In the Digital Game Design badge, Ambassadors explore narrative video game design and how games can make a positive change in the world. They create avatars, scenarios, decision trees, and conditional statements to design the elements and mechanics of a game. They also consider how they can design video games that help people understand the world and its issues.

The Ambassador Coding for Good badges are unplugged - no device needed! However, if girls want to practice coding on a computer as part of the badges, you can use VidCode, a web-based platform that teaches creative coding through JavaScript. For this lesson, girls will explore how to apply game physics to make jumping characters and create a game where their character has to jump. See the **Ambassador Coding for Good Badges - Plug It In** meeting aid for more information on how to access VidCode and support girls through the plugged activities.

Activity 1: What Makes a Game Fun?

This activity is meant to start thinking about what makes video games engaging (or not) and how video games can reflect or influence the real world

Materials

- Thought-starter questions

Steps

Take turns reading questions and discussing it

Questions:

1. What do you like most about your favorite video game: the characters, setting, game play, or story? Why?
2. What do you like least about video games you've played? Why?
3. What video world would you like to live in? Why?
4. What kind of video games would you like to develop?
5. How can you use what you like or dislike about different games to design your own game?

Activity 2: Brainstorm "Game for Good" scenarios

Ambassadors brainstorm ideas for their game. They'll imagine different scenarios where good can take place and create scenarios that could have positive impact.

Materials

- **Prepare Ahead**: Before the meeting, write "Big Ideas", "Issues to Address", and "Positive Events" on 3 pieces of paper
- Chart paper or whiteboard
- Marker for each girl

Things to Know

- Many of us play games every day, whether we're playing on our phones, on a computer, or even in competitions. This means games can have a lot of influence over how we think.
- Although some games can be negative, others work towards social good: they can shape how we see the world, help us understand others and imagine the difficulties people face, or teach us about important events.
- More and more women of all ages are taking the lead to improve their communities at the local, state, or national level. Girl Scouts do this by developing Take Action projects based on issues they care about.
- Developing a game "for good" is one example of a Take Action project that a Girl Scout could create to address an important issue.
- Developing video games can also be like putting together a puzzle or a Take Action project: there are lots of pieces that come together to make a whole.

THEN, Discuss different types of games “for good”. Can you think of any games that…

- Are designed to create social good?
- Let players experience aspects of what it is like to live in another part of the world or new social situation?
- Teach players a new skill or important information?
- Challenge people to solve problems in their community?
- Raise money or recruit volunteers for a charity or cause?

Things to Know

- Video games can build awareness about other people's experiences and challenges. They can even inspire social action.
- They can teach you everything from how to be a more active citizen to another language that will help you communicate with more people.
- Now that you've thought about games and how they can be designed to make a difference in the world, it's time to start designing your own video game.

Things to Know

- **The first step in developing a game "for good" is coming up with a scenario.** Think: What is your game about - what kind of outcome does your main character hope to accomplish? What kind of world does she live in? What kind of quests, challenges, or obstacles does your main character have to solve or overcome?
- **As you develop your scenario, it's helpful to think about the characters or players.** For example, do you want your main character to have a role traditionally associated with leadership, such as an elected official on a local, state, or national level? Or do you want her to be a leader in her community or workplace?
- Write down your ideas for a scenario based on the challenges and opportunities the character might face in their role as a leader on the papers with these three headings: "Big Ideas," "Issues to Address," and "Positive Events."
- List some **big ideas** that you'd like to champion and that will help and inspire people.
- List some **issues that you'd like to address** with your game**.**
- List some **positive events** that could occur in your game.

Take 5-10 minutes to write down your ideas. If they need help, share some of the possible examples to jumpstart brainstorming:

- **Big Ideas**: creating new education initiatives, strengthening national security, providing broadband access for the whole country, bringing new business to rural areas, developing new services for homeless people or people with disabilities, etc.
- **Issues to Address:** If your role is that of an elected official, these could be natural disasters, a global economic crisis, or an attack on the country. If your role is that of an engaged community member, these could be issues specific to where you live, such as a need for more school counseling services, more public transportation, or the creation of a food pantry.
- **Positive Events:** For example, a mayor may learn that her city has been chosen to host an international sporting event or a technology breakthrough could boost the nation's economy. Even positive events can require hundreds of decisions that people may not agree on.

