

Title: Creative Writing with a Fork in the Road

Author(s): Richard (Rick) G. Freedman

Approximate Time: Varies by length of story and use of extra features

Level: Grade 6-7 (if some code is already provided), Grade 7-8 (if no code is already provided)

Curricular Areas (Subject): Creative Writing (includes English and Foreign Languages)

Computational Thinking Topics: Conditional Logic, Branching, Generalization through Nesting, Cause/Effect Relationships

Prior Knowledge: Control-type commands including “broadcast/receive” and “if/else,” variable manipulation, “and” operator, costume creation and manipulation, “say” command

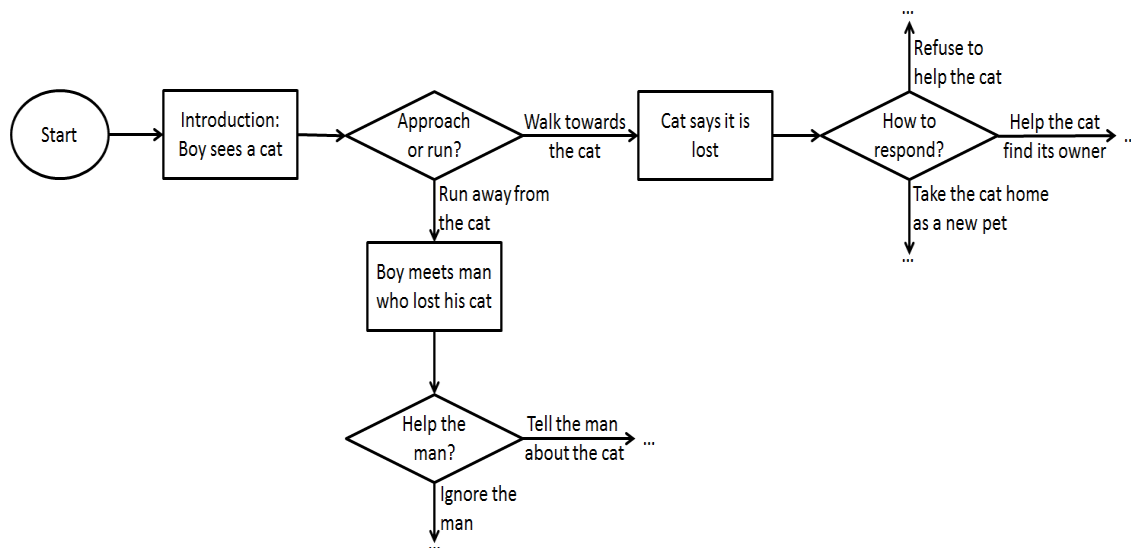
Version History:

1.0: ab initio

Planning Notes:

Many stories that we write have an introduction, a conclusion, and a single sequence of events that transitions from the introduction to the conclusion. However, not all stories have to be so linearly structured. As seen in many Choose Your Own Adventure books and modern video games, the audience’s choice of actions can change the events taking place in the tale. This can lead to multiple variations of the story by having different story pieces that fit together based on the user’s decisions at transitional moments between the pieces. Such literature is **nonlinear** since the path from the beginning to the end is not as direct as a straight line.

