# INF200 – Modelling the Ecosystem of Rossomøya

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&

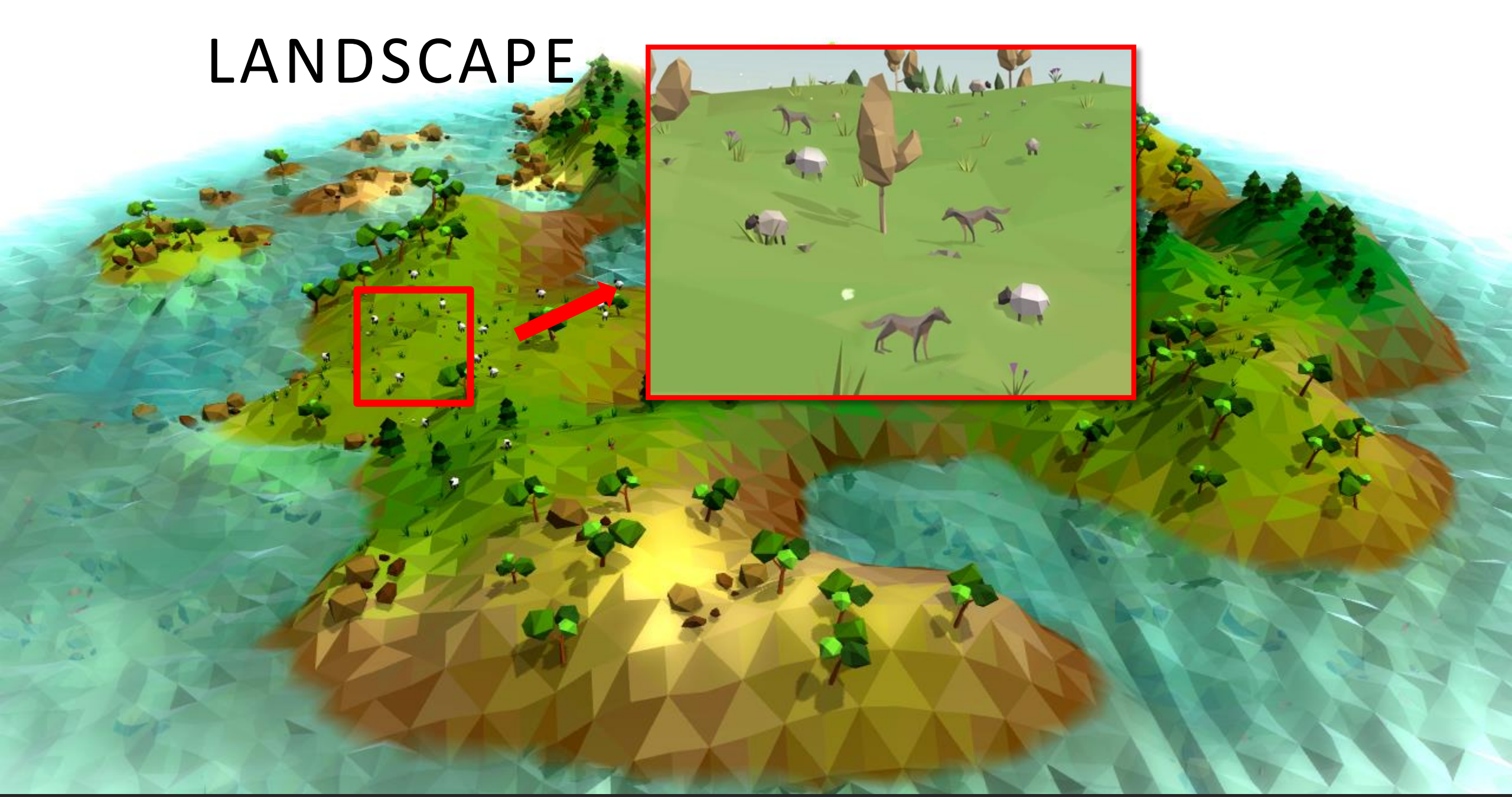
ERIK RULLESTAD

*“Give me six hours to chop down a tree and I will spend the first four sharpening the axe!”*