Activity 2: Create a G.I.R.L. Avatar For Your Game

Ambassadors develop characters, or avatars, for their game.

Materials

- Scratch paper
- Pen or pencil

Things to Know

- Now that you've developed ideas and events that you might use in your game, it's time to create your characters.
- Your main character will be a leader who will have to deal with whatever comes up in the scenario you create. The main character will interact with one or more other characters in your game.
- You're going to use the characters you create to roleplay your game. You'll play a few times by making different decisions, inspired by the different characters.
- In a video game, the digital image that represents characters is called an **avatar.** Each character, or avatar, has personal traits - how they look and move, what motivates them, and how they think and feel.
- In your game, one of the characters will be you! Your avatar could be you, right now - a G.I.R.L. taking action. Or it could be you, sometime in the future.

Take some time to discuss how the girls see themselves in leadership roles, now and in the future.

- How are you a leader right now? At home, at school, on a team?
- Where do you see yourself making a difference? What do you think you'll be doing in college, after college, or at any time in the future?

Do you see yourself helping others by:

- Starting a non-profit?
- Running for elected office?
- Organizing a volunteer group in your town?
- Serving in your neighborhood association?

- Leading a business?
- Creating stories and videos to spread the word about inspiring solutions to big problems?
- Working on a political campaign?

THINGS TO KNOW:

- All of the opportunities you just discussed are ways you or your characters can be leaders.
- Now, develop 2-3 game characters.
- One way to get a feel for your character's personality is to roleplay. Try acting like your characters to get a sense of what they're like physically. How would they stand, walk, or talk? Look for a pose or catch phrase that captures their personality. You might even want to take a photo or video to capture these traits.
- Another way to flesh out your characters' personalities is to give them some tricky questions to ponder. You can use sentence stems like "What would they do if X happened?" or "Which would they rather: X or Y?" These questions should be less about right and wrong, and more about how the character will approach problems. These kinds of questions are often called 'dilemmas.'
- Once you've got a sense of who each character is, give them a name that reflects their personality!

What are your character's personality traits? Circle those that apply and add your own.

Shy	Cautious	**Add Your Own:**
Outgoing	Likes to take risks	_____
Wants to take charge	Tends to be a worrier	_____
Wants to work with others	Perfectionist	_____
Free-spirited	Likes to think through every decision	_____
Innovator	Impulsive	_____
Imaginative	Cautious	_____
Detail-oriented	Hot-headed	_____
Bold	Calm	_____

How does your character deal with challenges? Circle those that apply and add your own.

Jump right in and deal with it!	Add your own:
Learn more about the problem and make a plan	_____
Go it alone — you're confident you can handle it	_____
Recruit a team to help out	_____
Get upset: turn to a close friend for help and support	_____
Get mad: take action without thinking	_____
Get creative: quickly try several solutions to see what works best	_____

Activity 3: Learn About Decision Trees in Game Design

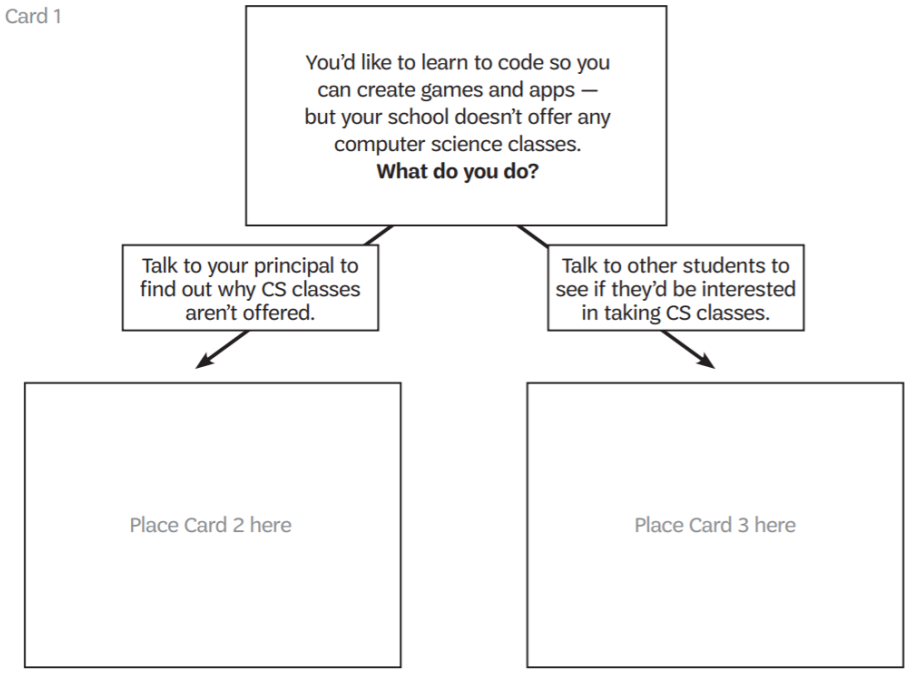
Ambassadors learn about decision trees. First, they learn how game narratives can be designed using decision trees by playing out a pre-existing game. Then, they convert decision trees to pseudocode using IF-ELSE statements.