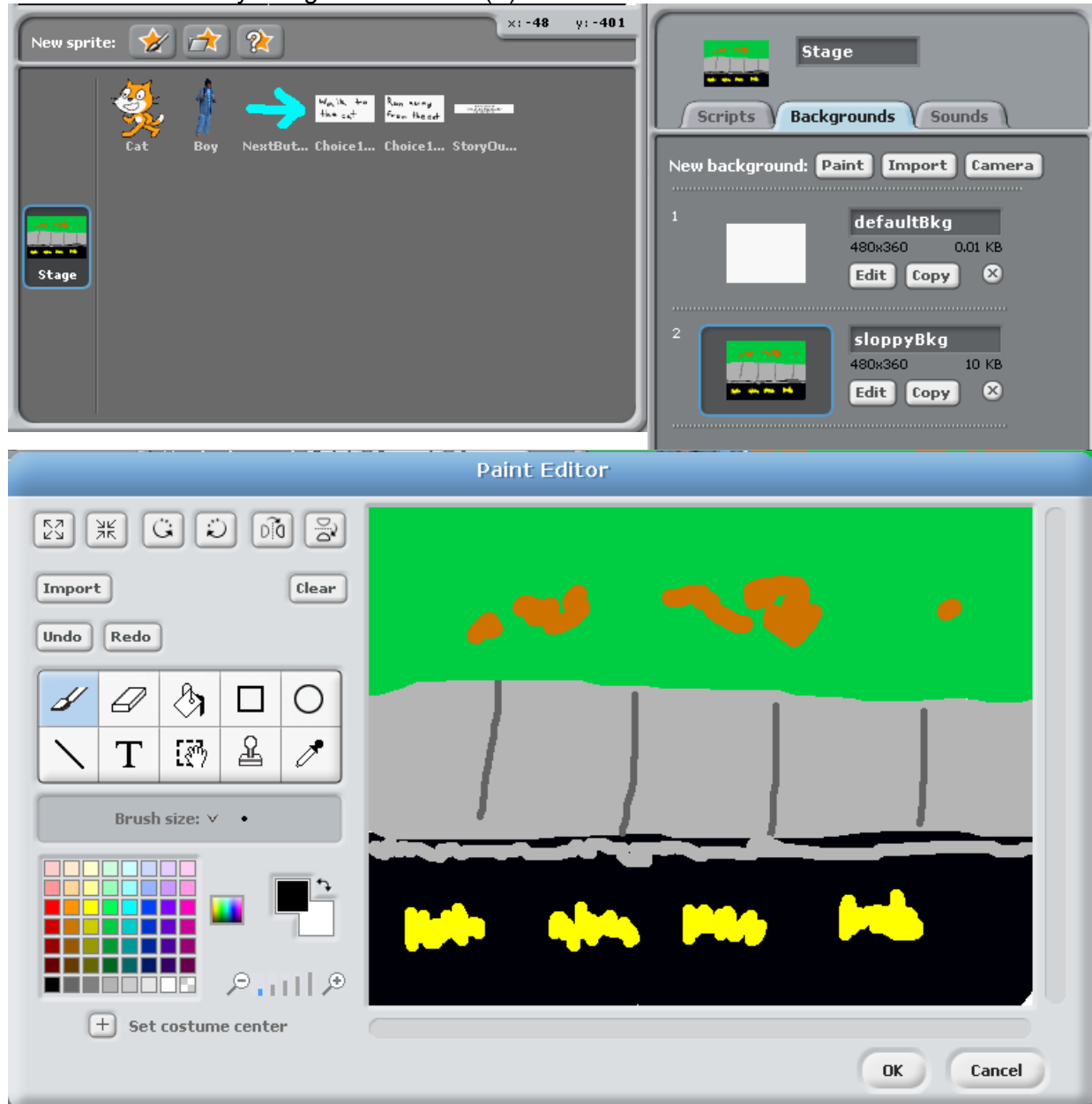
Have students create their own nonlinear stories. Give them a theme or let their imaginations run wild! Consider how the story pieces will link to one another in addition to what choices can allow such transitions. It may help for younger students to write several similar stories and intertwine them afterwards. Planning can be done in a flowchart such as the one below:



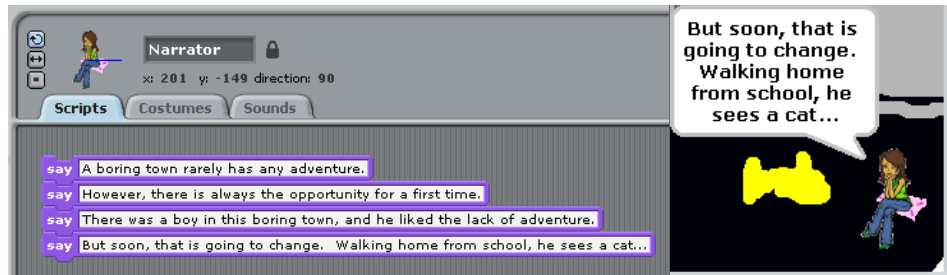
The students can then make their story interactive using Scratch. This program can be as simple as a text-based storybook, or it can have graphics and sounds to bring the nonlinear adventure to life. User actions will enable transitions and can range from clicking on a button when choices are presented to clicking on something in the image to progress the story.