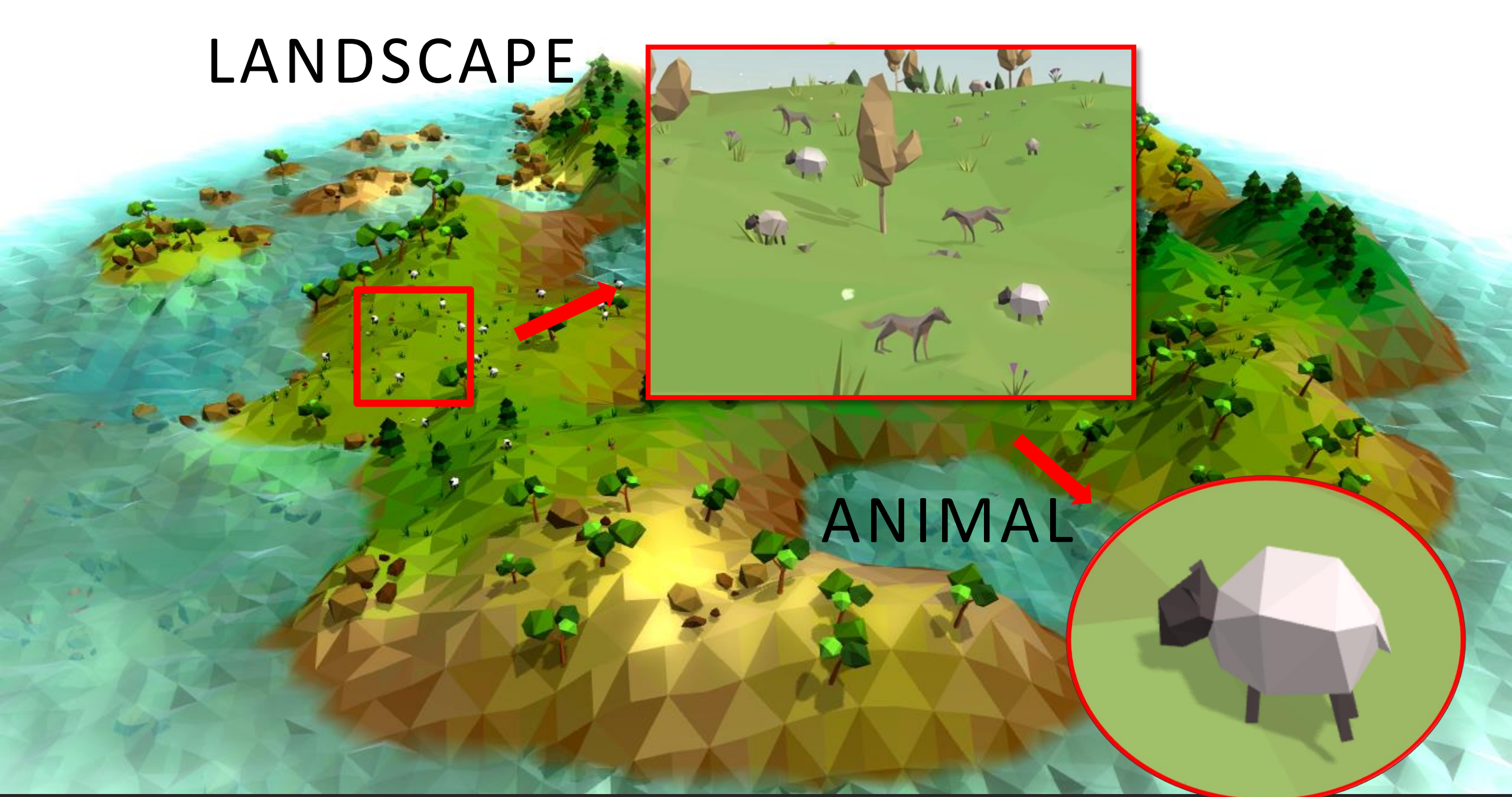
- ABRAHAM LINCOLN

# ISLAND

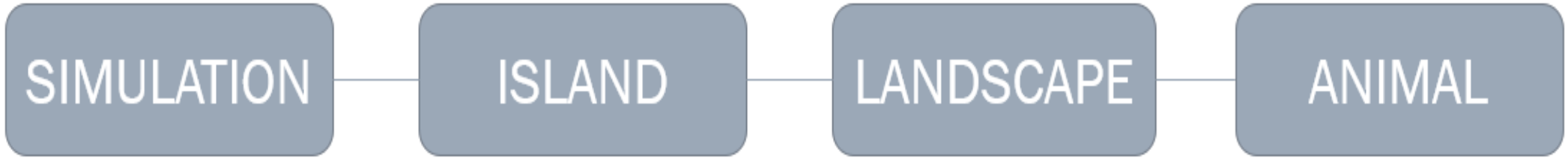
# LANDSCAPE

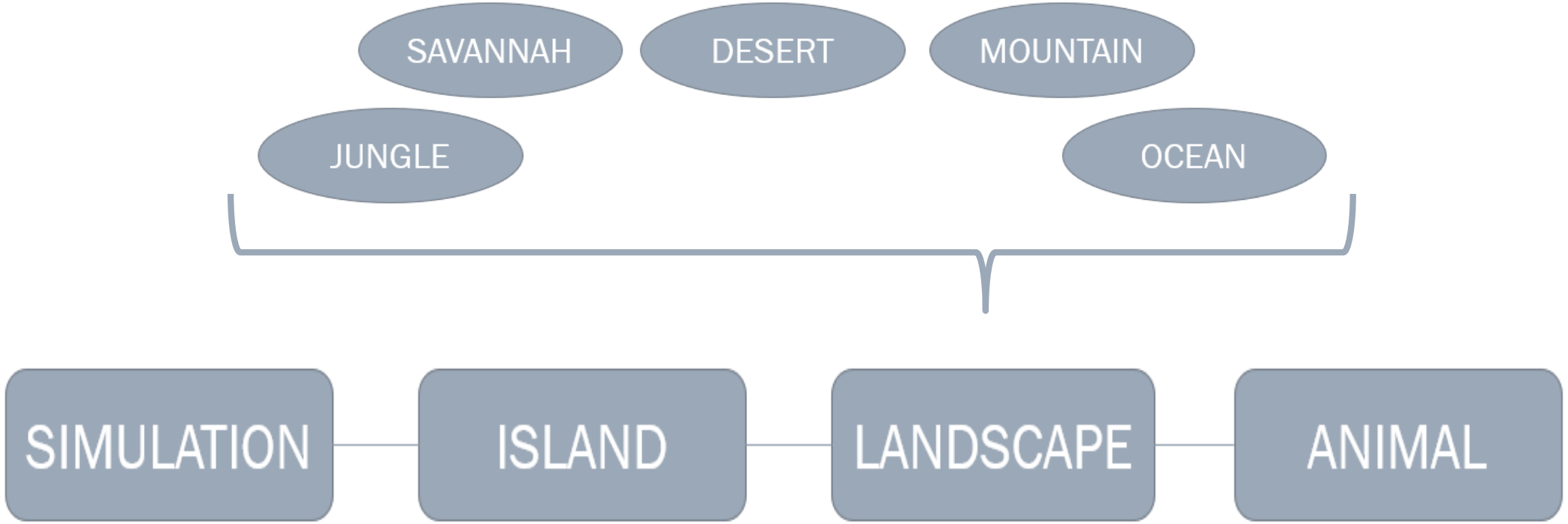


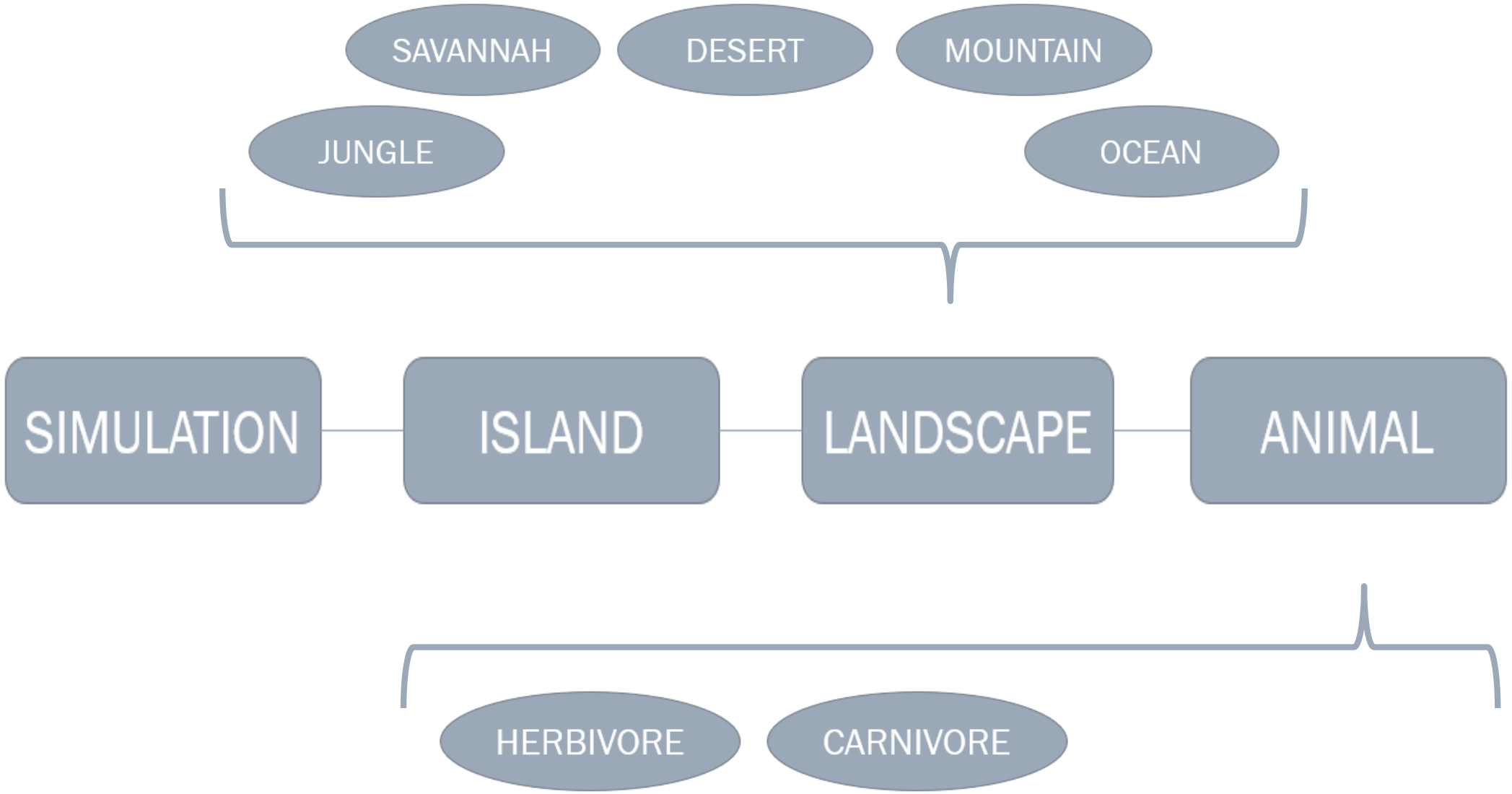
# LANDSCAPE



ANIMAL


SIMULATION
ISLAND
LANDSCAPE
ANIMAL


SAVANNAH
DESERT
MOUNTAIN
JUNGLE
OCEAN
SIMULATION
ISLAND
LANDSCAPE
ANIMAL


SAVANNAH
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OCEAN
SIMULATION
ISLAND
LANDSCAPE
ANIMAL
HERBIVORE
CARNIVORE

