



Museum of Science.



Families
and STEM Events



Computer Science at Home:

This Game Rules

Activity Book



FOR AGES 4+

Try computer science as a family!

Naomi and her family have a problem. Their game always ends the same way. Dad uses his knowledge of computer science to help them solve their problem. **Computer scientists are people who figure out ways for computers to solve problems.** Try this activity as a family and you'll be thinking like computer scientists too!

This Game Rules challenges you to write the rules for a new game. Can you create different outcomes, depending on the conditions? Here's what you'll need to get started:

- **Materials** – You'll need paper or index cards and some tools to write or draw with, such as pens and pencils.
- **Test It Out** – You'll need space to write your rules, such as a desk, a table, or the floor. You'll also need some space to move around and play your game.
- **Your Favorite Game** – Before starting this activity, think about one of your favorite games. How do you play it? Are there rules that you have to follow? Reviewing the rules of a favorite game may give you ideas that will help you build your new game.



Computer scientists use a variety of tools, including conditionals, when they design solutions to problems. A **conditional** is a rule a computer follows to make a decision.

Rolling dice is an example of how board games also use conditionals. For example, a game might have a rule that IF you roll a two, THEN you move forward two spaces. The rule decides the next action in a game, just like a conditional decides the next action for a computer.

This activity supports an understanding of computer programming, logic, and creativity. It's also a fun way to connect as a family! Children as young as four can participate, though they may need a bit more support. Older children can use their imaginations to create more complex solutions. You can read this activity book with your child, or, if they're ready, let them read it to you!

For more fun computer science and engineering resources, visit families.eie.org.

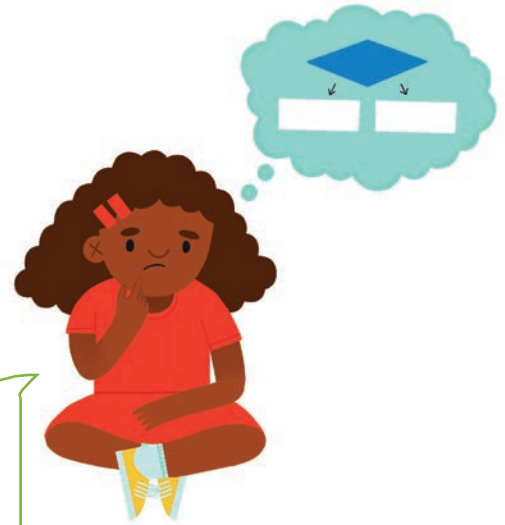


Turn the page to help Naomi make up rules for a fair game!

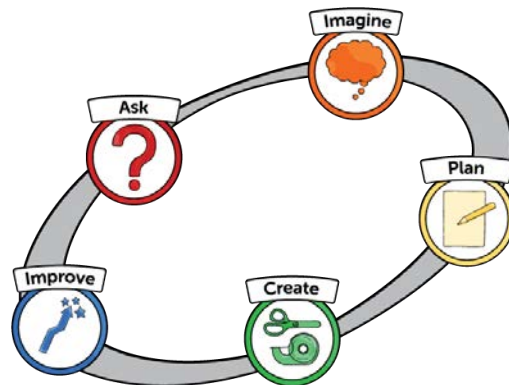
Computer scientists are people who use computers to solve problems.



First, they **ask** questions about the problem . . .



Then, they **imagine** possible solutions. One of the tools they can use to solve a problem is a conditional.

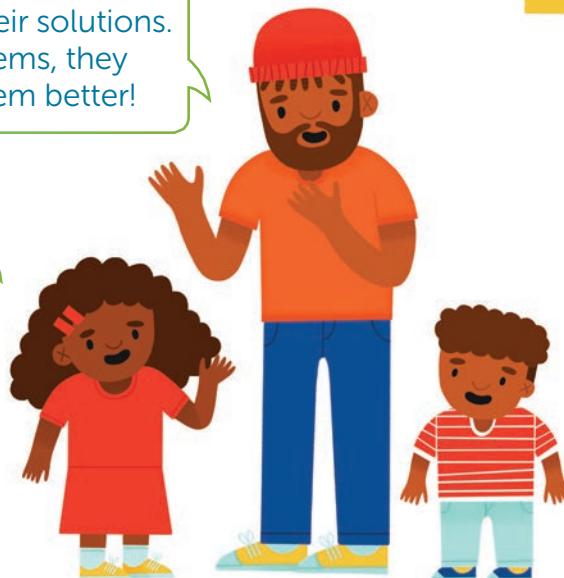


Next, computer scientists make a **plan**.



Then they **create** and **test** their solutions. When they run into problems, they **improve** them to make them better!

Let's think like computer scientists! We'll make a new game using conditionals.



We can work together. Let's start by asking questions.



What are the different things that might happen in our game?

I drew ideas for what the leader can do.