To create pages in the book, either:

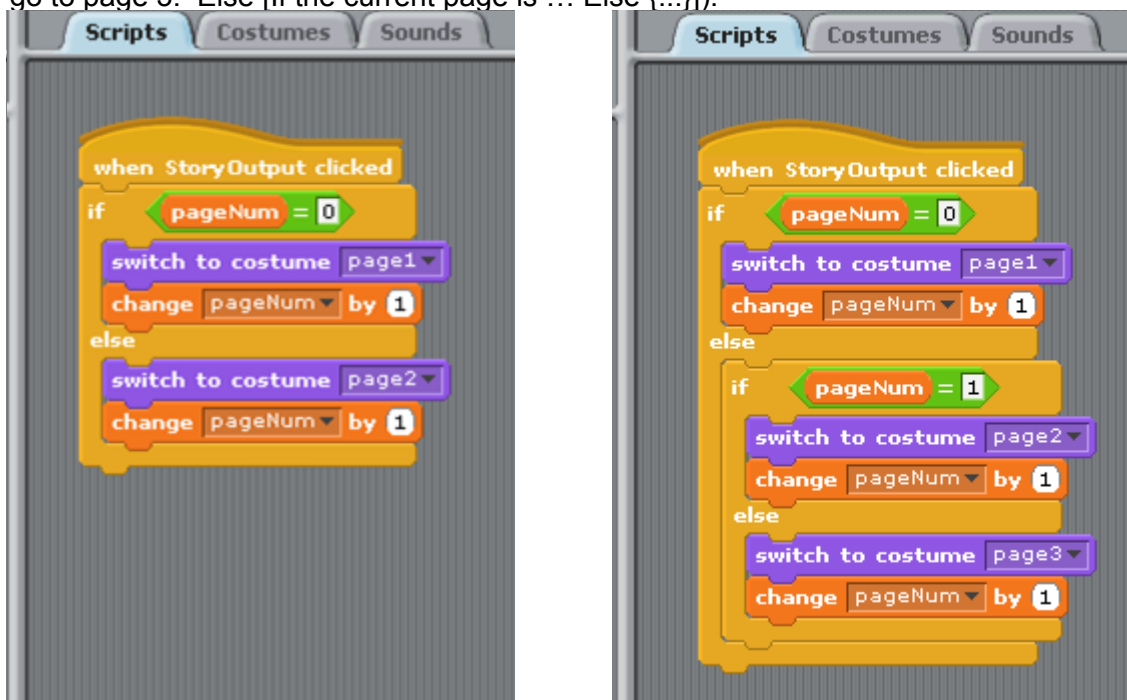
1. Draw each page as a single background for the stage. Simply click “Stage” in the sprite list, select the “Backgrounds” tab, and click “Paint” to draw a new background in the Paint Editor. Text can be added by using the Text Tool (T) in the Paint Editor.



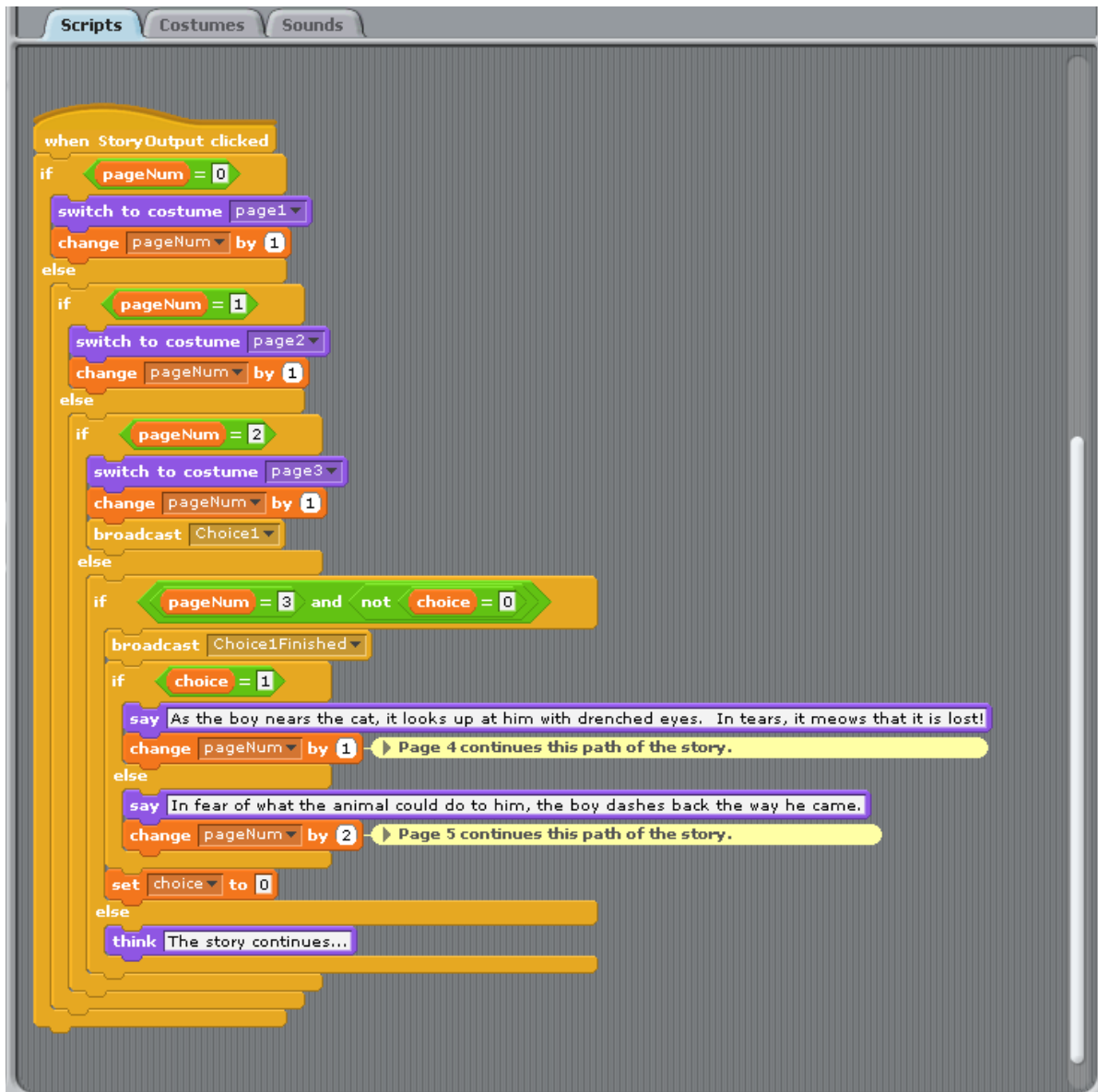
2. Develop the pages in a painting program like MS Paint, GIMP, or Photoshop, and save the image. Create a new sprite and import (see the Paint Editor above) the saved images as its costumes.
3. Create a sprite called “Narrator” and place it on the screen. Select the “Scripts” tag. Each page is written as text for a “say” command in a script.



