Animations

Flip Book Animation

- Take a stack of papers and number them
- Draw an image on each page—the images between consecutive pages have slight differences
- Flip through the pages in order fast enough to provide the illusion of movement
- https://www.youtube.com/watch?v=UGsOeY9rW9A

DrRacket animations

- DrRacket library for animations, use

  ```
  (require 2htdp/universe)
  ```

- The main function is

  ```
  big-bang
  ```

Idea behind `big-bang`

00:00

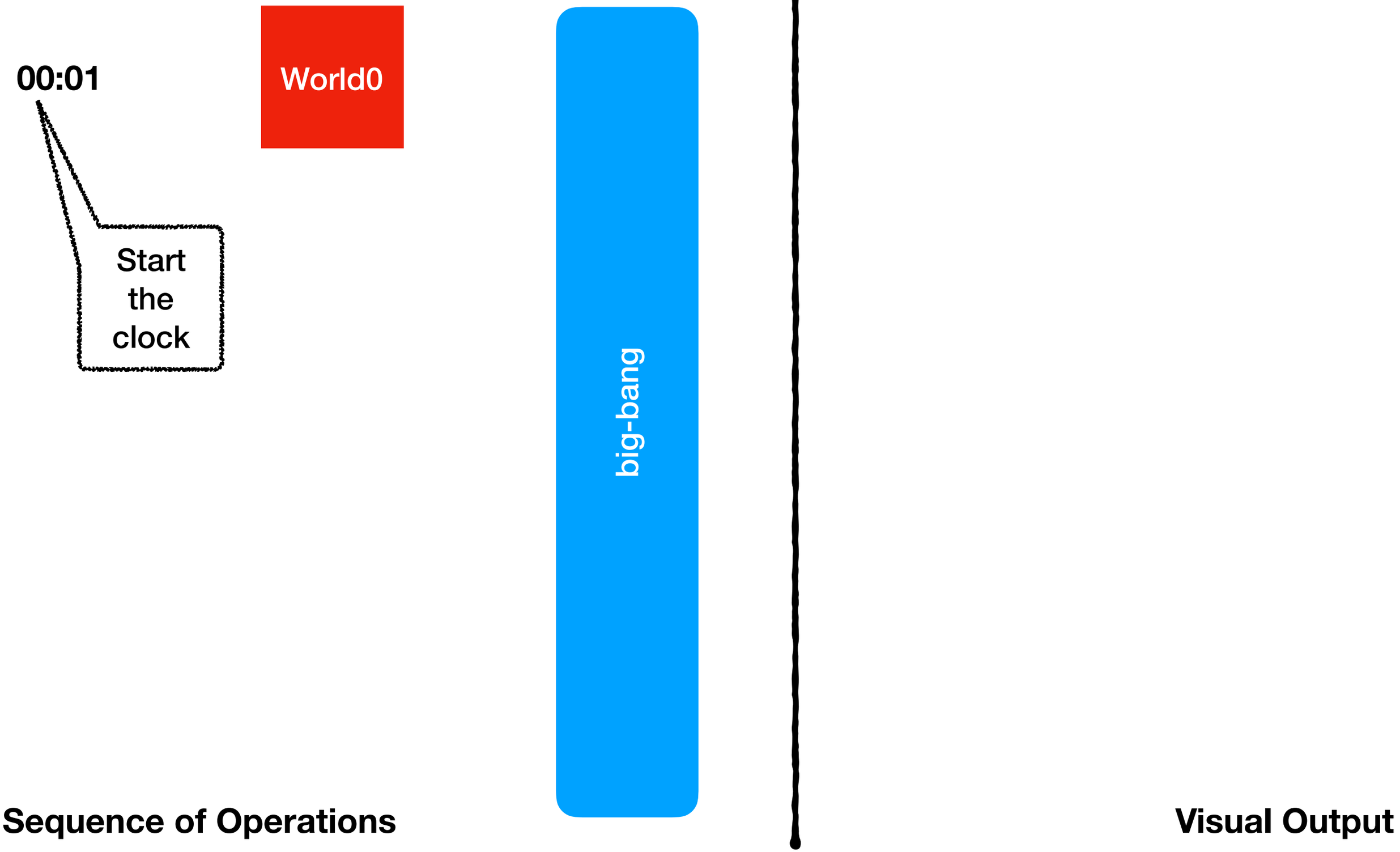
World0

big-bang

Sequence of Operations

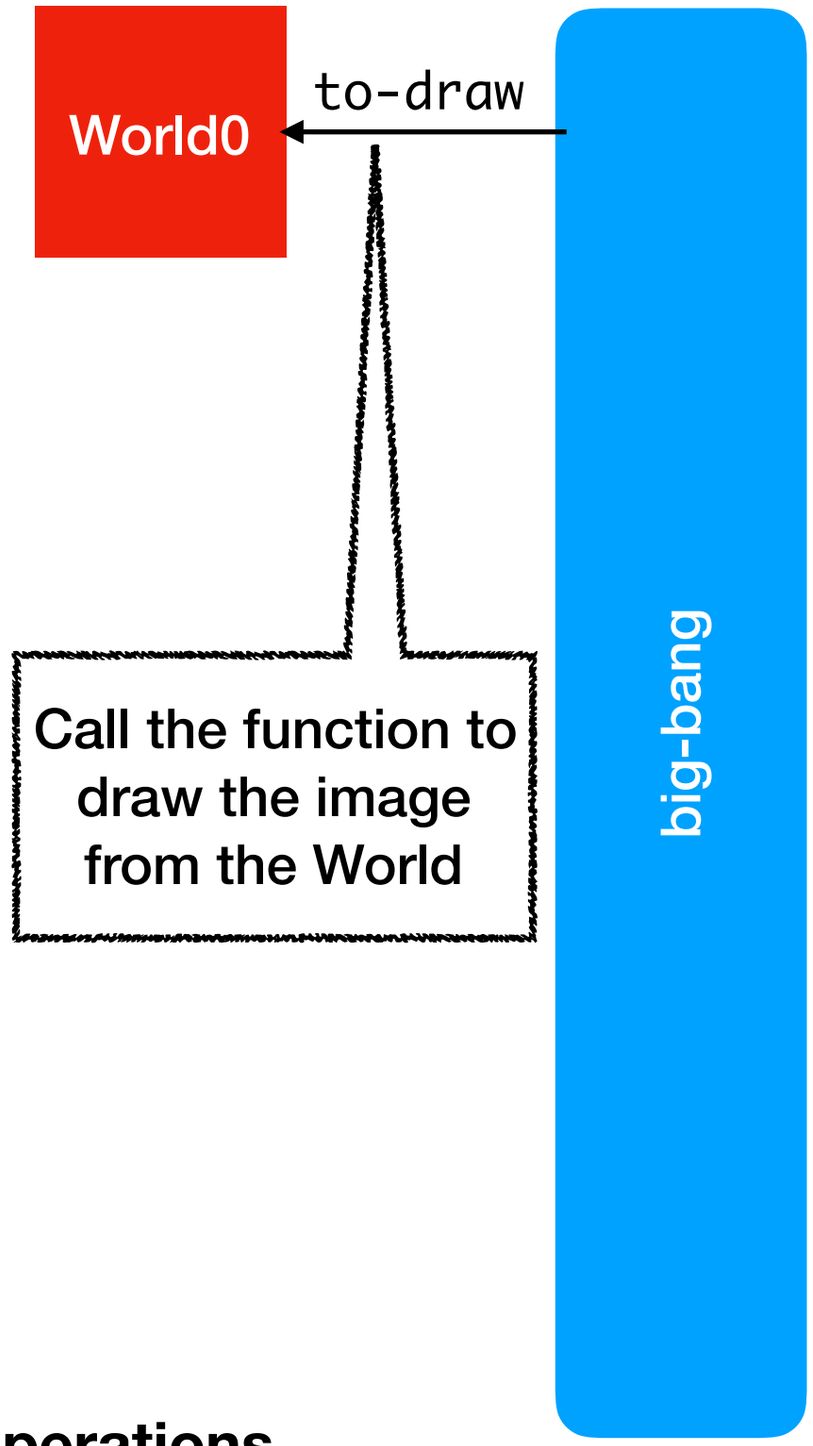
Visual Output

Idea behind `big-bang`



Idea behind `big-bang`

00:01