If leader shows red bucket



If leader claps



If leader stomps



If leader shows green rectangle



If leader shows blue triangle



Make your own condition.

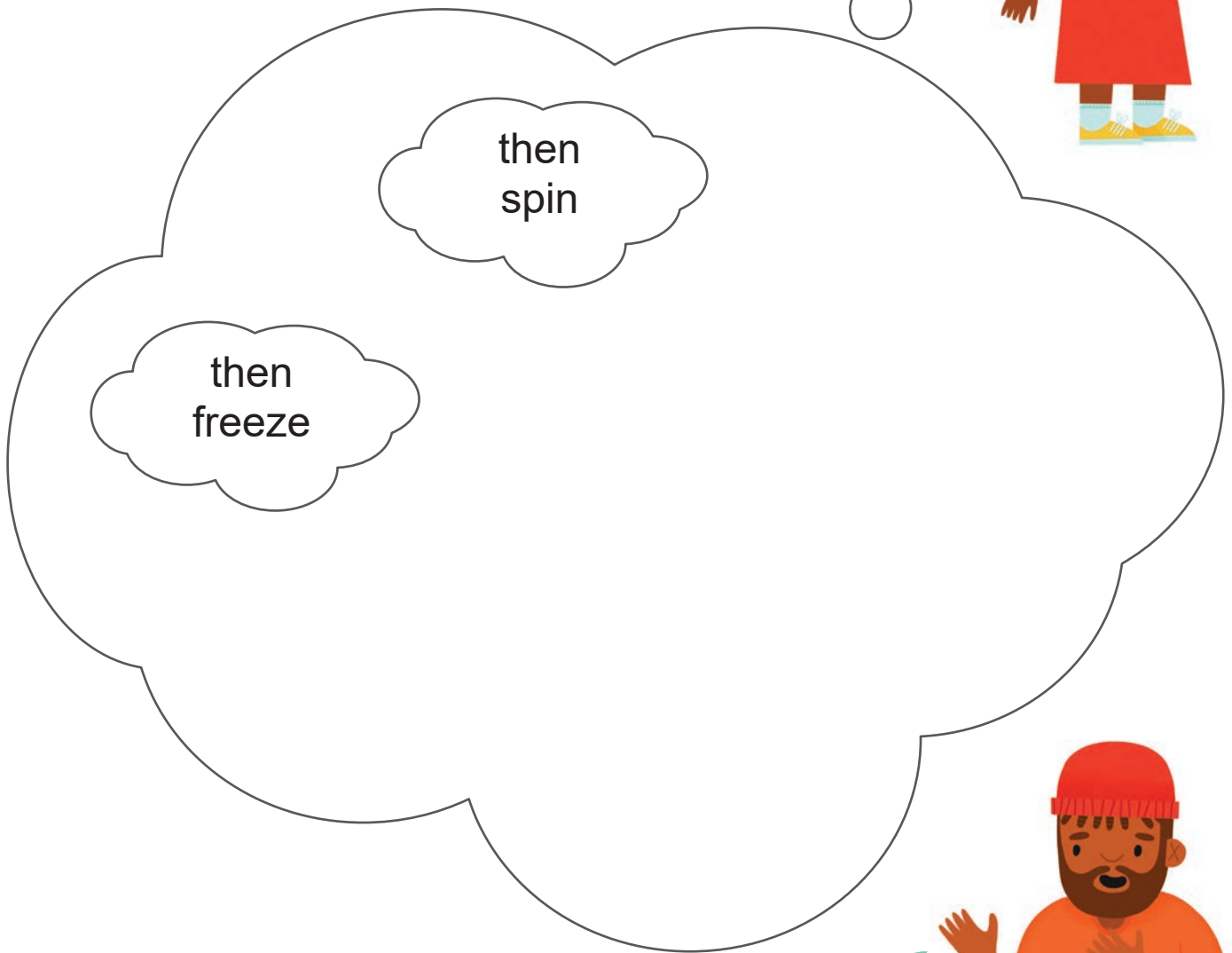


Use these examples to get ideas. Are there other objects or actions your family could use instead of these conditions?

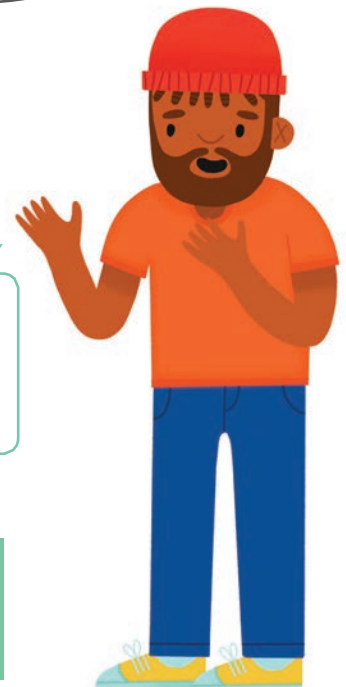
Write your conditions down on index cards or a piece of paper.



