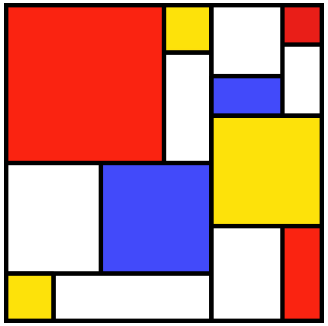
SLiM

Workshop Series



#9: Selective Sweeps

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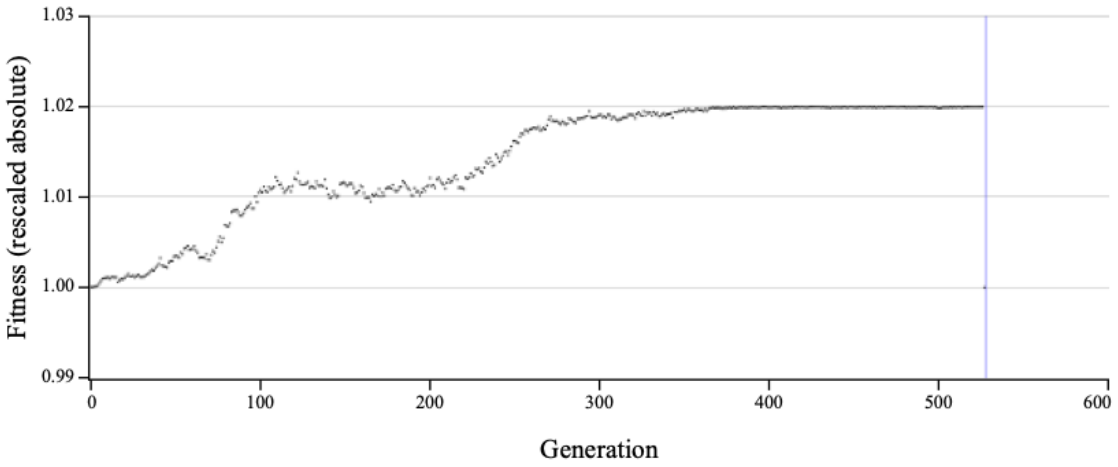
Selective Sweeps

- a selective sweep model involves:
  - a sweep mutation, generally beneficial
  - followed until establishment / completion
  - often *conditional* on success



Selective Sweeps

- sweeps can be:
  - "hard" – introduced in a single ancestor
  - "soft" – from multiple ancestral lineages

Selective Sweeps

- sweeps can be:
  - "hard" – introduced in a single ancestor
  - "soft" – from multiple ancestral lineages
- sweeps can be:
  - from a new, introduced mutation
  - from identical recurrent mutations
  - from standing genetic variation

Selective Sweeps

- a sweep has to start somewhere!
- select candidate subpopulation(s)
- get the genomes from the candidates
  - `p1.genomes`
  - `c(p1,p2).genomes`
  - `sim.subpopulations.genomes`
- draw a genome or genomes to modify:
  - `sample()`

Selective Sweeps

- a sweep involves a mutation
  - might be introduced
  - might be pre-existing
- introduce a sweep mutation:
  - `addNewMutation()`
  - `addNewDrawnMutation()`
- transmute into a sweep mutation:
  - `setMutationType()`
  - `setSelectionCoefficient()`

Selective Sweeps

- you might want to know
  - when it's lost
  - when it's established
  - when it's fixed

Selective Sweeps

- you might want to know
  - when it's lost
  - when it's established
  - when it's fixed
- monitor frequency:
  - `countOfMutationsOfType()`
  - `mutationsOfType()`
  - `mutationFrequencies()`
  - `mutationCounts()`

Conditional Simulations

- often desirable to be "conditional"
  - guarantees a particular outcome
  - doesn't bias the process leading there

