Badge 2: Digital Game Design

Lots of things go into making a great video game: the story, the challenges, the characters, the graphics, even the music! Game makers use their coding skills to bring the worlds and characters to life for players. Some game makers even go the extra step and design their games to make a difference in the real world.

Steps

1. Create an avatar
2. Learn how to use arrays to create images
3. Write an array to create an icon
4. Develop a game scenario
5. Play your game

Purpose

When I've earned this badge, I'll know how programmers develop video games. I'll have designed a game scenario, stored an image with an array, and used JavaScript to create my own character.

1 Create an avatar

What's your favorite thing about you? When your friends describe you, what do they say? "She loves to run!" "She's a great problem-solver." "Her smile lights up the room!" If you created an avatar of yourself, you could put wings on your shoes, a light bulb over your head, or a beautiful smile on your face.

An **avatar** is a digital image that represents someone or something and can be manipulated by a computer. When you create an avatar instead of using a photo, you can add to the image or emphasize elements by using color or making them bigger.

G.I.R.L. POWER

How will you show G.I.R.L. power in your game character?

Think about her attitude, choices, history, and appearance. As the game designer, YOU get to create her personality and beliefs.

You also have to decide on the choices she'll have to make and problems she'll have to solve.

What kind of attitude does a Go-Getter have? What kind of choices does an Innovator make? What life experiences have shaped a Risk-Taker? What does a Leader look like?

2 Learn how to use arrays to create images

Computers make images with pixels, little squares of color that are the smallest elements of a digital image. To make an image, like your avatar, it takes lots of pixels. In coding, the pixels that make up an image are called an array.

What's an array?

An **array** is a long list of information put in a particular order. To make an image, you tell the the computer what color to make each square on a grid. Each grid instruction or part of an array is an **element**.
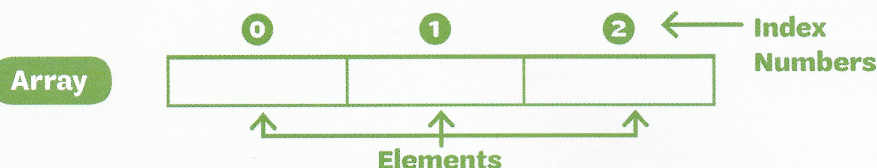

Pixels on a screen use a **binary system**, meaning there are two options for each square on the grid: on/off or one/zero. That means the square is either blank or filled in. By using an array with instructions for how to fill in the squares on each line of the grid, you can create an image by filling in some squares and leaving others blank.
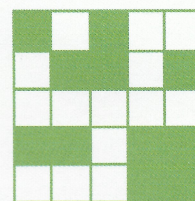
Writing code for a computer in an array makes it more efficient for you to write and easier for the computer to understand. An array in JavaScript might look like this:

```
myArray = [element 1, element 2, element 3...]
```

Just imagine how long the array for your avatar would be! Remember, a computer can only do exactly what you tell it to do, so a detailed image would have a very long array.
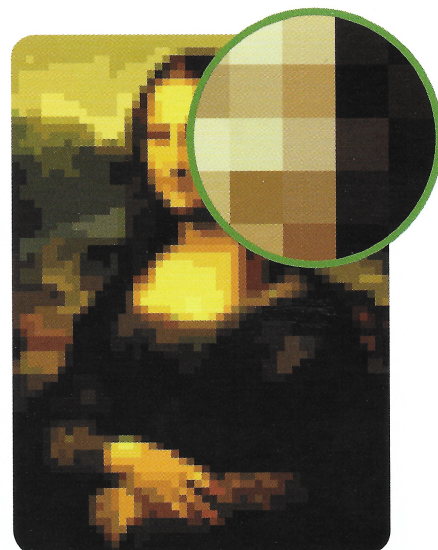
3 Write an array to create an icon

Grace Hopper is a coding icon. That means she's a famous person who represents innovation in the world of coding. In programming, icons are small images that represent other things. The little trash can on your screen where you put files you want to delete is an icon. An arrow pointing to the left that means "undo" is an icon, too.

What kind of icons would you create for your favorite band or musician, book, or movie? What about icons for the different chores you have at home or icons for your different family members?

In video games, game makers use icons to represent a lot of different things: life force, skills, resources, and rewards. They create the icons using arrays.

HELP WANTED! Careers in Game Design

It takes a lot of people to create a video game, not just the programmer. Each part of the game needs to be created, from the front end—what people see and hear—to the back end code that makes the game run. Here are some jobs in game design beyond programming:

Music composer or performer. Many video games include music to help create a mood during game play. If you like to perform or compose music, you could use your talents to create the music needed in video games!