Imagine all the things the players could do next.
Let's think of some ideas.



Changing the rules affects how we play a game. In computer science, conditionals let us make the rules for what the computer will do.




**When a condition happens, how could the players respond?
Write or draw different things players could do.**




Choose the conditionals you will use to play your game. Fill in the ideas below, or create your own on a new page.


We're almost ready to play our game, but first we need a **plan**.



IF  THEN _____

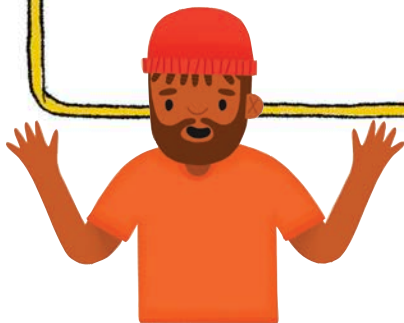
IF  THEN _____

IF  THEN _____

IF  THEN _____

IF  THEN _____

IF  THEN _____



Computer scientists like to plan their rules out before they start writing a program.



Create



It's time to try out the rules. Let's see who makes it to the tree first this time.

I can't wait to play!



Try playing your game together. You can choose one person to be the leader while everyone else follows the conditional rules.

How fun and fair was your game? What can be improved?



Improve



Computer scientists LOVE to improve! When they find and fix errors, it's called **debugging**!



If the game doesn't work, that's okay. We can always improve it by changing some of the conditionals.



How can you make your game more fun to play? How can you make it have different endings?

Talk about the rules together. Which parts need to change?

Then try playing your game again.



It can take many tries to find conditionals that work. We've got to keep at it!

Congratulations!

Now you know that
conditionals are rules
for different situations.
You are thinking like a
computer scientist!



When you do computer science activities like *This Game Rules*, you practice thinking like a computer scientist. Computer scientists use conditionals to control what a computer will do next. This is similar to the way rules tell players what to do during a game. Like game designers, computer programmers may try several times before they get the result they want. Here are a few ways that you can extend the activity and continue the fun as a family.

- 1. Do you want to play a different game?** Try the activity again with a game that you have played before. Simon Says or Red Light/Green Light could be a good place to start. Turn the rules of the game into conditionals.
- 2. Do you want to test your game more?** Share your game rules with friends and other family members. Can they understand your conditional rules? Ask them for tips on how to make your game better.
- 3. Do you want to use a computer program to make a game?** Ask an adult to help you make a playable game with a website such as Microsoft MakeCode or Scratch. Use IF/THEN blocks to tell the computer what rules to follow.
- 4. Do you want to make your game more complex?** Computer scientists have other tools that help them write complex programs, including loops. Interested in learning more? Try out the *Loopy Moves* activity on families.eie.org.
- 5. Do you like solving problems?** Think about a new problem that you can solve by using conditionals.
 - What's the problem?
 - How could conditionals help you solve the problem?
 - How will you test your conditionals?
- 6. Do you want to learn more about computer scientists?** Check out EiE's [Careers for Engineers quiz](#) to learn more about the types of problems that computer scientists solve.



Scan for links

Keep doing computer science together!

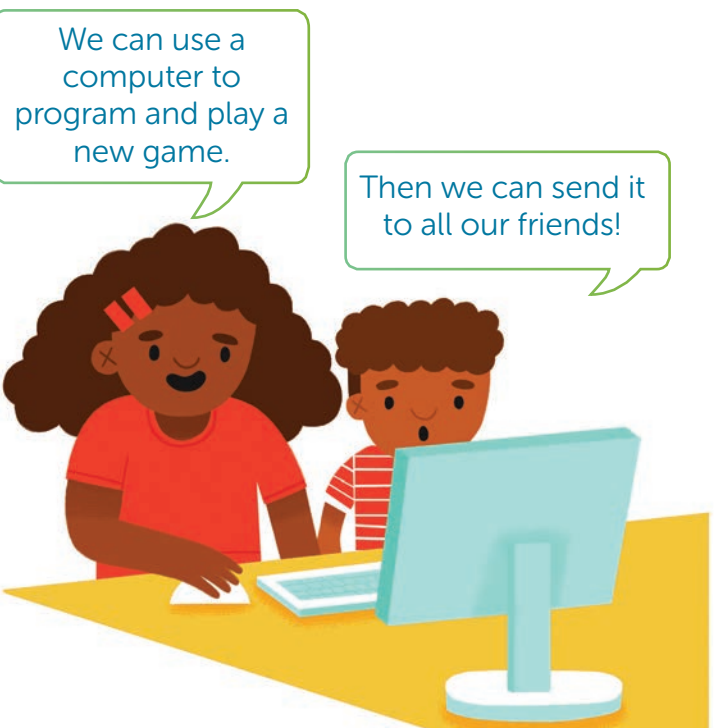
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