To transition between pages in the story, use the “if/else” blocks in a script that begins when its sprite is clicked or when a certain key on the keyboard is pressed. The “if” condition will check the value of a variable storing the current page number. When the page number matches, the code between “if” and “else” is used. Otherwise, when the page number does not match, the code between “else” and the end of the block is used. This code will either change the background/costume or provide a new line of text to “say” as well as change the value of the variable storing the current page number. Since we will probably have more than two pages to present, we will need multiple “if/else” blocks that can be placed inside each other; this process of *nesting* blocks inside each other allows us to create a story with as many pages as we want. The script can be interpreted as, “If the current page is 1, go to page 2. Else (If the current page is 2, go to page 3. Else [If the current page is ... Else {...}]).”



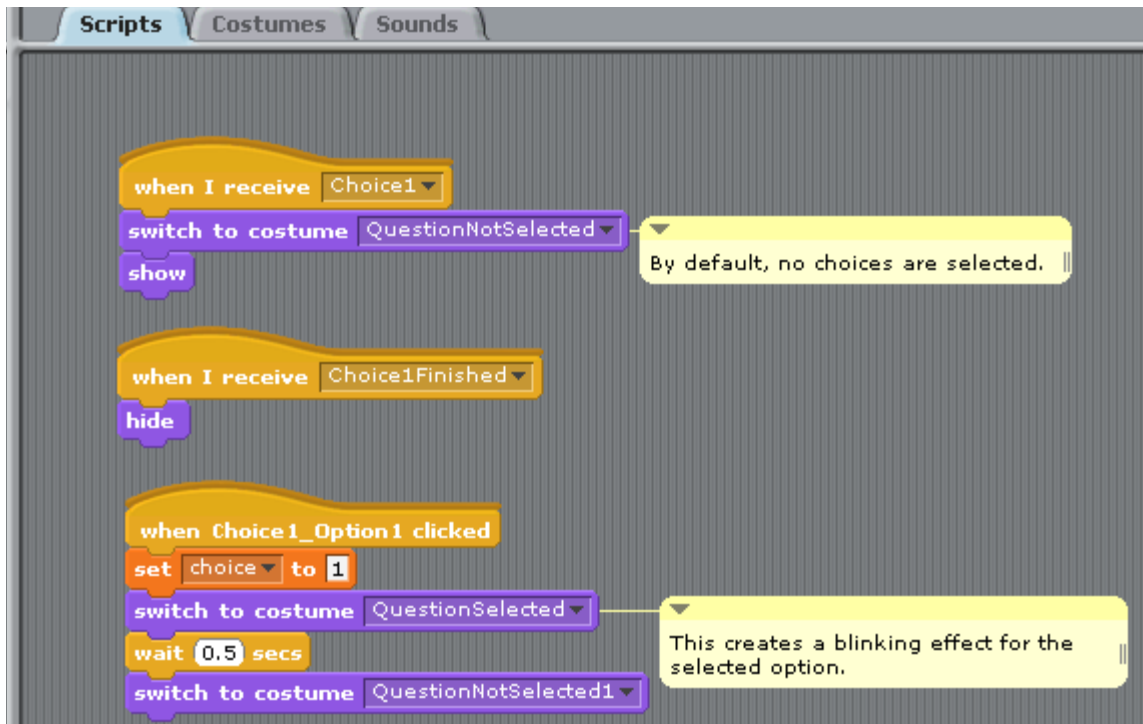
Eventually, enough nesting will provide a case for every page and decision in the story. Although the script below appears complex, it is simply the result of nesting four “if/else” blocks.



