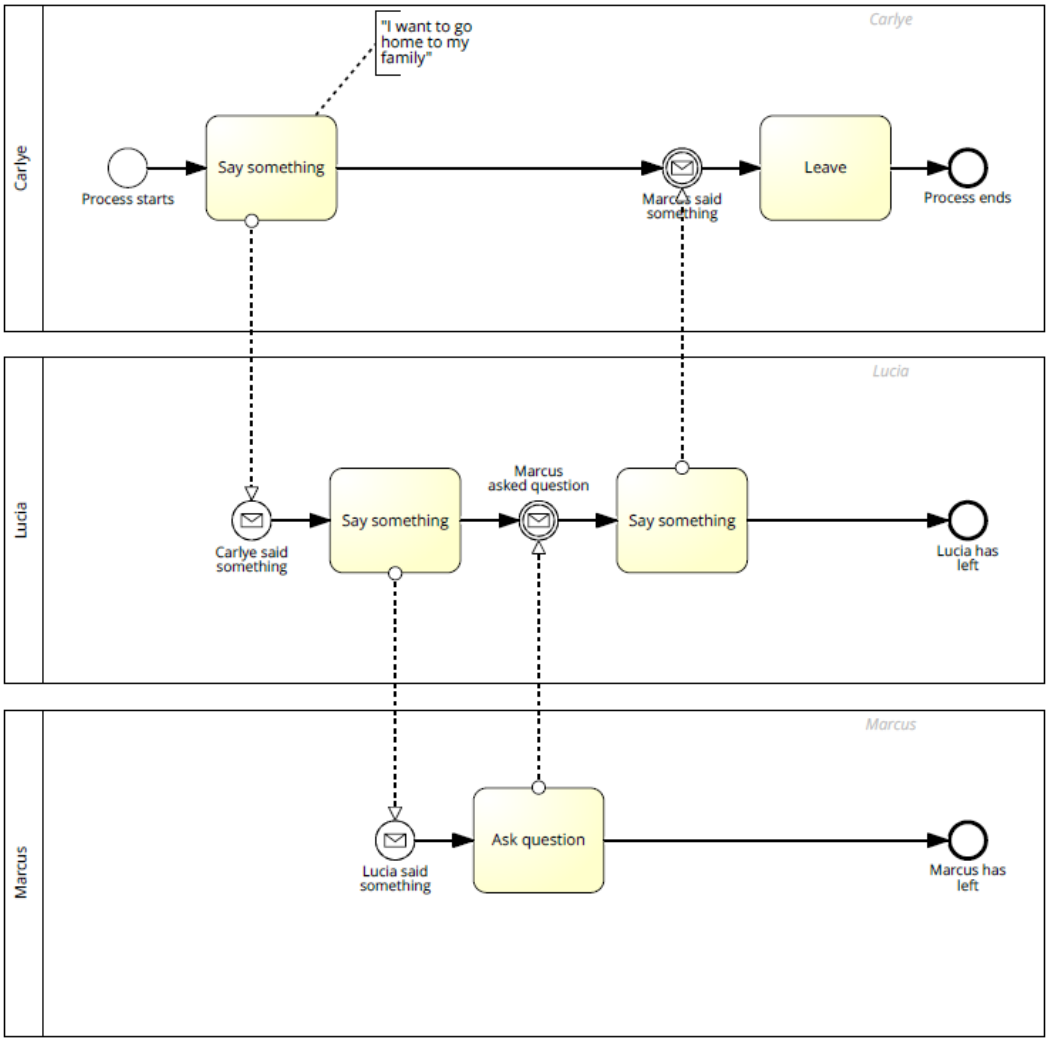
Snap! Events, Concurrency, and Graphical Effects