Sequence of Operations

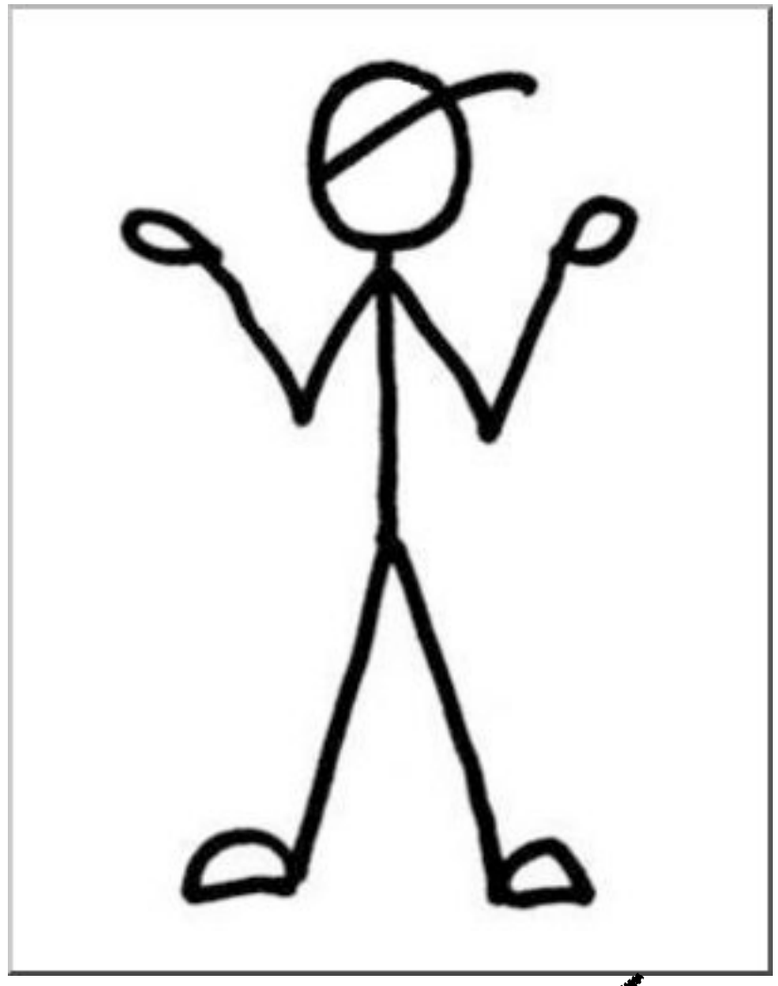
Visual Output

Idea behind `big-bang`

00:01

World0

big-bang



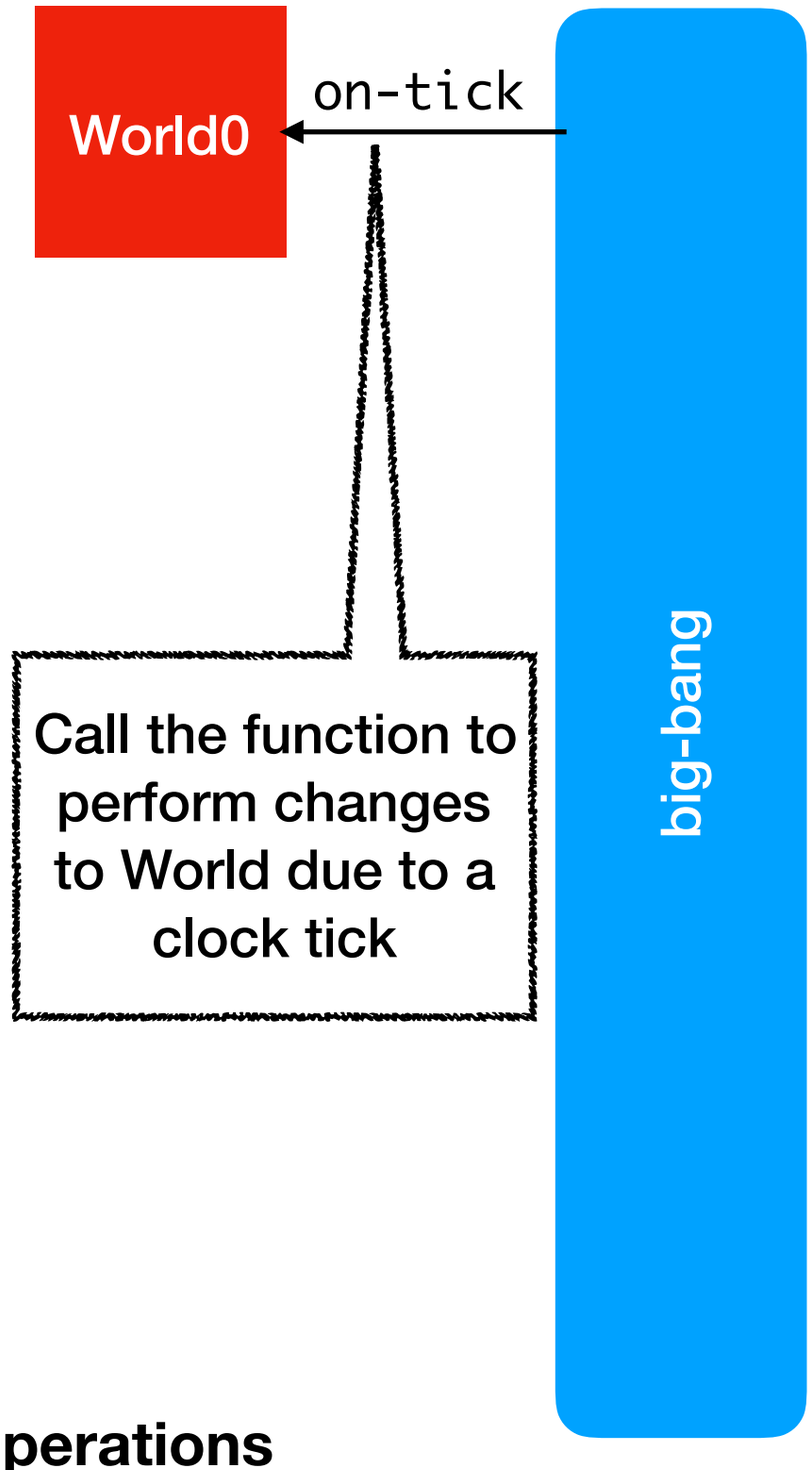
Draws the image we want

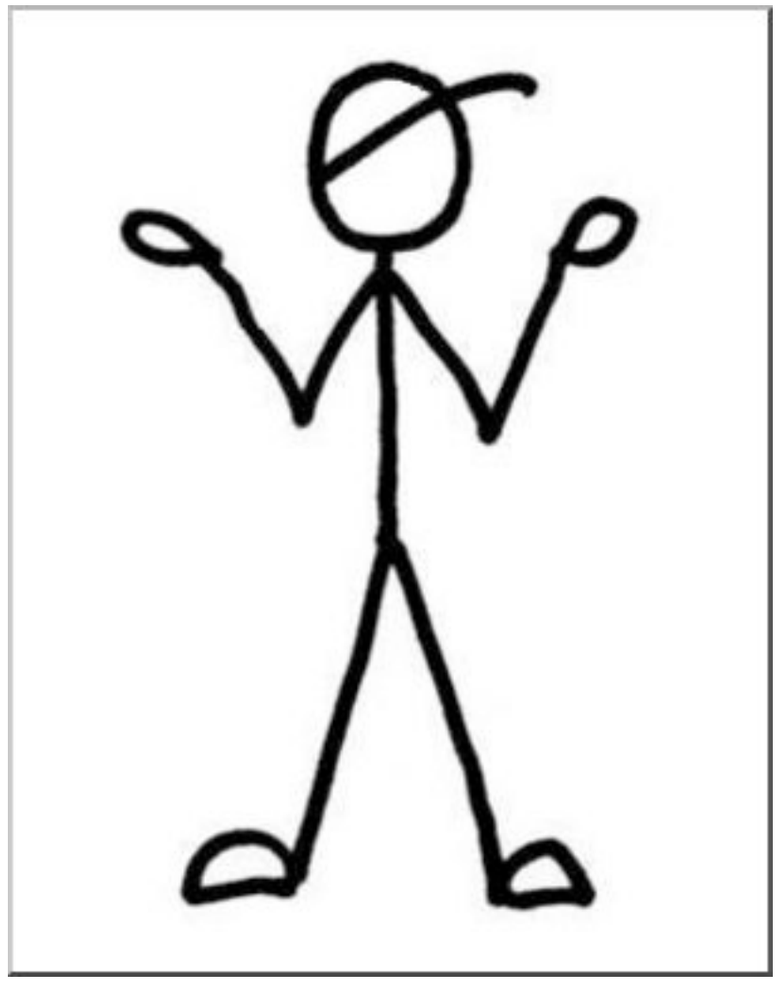
Sequence of Operations

Visual Output

Idea behind `big-bang`

00:01



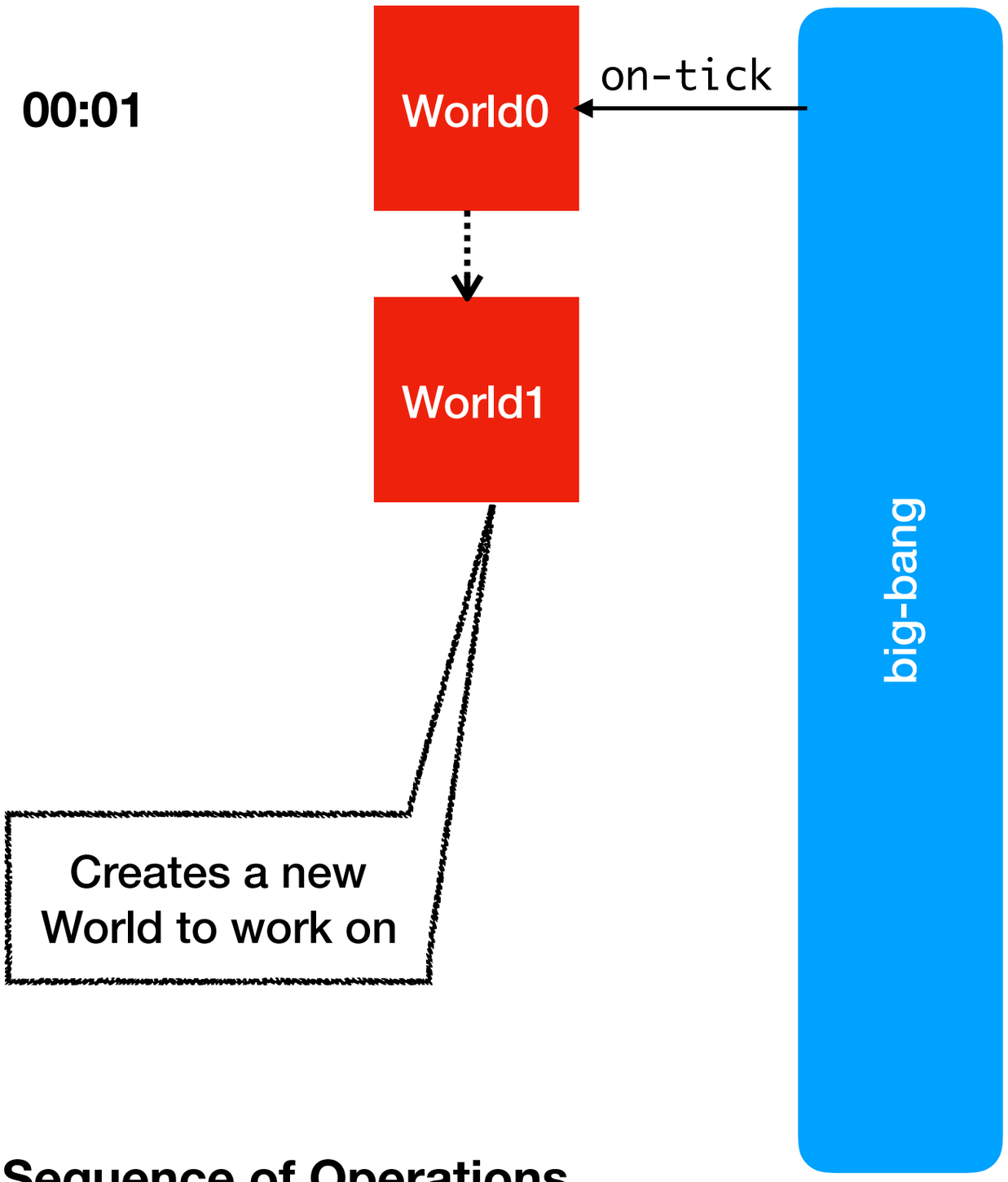