When a particular page’s transition depends on the user’s choice, the “if” condition will check for both the value of the variable storing the current page number “and” the value of the variable storing the user’s choice. The “and” operator block can be used to make sure that more than one condition is satisfied. To present such choices to the user at these transitional moments, additional code will be needed besides simply turning the page.

There are several ways users can make choices:

1. Present choices as sprites with button costumes. “Hide” and “show” the buttons when the specific transitional page is reached. This can easily be done with the “when I receive _” control block where the page turning script uses the “broadcast _” block. Using “broadcast” and “receive” allows **branching** in a program from one section of code to another. A script that begins when the button is clicked will change the value of the variable storing the user’s choice.



2. Display the choices in the story's text, and specify a key to press for each option. A script that begins when a specified key is pressed will change the value of the variable storing the user's choice. To avoid making non-existent choices, it may be necessary to use "if/else" blocks whose **conditional statements** check the value of the variable storing the current page number.

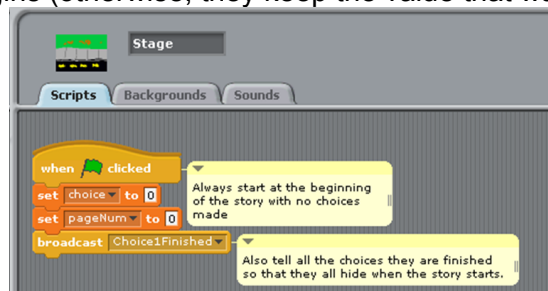
1. Walk towards the cat
2. Run away from the cat





The image shows two scripts side-by-side. Both are triggered by "when 1 key pressed" and "when 2 key pressed" respectively. Each script has an "if" block with the condition "pageNum = 3". If true, they set "choice" to 1 and 2 respectively. If false, they set "choice" to 0.

Make sure to reset the variable storing the user's choice after the transition completes! The value to which it is reset can signify "no choice made" so that our script can determine when a user has made a decision. It is important to also change the value of the variable storing the current page number appropriately. Furthermore, remember to set all variables to their initial values when the story begins (otherwise, they keep the value that was previously assigned).



For additional exercises in computational thinking, ask the students questions about their stories regarding cause and effect. For example, how does one get to the student's favorite part of his/

her story? For what reasons are the events in some endings different than others? Why would someone decide to make certain choices at particular transitions in the student's story?

Extension Ideas:

- Create a back button either as a sprite on the screen or as a key on the keyboard. The back button should return the user to the previous page.
- Nonlinear stories do not have to be completely deterministic and up to the user's choices. Sometimes **random** things can occur. Use the "random" command at some of the transitions to make the story different every time, even if the user makes the same decisions. One way to add this into the story would be to have the user choose heads or tails during a coin flip while randomly deciding the actual outcome of the flip; the transition would then be based on whether the user made the correct call or not. Did you know that Mozart wrote a piece of music that transitions between sections based on dice rolls?
- If sound and graphics are used, then some changes can be even more subtle than just altering the storyline. Try changing the sound (background music, sound effect, voice clip, etc.) or image (background, person's clothes, flower color, etc.) based on the user's choices as well. Perhaps taking the last banana in the grocery store will make a little boy have a sad face for the remainder of the story, or he will smile if you took an apple instead.
- Foreign language teachers should consider changing the default language in Scratch to the one being taught. It is amazing how much children can learn from direct immersion!

Resources:

(Nonlinear stories): Choose Your Own Adventure book series, Meanwhile by Jason Shiga

(Description of nonlinear stories): The movie Big describes an electronic comic book

(Conditional Statements and Cause/Effect): If You Give A Mouse A Cookie by Laura Numeroff and illustrated by Felicia Bond

(Other nonlinear media examples): Video games, tabletop board games, role playing games