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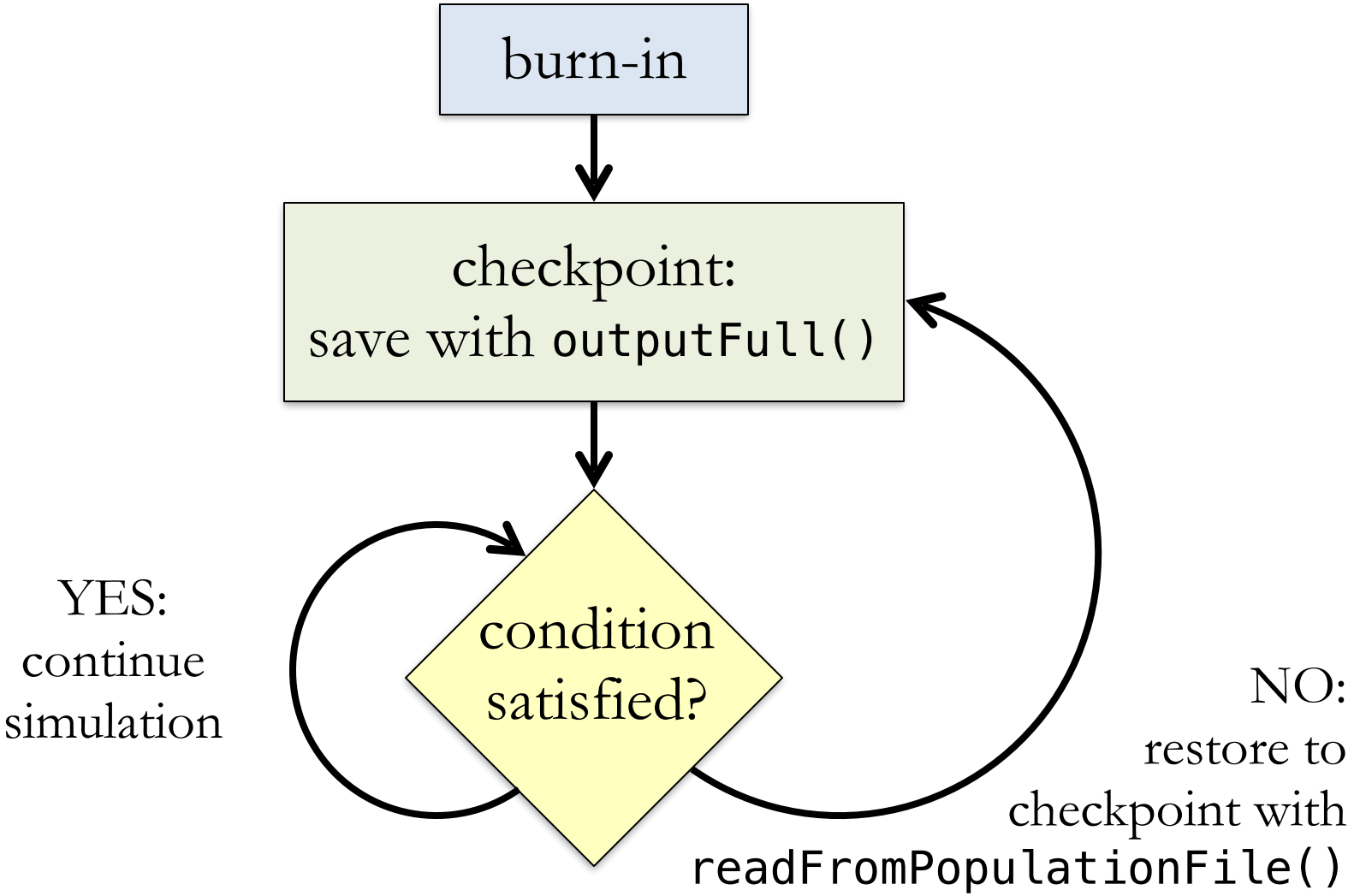
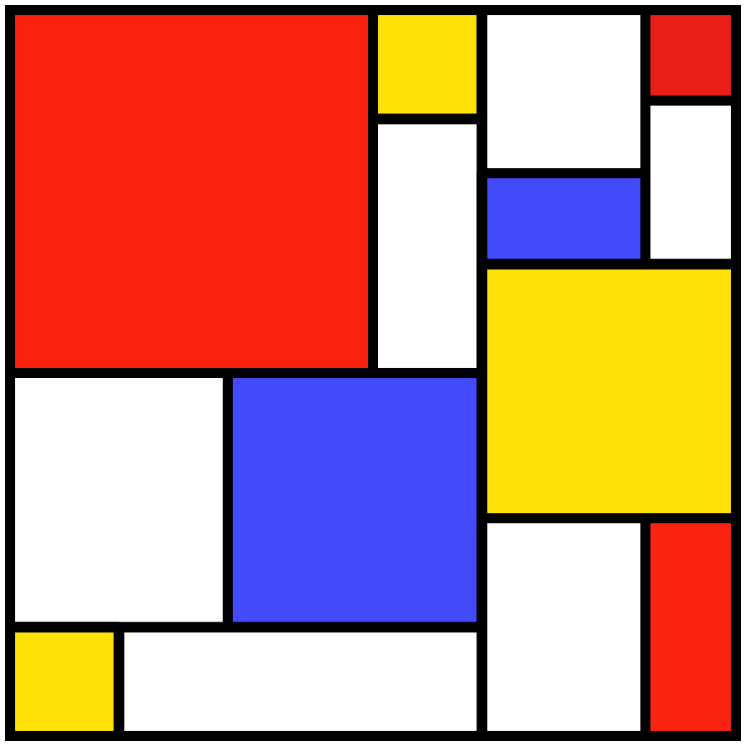
- often desirable to be "conditional"
  - guarantees a particular outcome
  - doesn't bias the process leading there
- a conditional simulation should:
  - save at a key point when the condition begins
  - watch for deviation from the requirement
  - restore to the key point with a new seed

Conditional Simulations

- to make a conditional simulation…
- save / restore population state:
  - `outputFull()`
  - `readFromPopulationFile()`
- manage the random number seed:
  - `setSeed()` (this is optional)
- conditionality can be on anything!

Conditional Simulations





SLiM Workshop Exercise #9