Animator or artist. Multimedia artists, graphic designers, and animators create the look of a video game. They bring the writer's story to life, creating the world the player sees.

Game tester. It's true: some people get to play video games for a living! Game testers look for bugs and places where the designers can make improvements.

Customer service agent. If you like solving problems, this could be a great job for you. You'll need to be patient and a good listener to help players when they experience a problem. Speaking more than one language is helpful, too

4 Develop a game scenario

Video game designers have to create every element of their game. One important element is the setup—including the setting of the game and the game narrative. Another element is the **game mechanics**—how you play a game and what you need to do to succeed.

Video game scenarios include the setting and a sequence of events. A scenario might include what players need to do to win and what their reward will be. Game makers decide everything about what's happening in the scenario and game setup.

For example, if a local park was always covered with litter, and you wanted to stop that from happening, you could create a scenario much like a video game.

- **What is the location of and situation in the park?** What size and type of trash or litter is there? Where is it? How much trash is there?

- **What are the challenges to cleaning up the park?** Who owns the property? Do you need permission? How do you get permission? What is the terrain like? How is the park getting dirty in the first place?

- **What skills (or resources) do you need to solve the challenges?** Research skills? Strong letter-writing or speaking skills? Scheduling or volunteer management skills?

- **What actions are possible or needed to clean up the park?** Placing new trash and recycling bins? Placing dispensers for pet waste pickup? Creating and placing signs about keeping the park clean? Organizing community members to take turns visiting the park weekly to encourage park visitors to keep the park clean?

- **What are the rewards for developing a plan to keep the park clean?** In the real world, the reward would be having a clean park for your community to enjoy. If this were a video game, you might earn points, some kind of medal, or some kind of special ability or resource.

5 Play your game

Game mechanics control how your character can work her way through a scenario. For example, some games give you bonus points for working together while others give you points for doing tasks alone. Some skills or powers cost a character more energy or life force than others. In a video game, you often get to try and solve the same problem many times, so you can try different approaches.

Choosing how you'll solve a problem in a video game can be a lot like problem solving in real life. Some things you have to handle on your own, but many times working with others is a good choice. Can you think of a scenario in your life and how you might solve it? Would you work on it alone or ask others for help? What kind of skills or resources would you need?
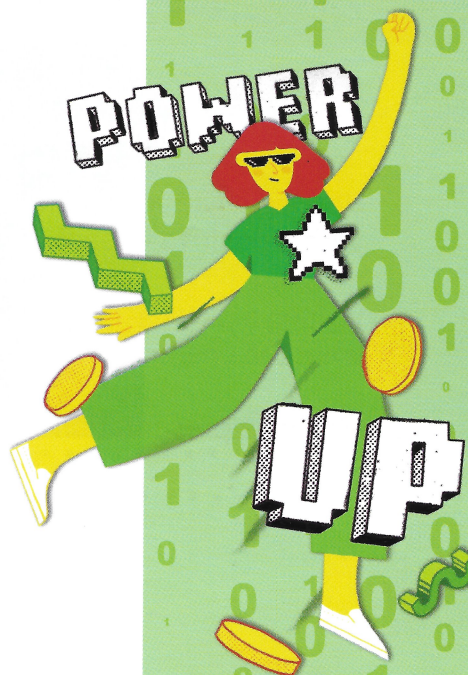
WORDS TO KNOW

Array a type of list that has a particular order, like an index or a shopping list. Each part of an array is called an element. Each element is separated by a comma. At each end of an array are square brackets '[ ]'.

Avatar an electronic image that represents a person or character. Avatars can be manipulated by a computer user, like the player of a video game.

Binary system computers work on electrical signals which can be expressed as on/off—on is a one and off is a zero. This is called a binary system because it uses only two units for all information. There are lots of ways to think about binary systems: yes/no, up/down, black/white, etc. Pixels on a screen also work as on/off or one/zero.

Bit the smallest unit of digital information. It's often represented as a one or a zero.

Game mechanics the instructions given to the computer on how the game is played. They're specific to the type of game: for example, in chess, all the moves relate to the game pieces. In video games, the rules of the world created by the game's designers are game mechanics. This can include how avatars move and how players beat a level.

Icon the word used for a small symbol in game design. Icons can be used to symbolize almost anything, but for this badge they'll represent the special skills used in the game.

Scenario the details of a situation, including settings and sequences of events for a game, scene, or plot. It's part of the setup in many types of games.

Now that I've earned this badge, I can give service by:

- Hosting a gaming event at my school's computer lab where I feature games with a positive impact.

- Writing a play based on my game scenario, where the audience gets to choose what the characters do, as if they were playing the game.

- Making a presentation about the different kinds of careers in game design.

I'm inspired to: