ML-Loop[JR]
9	JR-JR-Loop[JU-MR-MR]
10	JU-MR-MR-JR-Loop[JU-MR-MR]

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**

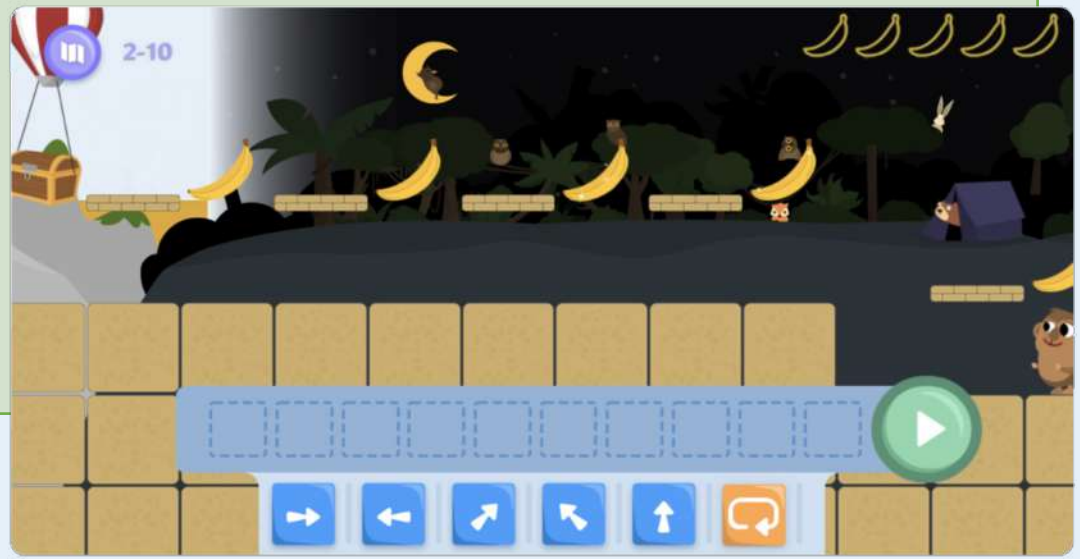
Open challenge #10 and ask one of the students to solve it. In this challenge the students need to find from where the pattern of a loop begins. It is a bit tricky since there are 4 blocks to use before the loop and 3 blocks inside the loop.

You can write the code on the board without the loop to find the pattern. Or you can ask a volunteer to say the blocks needs (”Jump up, move left, move left, etc.) to find the pattern.

Code without a loop:
- JU-ML-ML-JL-JU-ML-ML-JU-ML-ML-JU-ML-ML-JU-ML-ML-JU-ML-ML

Once you write the code, you can circle the repetitive code (JU-ML-ML). The same code exists in the beginning, but since there is also a Jump Left block, you can not solve the challenge using just a loop.

Code with a loop:
- JU-ML-ML-**JL**-Loop[JU-ML-ML]



Lesson 7 – until the end

In this lesson, students will complete challenges 11-15 and will complete the Advanced Loops chapter.

U.S. Standards Addressed

CSTA-K12 Computer Science Standards	
• 1A-AP-10 • 1A-AP-12	• 1A-AP-14 • 1A-AP-15

Part 1: 5 Minutes
Present

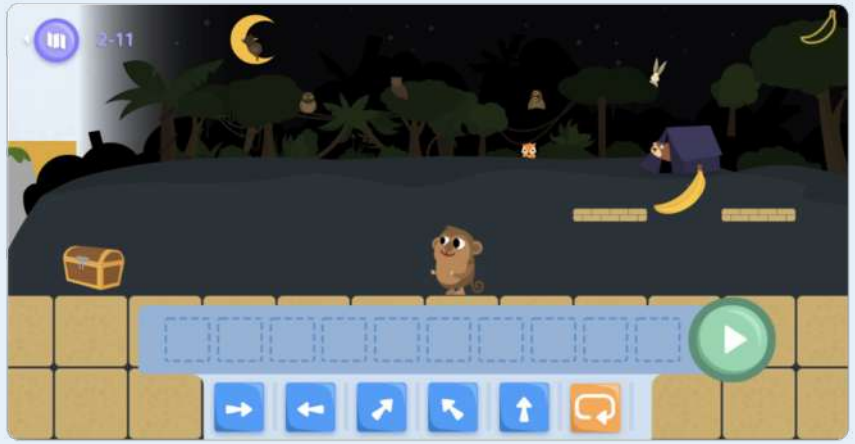
Discussion	**5 mins.**

Tell the students that we in our life, many things that we do involve loops. Ask them to think of some examples.
For example - describe how to make a smoothie

- Do we use a loop when preparing a smoothie? YES, while blending.
- What is the order of instructions? Do we need to have instructions before and after the loop? YES, we do!
  - Slice fruits
  - Put in blender
  - Add ice
  - Blend until smooth ← Until loop
  - Pour into glass
  - Enjoy!

- Can you think of other daily activities where you have a loop with actions before and after?
  - For example - brushing your teeth, taking a bath, cleaning your room.
- For these additional activities, define the following with your class:
  - What is a loop responsible for? For the repeated section. For example, Loop [brush your teeth until you have cleaned all your teeth] After loop [wash your mouth until all toothpaste is washed]
  - Where is the loop within the entire process? Are there instructions before or after the loop? [the loop is in the middle of the process, actually we have 2 loops, the first for brushing the teeth, which takes place after a sequence of instructions, then the loop for washing the mouth]

Part 2: 25 Minutes
Playtime



Instructions	25 mins.
Remind them to find the pattern in order to know which blocks should be before the loop and which are part of the loop. In these challenges they need to move back before using the loop.	

Challenge	Scope
11	MR-MR-MR-JU-Loop[ML]
12	MR-Loop[JL-JL-ML]
13	MR-Loop[MR-JR-MR-JU]
14	JR-MR-Loop[ML-ML-JL]
15	JR-JR-JU-Loop[ML-ML-JL]

Part 3: 5 Minutes
Debriefing

Discussion	**5 mins.**

Open challenge #13.
When looking at the challenge it seems that the monkey needs to move twice to the right and then start a loop of jump right, move right, jump up and move right.

Run the challenges using that code: MR-MR-Loop[JR-MR-JU-MR]

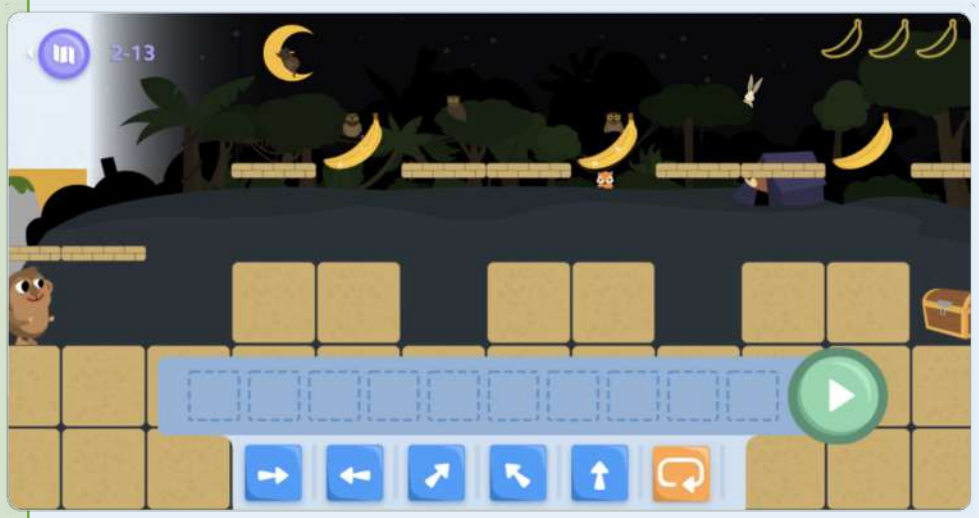
This code only earns two stars. It means that we can solve it with less blocks.
We can not reduce the blocks inside the loop because the monkey must perform these four steps three times.

You can write the steps the monkey needs to make (without a loop) on the board:
- MR-MR-JR-MR-JU-MR-JR-MR-JU-MR-JR-MR-JU-MR

You can mark the blocks that we used inside the loop as shown above.

Show the students that since the monkey needs to move right before jumping right, we can actually start the loop with moving right.
- MR-MR-JR-MR-JU-MR-JR-MR-JU-MR-JR-MR-JU-MR

Run the code again and see that this code earns 3 stars.



Glossary

Term	Definition
Computer	A **computer** is a machine that is able to take information (input), do some work on or make changes to the information, to make new information (output). Modern computers are very different from early computers. They are now very powerful machines that are able to do billions of calculations every second. Most people have used a personal computer in their home or at work. Computers are useful for many different jobs where automatic tasks are useful. Some examples are controlling traffic lights, vehicle computers, security systems, Washing machines and Digital Televisions. (source: https://wiki.kidzsearch.com/wiki/Computer)
Software	Computer software (often called just software) is made of one or more computer programs. Sometimes it means one specific program, or it can mean all the software on a computer, including the applications and the operating system. Applications are programs that do a specific thing, such as a game or a word processor. (source: https://wiki.kidzsearch.com/wiki/Computer_software)
Hardware	Hardware (computer hardware) includes the physical parts of a computer, such as the cabinet, motherboard, central processing unit, storage, and more. Peripheral hardware include - monitor, keyboard, speakers, mouse and more. In some computers the peripheral devices are built-in (like laptop or tablet)
Until loop	Until loops are a way to repeat a set of actions until a certain condition is satisfied

Great Job!

You have Completed