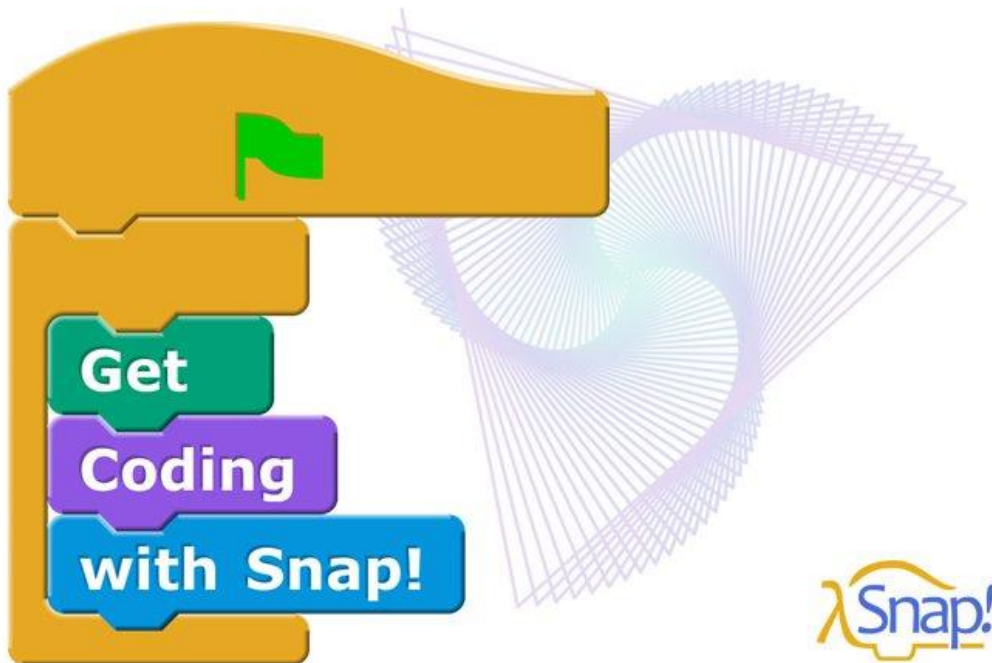# openSAP Get Coding with Snap!
Exercises Week 2 Unit 3

WHAT YOU HAVE LEARNED THIS WEEK

This unit's main topic were clones. Clones are shallow copies of the original sprite. That means they share complex attributes such as scripts, costumes, sounds, and variables. In a "biological" sense, clones share the same "genetic material" (in this case the scripts) with their parents. However, this "genetic material" can manifest in different ways due to external conditions (in biology e.g. climate, nutrition - in computer science e.g. random values for variables).

They start with the same values with their parent sprite. You can use the "When I start as a clone" hat block to initialize and individualize them to other values like wearing another costume, going to another position or setting a different size. This is a concept called "initialization" in computer science. You can use clones to create project with multiple agents that behave similarly.

Also, you learned about script variables. You already got to know sprite-local and global variables. Script variables have a more limited scope, which means that they are only valid inside the script they are defined in.

Useful Blocks

This block creates a temporary clone of a sprite that is not shown in the sprite corral. Temporary clones can be deleted with red stop sign button	create a clone of ▼
This block gets executed once whenever a clone is created. The script below the hat block is only run by the clone itself, not the parent sprite.	when I start as a clone
This block programmatically deletes clones	delete this clone
This block initializes a script variable (is only valid inside the script it is defined in). You can rename the variable by clicking on it once. Also, you can expand the block by clicking on the right directed arrow if you need more than one script variable.	script variables a ▶

YOUR TURN

- Make your project interactive. Add a variable for the angle in the "turn" block. Increase that variable when the right arrow key is pressed and decrease it when the left arrow key is pressed.

  `turn ↻ (angle) degrees`

- Create an animation of "virtual soda". Draw a bubble costume and clone that forever. Let the clones appear at a random position at the bottom of the stage and then make them move upwards and delete them, when they touch the edge.

  Refine your animation with as many of the following ideas as you want:

  - Randomly setting the size of your bubble

    `set size to (pick random (5) to (18)) %`

  - Picking slightly different colors for each bubble

    `set [color ▾] effect to (pick random (-10) to (10))`

  - Adding a small horizontal (x-axis) motion

    `change x by (pick random (-2) to (2))`

  - Randomly setting the speed for the vertical (y-axis) motion

    `script variables (speed) ▸`
    `set [speed ▾] to (pick random (2) to (7))`
    `change y by (speed)`

  - Including a random waiting period before the clones get deleted

    `wait (pick random (0.2) to (1.5)) secs`

  - Changing the background so it matches the color scheme of your bubbles

Coding Samples
Any software coding or code lines/strings ("Code") provided in this documentation are only examples and are not intended for use in a production system environment. The Code is only intended to better explain and visualize the syntax and phrasing rules for certain SAP coding. SAP does not warrant the correctness or completeness of the Code provided herein and SAP shall not be liable for errors or damages cause by use of the Code, except where such damages were caused by SAP with intent or with gross negligence.

THE BEST RUN **SAP**