Materials

- **Take Action Decision Tree Cards,** one set for the troop or each small group of 3-4 girls (**Note to Volunteers:** Depending on the size of your troop, you can play the game as a troop or in smaller groups.)
- **Take Action Decision Tree Layout** for each girl or small group of 3-4 girls and one for you as a reference
- **Complex Decision Tree Layout** for each girl or small group of 3-4 girls and one for you as a reference
- **Blank Decision Tree Card Template & Layout** for your reference
- Chart paper or whiteboard and markers
- 3 or more sheets of blank paper for each girl
- Pen or pencil for each girl

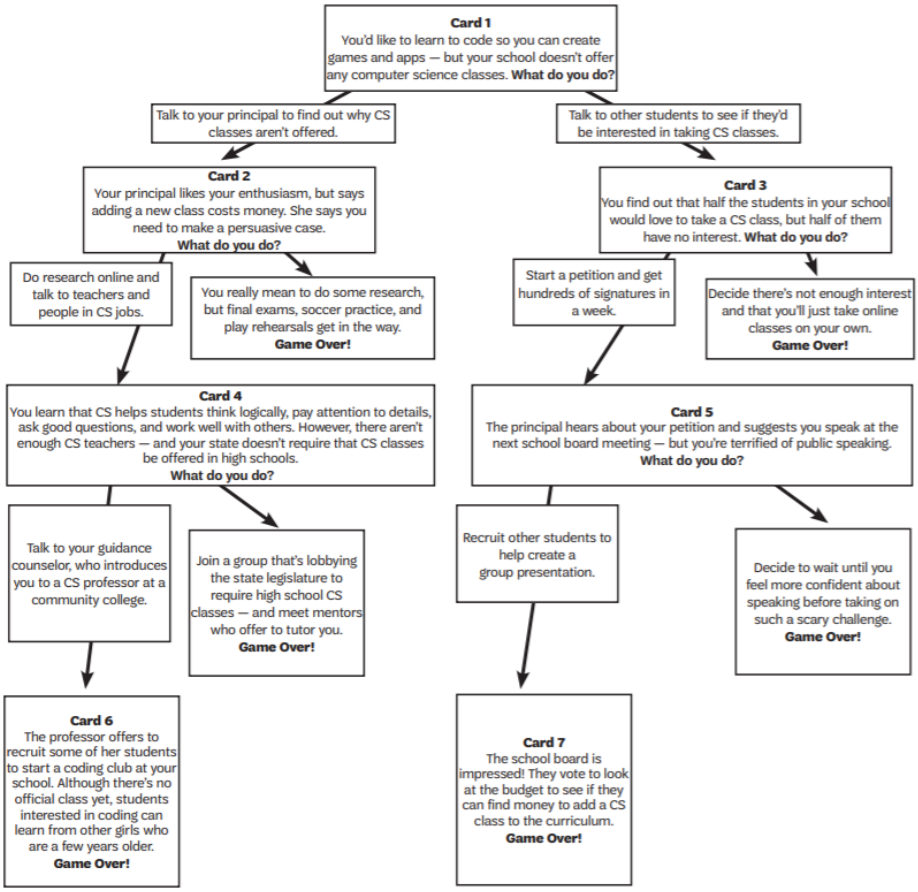
Things to Know

- In role-playing games, players get to make **narrative** decisions. Narrative means "story."
- When you, as a player, are given the chance to make a decision that changes the story in a game you're playing, you've made a narrative decision.
- Here's an example: You're coming home from school with your friends but have a lot of homework to do. Do you: 1) hang out with your friends - you're sure you can finish your homework later tonight or tomorrow morning; or 2) make sure to get home and get the homework done first, then spend time with your friends later?
- When creating video games, developers store open-ended narratives like this using a tool called a decision tree.
- A **decision tree** allows game developers like you to build and organize an open-ended story. Decision trees have a flowchart or tree structure that helps design **consequences** (the results of a decision that has been made) of open-ended stories.
- Decision trees give players a sense of freedom when playing the game by letting them make choices.
- Now that you have some ideas for different "for good" game scenarios and avatars for your game, it's time to look more closely at game mechanics and game play with "decision trees."



THINGS TO KNOW:

- Now, look at this from a game designer's perspective. The **Take Action Decision Tree Layout** shows an entire decision tree for the Take Action game.



- A decision tree is the structure of all the possible games - not just the one you played but all of them together.
- In a decision tree, each choice and consequence is in a **node** - the part of the tree with the questions and answers.
- Each card that's played contains **nodes**. The first node is called the **root node**. The root node begins the game. Each following card is called a **child node**. A node without any children is called a **leaf**. When you end any possible game, you've reached a leaf node.

DISCUSS:

- What is the root node in the Take Action Decision Tree?

(Answer: You'd like to learn to code so you can create games and apps, but your school doesn't offer any coding classes. What do you do?)

- Which child node did someone choose for the first decision?

(Answer will depend on which route the girls took.)

- What was the leaf node someone ended up with?

(Answer will depend on which route the girls took.)

Share the **Things to Know** for the next part of the activity.

THINGS TO KNOW.

- So what do decision trees have to do with *designing* video games? When you're designing a video game, you wouldn't just jump right onto a computer and start typing!
- For role-playing video games like the one you're making, you first need to create a narrative structure or story that has lots of different stories, all stemming from one problem. The best way to do this is with a decision tree.
- In video games, many of the decisions in video games are moral or ambiguous. Decisions which have a clear 'right' answer often don't make for interesting games. So, when you make a decision tree, it's better to make both answers sound 'right' or both sound 'wrong' than have a clear path.
- In terms of the structure, the idea is that you have a first situation which presents a problem and offers the player two possible choices to make. The player makes a choice, which then presents a new situation with two more choices, until you reach one possible conclusion to the story.

THINGS TO KNOW:

- For example, the very first box in this decision tree on Card 1,"You'd like to learn to code, but your school doesn't offer any computer science classes. What do you do?" is called the **root node.**
- Underneath, in the lines, there are two choices.
- When you make your own decision tree, these choices should be actions of some kind; they should be verbs.

Point out the first two choices on the **Take Action Decision Tree Layou**t handout: "Talk to your principal." and "Talk to other students to see what they think."

THINGS TO KNOW:

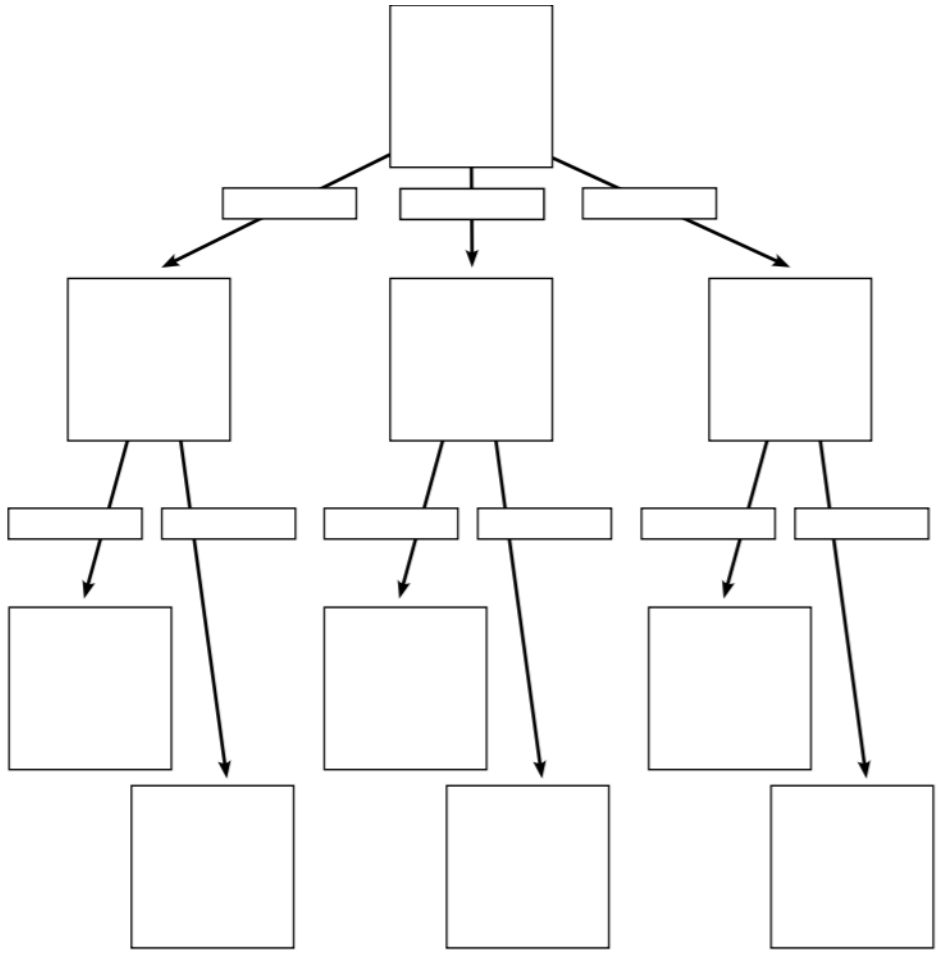
- These are your two possible decisions: The player can either talk to the principal or talk with other students.
- Under each choice on the decision tree is a child node. The child nodes are the results or consequences of the decisions.