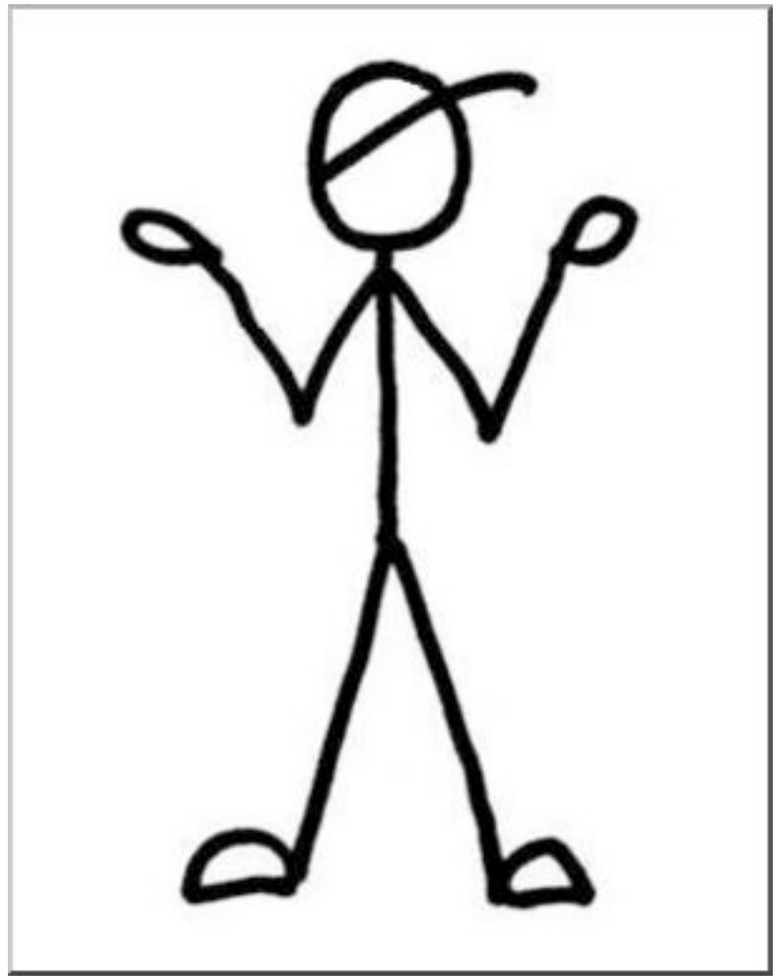
Sequence of Operations

Visual Output

Idea behind `big-bang`

00:01





Sequence of Operations

Visual Output

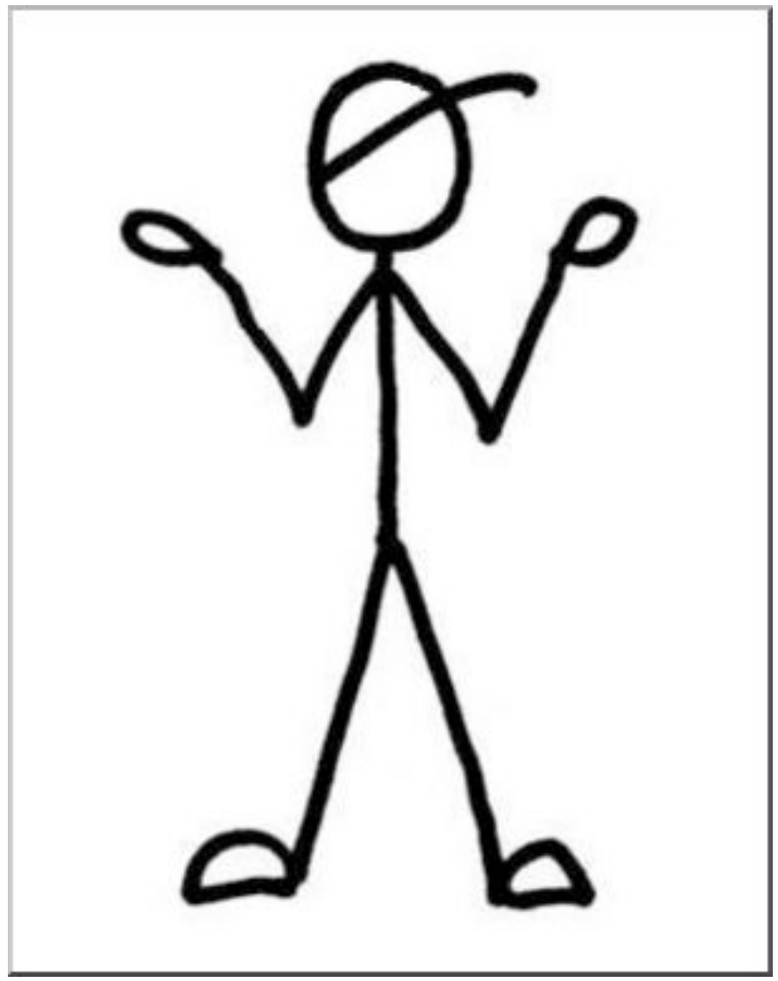
Idea behind `big-bang`

00:02

World1

big-bang

Clock ticks again

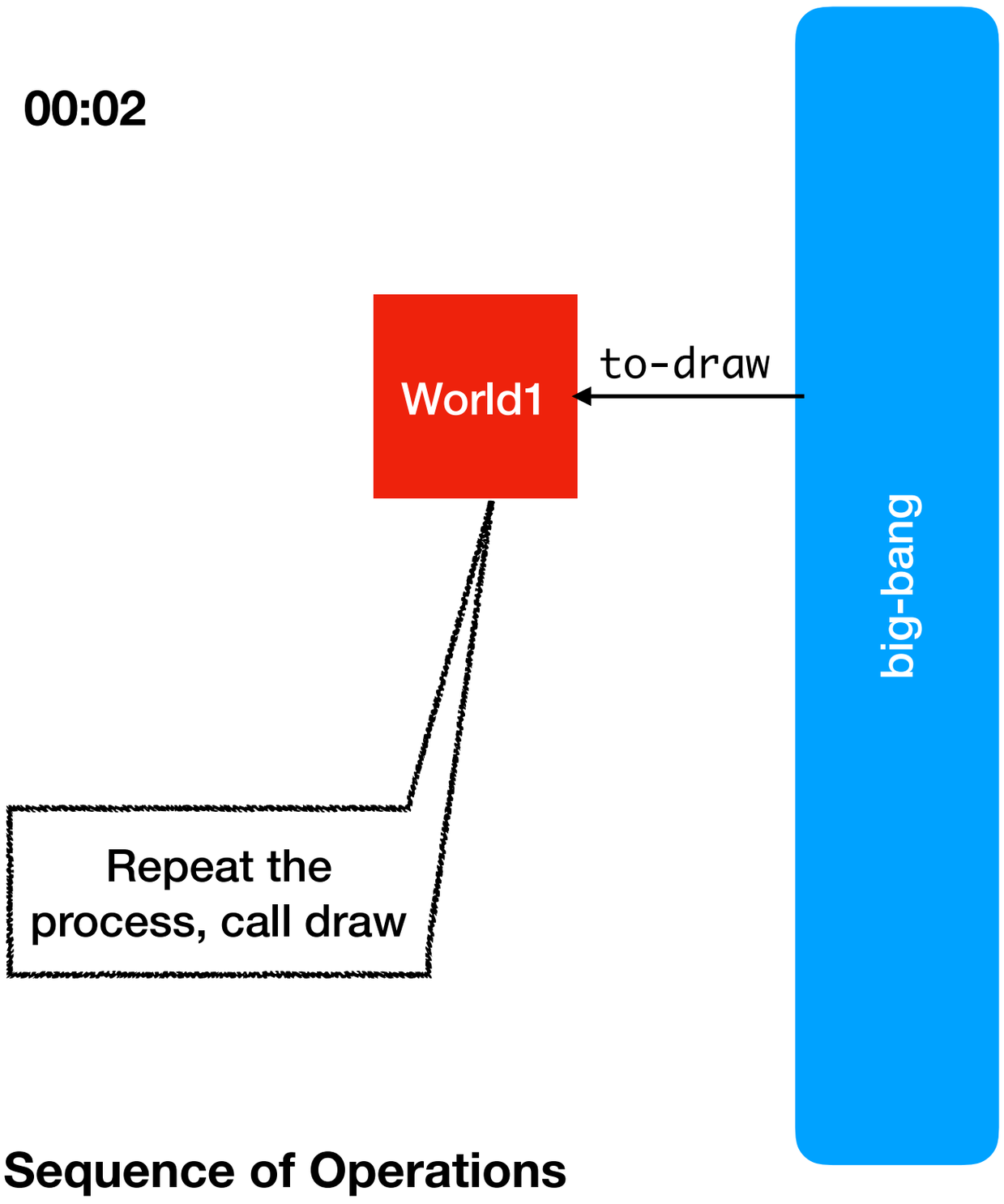


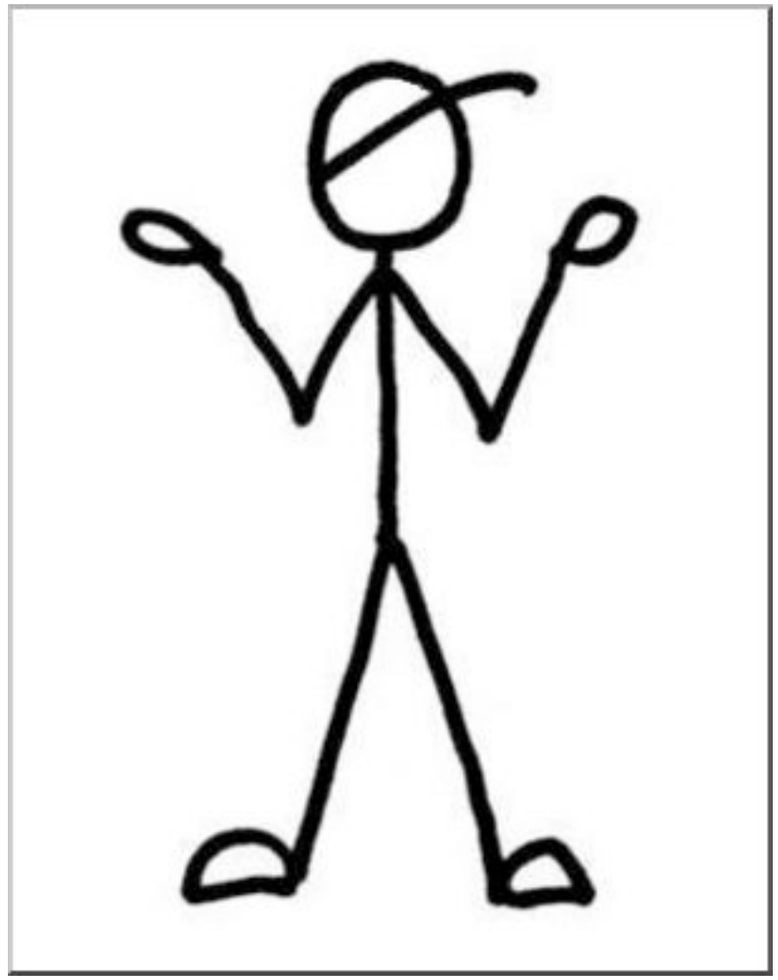
Sequence of Operations

Visual Output

Idea behind `big-bang`

00:02





Sequence of Operations

Visual Output

Idea behind big-bang

00:02

World1

big-bang

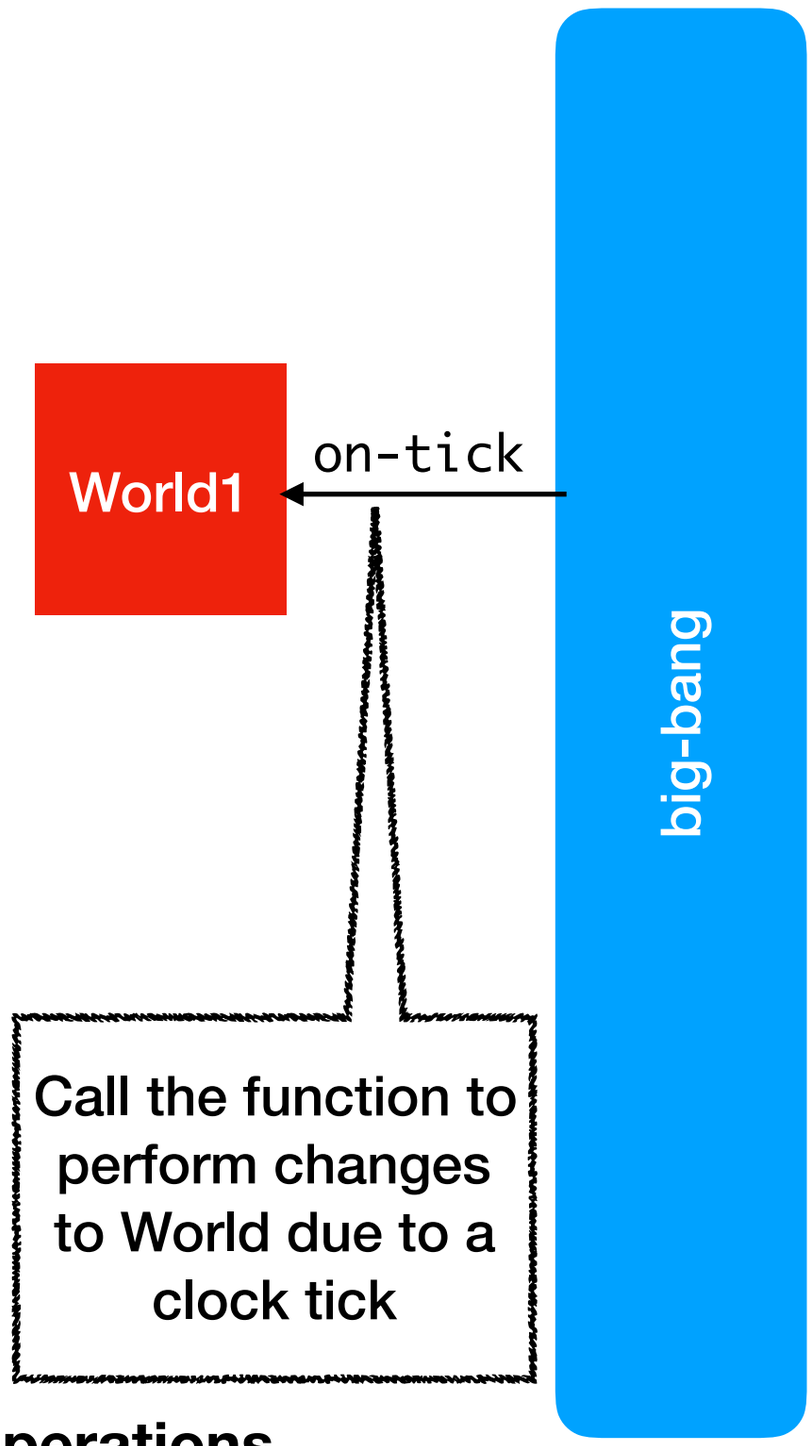
Draw the new image to replace the old

Sequence of Operations

Visual Output

Idea behind `big-bang`

00:02

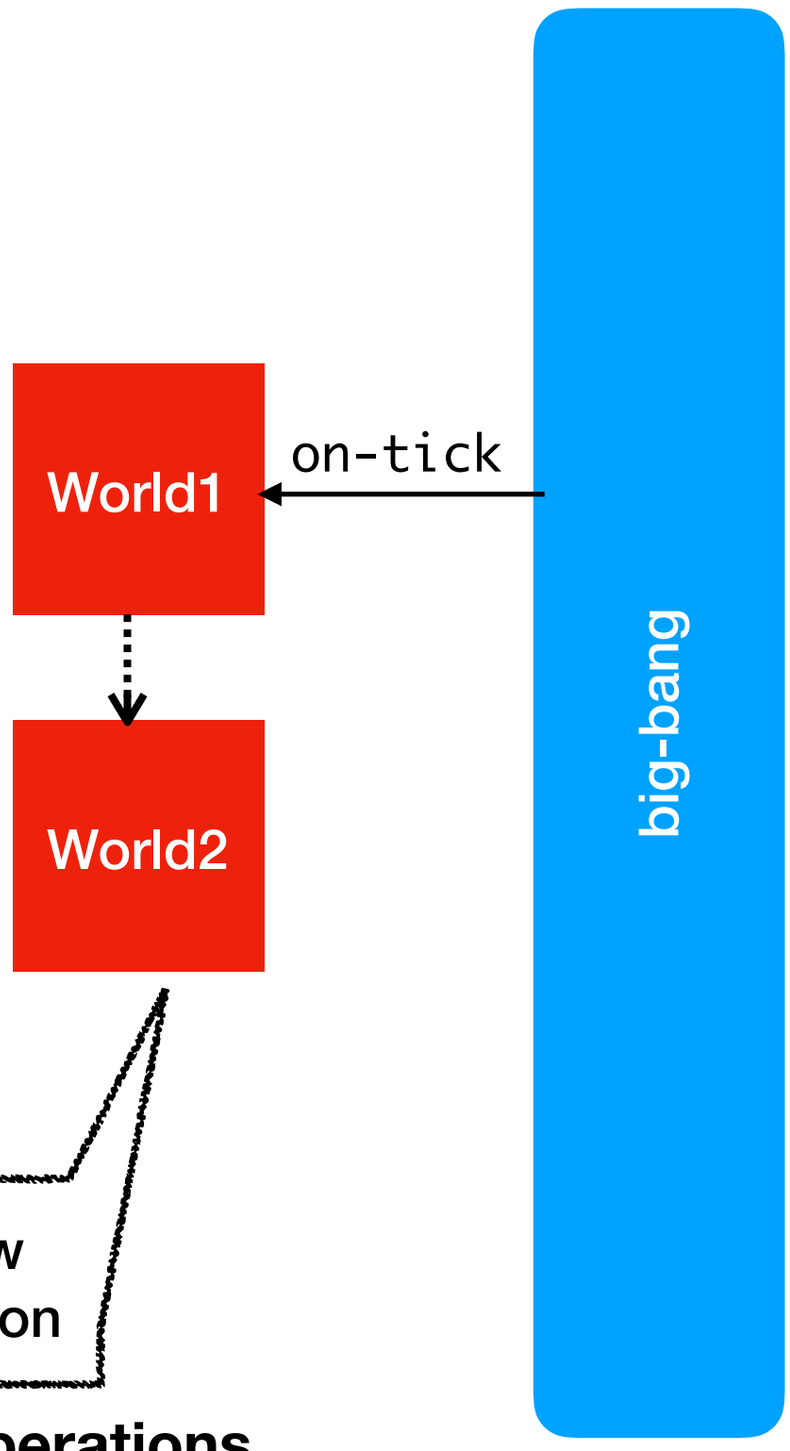


Sequence of Operations

Visual Output

Idea behind `big-bang`

00:02



Creates a new
World to work on

Sequence of Operations

Visual Output

Idea behind big-bang

00:03

World2

Clock ticks again

big-bang

Sequence of Operations

Visual Output

Event handlers

- big-bang allows us to specify functions to be called at certain events, e.g., `to-draw`, `on-tick`, `on-key`, `stop-when`

- These are called *event handlers* — they are responsible for handling events

The importance of `World`

- World is the Data Definition that *we* must design. It must
  - Contain all the data needed to draw our animation
  - Contain all the data needed to interact/manipulate/ keep track of our animation

Simple animated ball

- We want to create a simple animation of a ball that moves around our canvas at a constant speed.

- The user can control the ball's direction using the arrow keys on the keyboard

- The ball can move

    - up
    - down
    - left
    - right