UBMS Game and Robo Programming with Snap! and Python

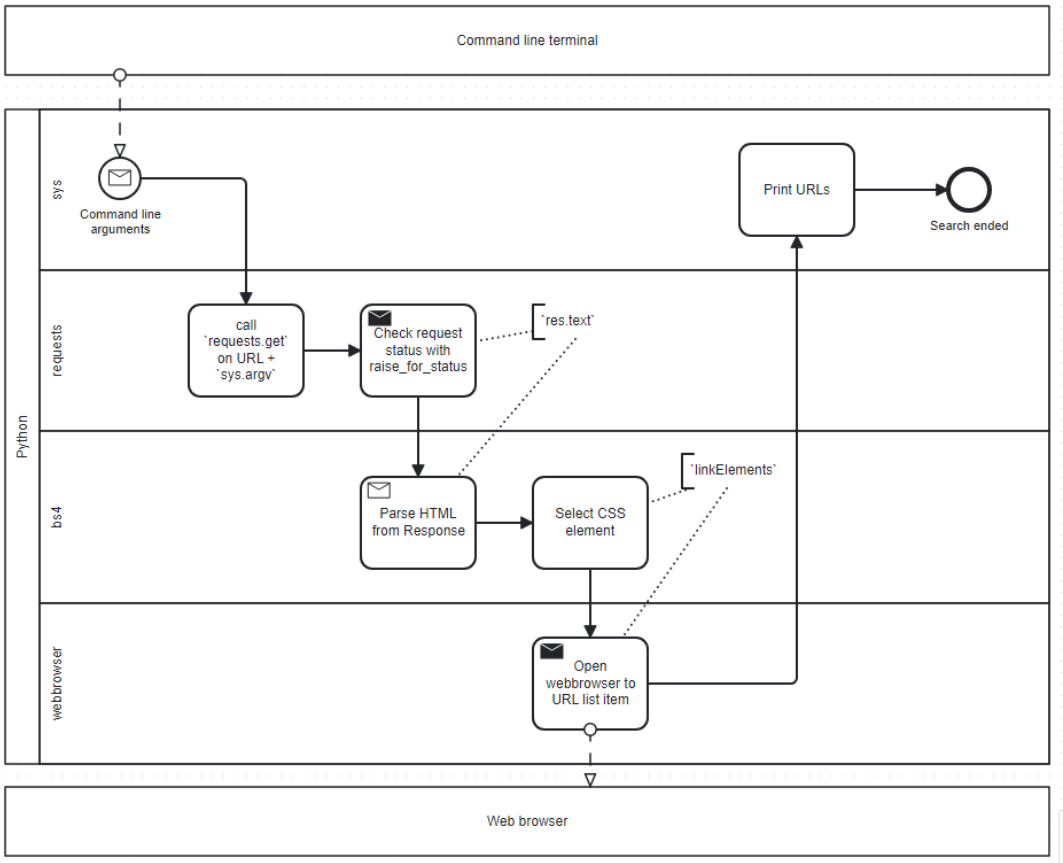
June 27, 2023

Events

- A central concept to humans running the world is "process"
- What's a process? What are its elements?
    1. agent or actor or role or pool or swimlane
    2. start event
    3. tasks or intermediate events
    4. decision points or gateways or logical operators
    5. flow (sequence of events or tasks)
    6. end event
- Example: BPMN diagrams with the Signavio Process Manager



- Here is a process model that I made for a webscraping project in Python (bit.ly/searchpypi): _



- Events in data science:

    1. every digital device produces event logs
    2. event logs can be mined (process mining)
    3. event data mining can lead to pattern detection (EDA)
    4. event data can be labeled to build predictive models (ML)

Birth of the modern novel

- For most of human history, stories where just like "one thing happens, and then another" - a sequence of events between a starting and an ending point. Not overly riveting!
- This changed when Jane Auston wrote her novels ("Pride and Prejudice", "Emma", "Sense and Sensibility" etc.) - these were the first novels with "decision points" in the name of love. Much more fun!

Snap! events

Example:

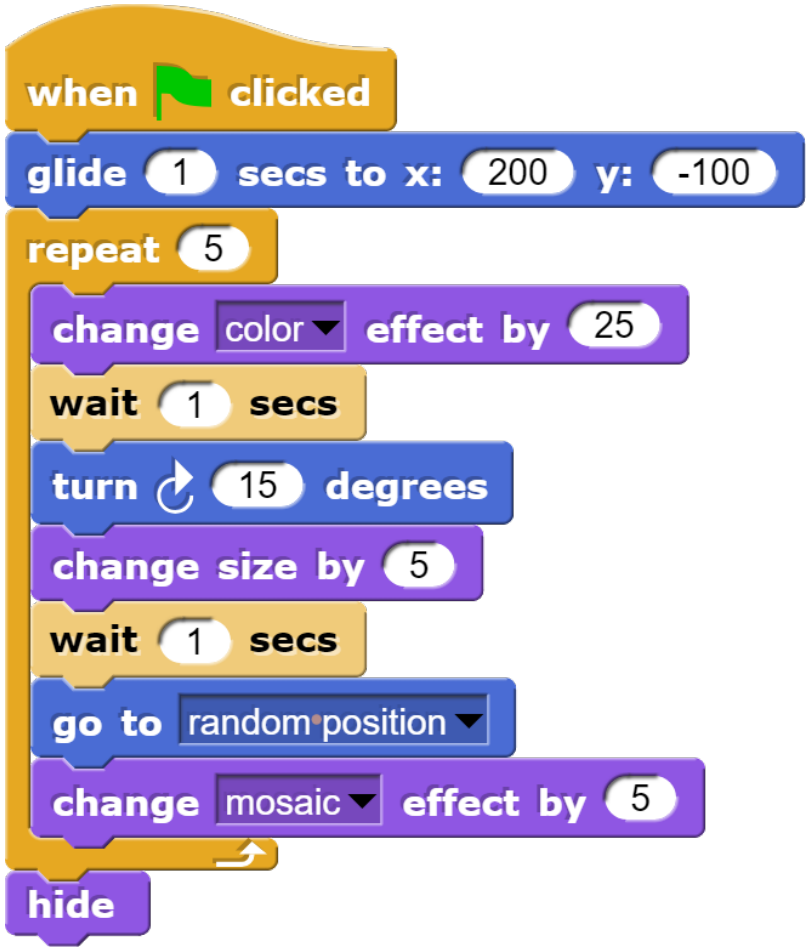
Reset scripts

- Events represent a state. Changing events changes the state of a system.
- Every sprite has a set of properties or attributes, which determine its state.
    1. Screen position (default x=0, y=0)

2. Orientation angle (default 90 degrees to North)
3. Color (default 0 for first sprite)
4. Size (default is 100%)
5. Visibility (default is visible)
6. Costume # (default is the turtle at creation)
7. Graphic effects (default is ???)

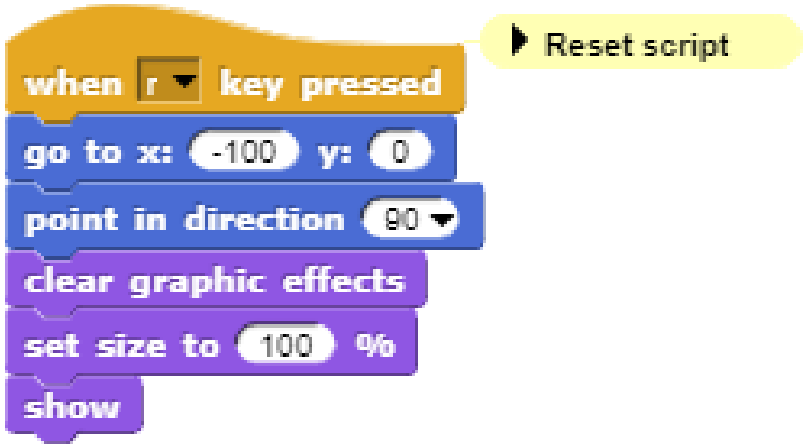
Practice: reset script

1. Create a project "reset"
2. Create a script for a sprite, e.g. Alonzo:



3. Run the script. The turtle disappears. It's "expensive" to return the sprite to its original state.

4. Create a reset script:



5. Save this script as `reset.xml` on your PC so that you can import it into any project and script.

6. In the following exercises, you can `Import` the reset script to a sprite and then either drag it to a new sprite or clone that sprite.

Concurrency

- This is also called parallelism
- Important current concept for system design and operations
- In OS, (true) parallelism is an illusion if you only have 1 core - even with multiple cores, the main job of the OS is to manage processes so fast and so efficiently that the user experiences concurrency
- In database design, concurrency is important (multi-user operation) though the most common database system (SQLite) lacks concurrency
- The following script doesn't quite work. Can you see where the problem lies? Try it in Snap!

The script is held up by the conditional step in the middle.

- Split the script up into two concurrent scripts like this:

Practice concurrency

1. Create a new project "concurrency"
2. Pick a sprite with some 'surface area' (to see changes better)
3. Create three scripts for one sprite

4. Try each script before you create the next one.
5. Press the SPACE bar to start the three concurrent actions.

Programming assignment: Bird/Ball

For this programming assignment, pick either option 1 or 2 below. If you complete both programs, you get up to 10 bonus points (provided the program does what it should). Great opportunity to make up for low quiz scores!

1. Make a **bird** sprite fly around the screen while changing size and color at the same time. Have it make some sound every 5 seconds. Insert graphic effects like the ghost, the fisheye or the whirl effect.

   Solution by Tyler Landry (Fall '22) / My sample solution

2. Make a **ball** roll from left to right of the screen: the ball should appear at the left edge, roll to the right, disappear across the right edge, and reappear again at the left edge. Insert graphic effects like the ghost, the fisheye or the whirl effect.

Solution by Bryceton Church (Fall '22) / My sample solution

Submit the URL of your final, working program in Canvas (if you submit two programs, use the text entry option and paste both URLs into the text field).