"The principal likes your enthusiasm but says adding a new class costs money. She says you have to make a persuasive case. What do you do?" under the "Talk to the principal." decision and "You find out that half of the students in your school would love to take a CS class, but half are not interested. What do you do?" under the "Talk to other students to see what they think." decision.

THINGS TO KNOW:

- Then, you repeat the process. The basic structure is the same as before. You add a situation (the node), then draw two lines from it with two possible decisions.
- From each of the two new situations, you can draw two more lines, with two possible decisions. These will be child nodes.
- Then, you create consequences from those decisions to make two new situations.
- On the **Take Action Decision Tree Layout,** notice that the second consequence on the bottom line has reached the end of a narrative sequence and says, "GAME OVER!" From this box, you don't need to draw any more lines. This is a **leaf node**, showing that the story arc is done. However, the other three stories can continue!
- When you create a decision tree, not all boxes need to continue for the same length. Some stories can be shorter than others!
- This is a simple decision tree - if you were designing a video game, it would be much more complex. The more decision choices you offer players, the more complex your decision tree will become.

View **Complex Decision Tree Example** and discuss how adding a third choice adds complexity to a decision tree.



THINGS TO KNOW:

- Since computers can't comprehend drawings, another step in designing a video game is to convert the decision tree into code!
- Next, convert the Take Action decision tree into code using a form of syntax called **conditionals.**
- **Syntax is the rules of a computer language. These rules have a similar purpose to written grammar and help us communicate. In programming, the syntax must be specific and detailed, and needs to be correct. For that reason, programmers often use pseudocode to help them flesh out ideas without the burden of being too exact.)**
- The syntax you're using in our Coding for Good badges is for the programming language JavaScript.
- **Conditionals** are one of the ways that computers can understand decision-making. The most common form of a conditional is an IF-ELSE statement.
- **IF-ELSE statements** create algorithms for computers to be able to make decisions based upon an input. IF-ELSE statements work like this: "**IF** something is true, do this, **ELSE** do that."

On a piece of paper, write the code in bold below:

if (choose talk to your principal) {

Show card "She likes your enthusiasm, but says adding a new class costs money...What do you do?"

}

THINGS TO KNOW:

- For example, if you're looking at the first card ("You'd like to learn to code, but your school doesn't offer any computer science classes. What do you do?") in the last game, the first path of the decision: Talk to your principal would be written using this IF statement.
- However, what I've written up here is pseudocode. **Pseudocode is a way to plan a computer program using human-friendly language. It's a written description of the key elements of an algorithm or program.**
- This pseudocode says, "IF the player chose *talk to your principal,* then show the card with *'She likes your enthusiasm, but says adding a new class costs money...'"* This is the same as choosing the left path of the first decision of the Take Action game.
- But what about the right-side decision? If you follow the path on the right, this is like saying if we choose to not talk to the principal, so we choose the other path. In other words, it's the *ELSE* part of the *IF-ELSE* statement.
- Putting the two together, you're saying this: IF you choose to talk to the principal, show the "*She likes your enthusiasm, but says adding a new class costs money..."* card, ELSE show the "*You find out that half of the students in your school would love to take CS classes..."* card.
- Notice that you don't have to ask whether you're talking to other students because there are only two choices. If you're not talking to the principal, then choosing talking to other students is the only option!

THINGS TO KNOW:

- Every time you make a decision in a game with decision trees, the computer uses a structure like this one.
- Now, as a last activity, work to convert the **Take Action Decision Tree** into if-else statements. Use the code in bold below:

if (*1st choice*){

do this

} else {

do that

}

THINGS TO KNOW:

- Use this code to convert the Take Action decision tree into code.
- Write code for each "IF-ELSE" decision in the decision tree. Each IF-ELSE statement should correspond with the decision on the tree.

Activity 4: Design your game

For Step Four of the Digital Game Design badge, Ambassadors create a decision tree for their game based on their ideas from *Digital Game Design 1*.

Materials

- Scenario ideas
- **Character Development**
- **Blank Decision Tree Card Template & Layout**
- Sticky notes or quarter-sized pieces of blank paper for each girl
- Tape
- Chart paper or whiteboard and markers
- Pen or pencil for each girl

THINGS TO KNOW:

- Today, you'll design and playtest your own games that make a difference.
- **Playtest** means testing a game to find flaws and to identify possible improvements. This can be after the coding has been done or during the planning process.

Next, review the process of creating decision trees.

Possible Answer: How to Create a Decision Tree:

1. Write the opening scenario in the root node in the top box. The opening scenario should be simple and open-ended. It's a problem, not a solution.
2. Then, write two possible decisions below the root node and add boxes below that with the consequences of each decision.
3. Finally, continue to write different decisions and consequences and allow the narrative to develop. It's important not to have just one goal in mind, since most narratives will have lots of different endings.

Tips for Designing a Game Scenario:

- At the beginning, think of an idea that could go in many different directions. That kind of idea will offer enough potential decisions that your tree will continue to grow, and your narrative will have lots of different endings.
- Make sure that there's a scenario that many people would be interested in or care about. Your scenario is the place you'll set up your game "for good."
- Even if the game takes place in a fantasy world, think of a scenario that's in some way familiar. For example, if your game includes magic, characters could still experience everyday problems that they use magic to solve, like the bad weather interfering with

their plans. Reminding players of common situations or experiences they're already familiar with helps them relate to the story and characters.
- Write your different ideas for a root node on separate sticky notes or piece of paper. Each root node is the beginning of a story.
- Talk through the possible storylines that might be developed from the root nodes. The root node with the most possible stories is probably the best option.
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Tips for Writing Decisions: Creating dilemmas

- **Try to make sure both decisions are possible -** the game often works best when you have at least two options for answers that are equally good or bad. These are called dilemmas. For example, if you like apple pie and chocolate cake equally, and both are offered to you, that's a dilemma.
- **A story's drive comes from tension -** think of decisions that are difficult to resolve or which could have more than one solution. If a decision is too easy-like whether to take the direct, safer path to a destination or take a longer, more dangerous path, for example-or too obvious, your players will take the same routes through the narrative and become bored. This is also why it's useful to have a number of people involved in crafting a narrative.
- **Find inspiration from stories you know -** think about books, TV shows, or movies have kept you engaged (or not). What can you learn from the way their narratives were structured?

Tips for Writing Decisions: Pacing

- **Create decisions that have open possibilities** (where it's not clear exactly what might happen). You might even want to prevent a situation from being solved to keep the story moving. For example, rather than writing, "Your friends are going to the movies - do you join them or stay home?", you might write, "Some of your friends are going to the movies, but some want to hang out at the park instead. What do you do?" This is a dilemma because both options sound like fun, but you have to choose just one.
- **Keep your decisions and consequences small in each step.** In video games, interactivity is key. By keeping decisions small and giving the player lots of choices, the players feel like they're in charge of the story, even though the game designer wrote it.
- **Consider adding extra steps!** Sometimes you might want a few steps between the situation you're in and the decision you've thought of to extend the game or add some twists. Keep a note of that decision idea and try to come up with a few small steps to get from the situation to that decision.

HOW TO CREATE A DECISION TREE:

1. Now that you've chosen your two decisions, add them to your decision tree as leaf nodes.
2. On your first tree card, based on the "Card Template" from the **Blank Decision Tree Card Template & Layout** handout, write one decision in the left box beneath your root node and one in the right.

3. Number each decision with a unique number - the decision number will connect it to the consequences. This creates the first branches of your decision tree.
4. Then, create consequences for those two decisions and two new situations that players must navigate.
5. Each decision you've created will lead to two new situations. Each new situation should be numbered to correspond with the decision that it comes from. You'll use the numbers when you play the game.
6. At this point there are two types of decisions: a) a child node - a decision that continues the game because it leads to more decisions, or b) a leaf node - a decision that ends the game.
7. When you create situations that lead to new decisions to be made, repeat the steps you just did to create another situation, with two new decisions.
8. When you create situations that end the game, for good or bad, write the final consequence and GAME OVER!

HOW TO CREATE A DECISION TREE, CONTINUED:

1. Create two new tree cards and write your new situations in the top boxes. Each situation leads to new decisions. At this point your games should have two situations, so you need four new decisions, two for each new situation.
2. Working together, add more decisions and situations to your game until all the stories reach a conclusion or a good ending point.
3. This process can quickly become complicated, so you want might want to end one of the possible decisions at this point, although you don't have to. Remember that if a narrative line leads to a natural ending - that's ok. That's called a leaf node!
4. As your decision tree grows, the cards or drawing won't line up perfectly. If you've numbered your nodes and the lines clearly communicate how one node connects to another, you should still be able to play it.

Activity 5: Playtest and iterate your game

Ambassadors playtest their games and provide feedback to other game developers.

HOW TO PLAYTEST:

- Everybody should now be either playing the game as a playtester or running their own game as a game developer. You will take turns running your game or playtesting the game for the other group.
- Game developers, show your completed **Character Development** handouts to the playtesters so they see who their characters are.
- Game developers, start your game by placing the root node of your decision tree face up on a table or the floor. The tree could grow quite a bit, so make sure that there's enough room for your tree to grow without running into another group's tree.
- Playtesters, use the characters created by the game developers to think through the different decisions given in the game.
- Once playtesters choose a decision, they should place the next card beneath the first (and to left or right).
- Make sure the numbers correspond from one card to the next, so the story unfolds in the right way.

- Play the game until you reach the end of the decision tree (the leaf node).
- Let each member of the playtesting group play so that different paths can be taken.

After each group has finished playing their games, playtesters can give constructive feedback to the girls running the game by answering these questions.

Feedback Questions:

- What are the best parts of the narrative and why?
- What parts could be improved and why?
- Could some parts of the story be extended to add more complexity? Could some parts be shortened so that you get to GAME OVER! more quickly?
- Are there any places where the designers could increase the positive message or impact of the game?
- Do you have any other feedback for the game developers?

THINGS TO KNOW:

- Now that you've received feedback, discuss how you can use the feedback to improve the next version of your game
- Try not to take the feedback personally - designing any part of a video game requires a lot of **iteration,** or repeating of the design process, and everyone wants the game to be the best that it can be.
- The playtesters' role is to help the game developers improve their game.
- In coding, you wouldn't build the whole game before testing out parts of it. Instead, you would work through many different narratives, before settling on a final choice. Then, you'd code it.

Tip for Improving Your Game: If you get feedback that...

- **The story is confusing, or the decisions don't seem to be in the right order,** try moving the nodes of the tree to different places or rewrite the nodes to be clearer.
- **The game moves too quickly,** break big decisions into smaller decisions or add some nodes to insert new twists in the story.
- **The game moves too slowly,** remove a few nodes that don't seem to move the narrative along. You can then add other stories to the narrative to make it more interesting.
- **You should create a completely different game,** think about how much you want to change. Radically rethinking your design could be a great idea, or it could change what you hope to achieve with your game.
- **Upsets you,** remember that not all feedback will be good, but it usually aims to help you improve your game and should be seriously considered.

Plug It In!

If girls want to plug it in, they can complete the Jumping! tutorial from Vidcode to practice coding. They'll finish coding a jumping game using JavaScript, learn about loops, and find out how to control character behavior.