# TROVERDIGHET

- BRA COVERAGE
- REALISTISK VISUALISERING

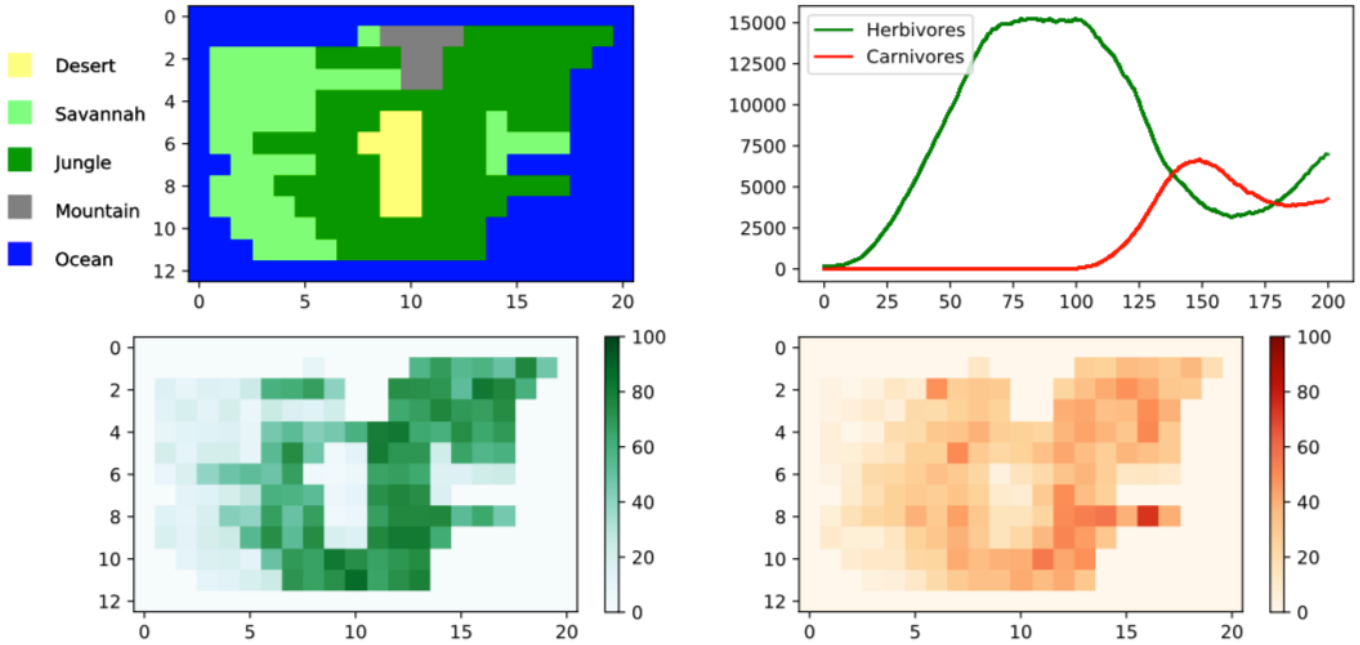
TEST AV VISUALISERING

- check_sim
- test_biosim_interface

Coverage: pytest in tests

100% files, 94% lines covered in 'biosim'

| Element | Statistics, % |
|---|---|
| images | |
| __init__.py | 100% lines covered |
| animals.py | 98% lines covered |
| island.py | 95% lines covered |
| landscape.py | 98% lines covered |
| Rossumøya.png | |
| simulation.py | 88% lines covered |



# OPTIMALISERING

- LAZY EVALUATION

FORSØK

- JUST-IN-TIME COMPILATION

```python
def aging(self):
    """
    Animal ages by one year.
    """
    self.age = self.age + 1

@property
def age(self):
    """
    Returns the animals age
    """
    return self._age

@age.setter
def age(self, new_age):
    """
    Sets the age of the animals to the new value, and flags the fitness
    attribute so that it will be recomputed the next time it is called.
    """
    self._age = new_age
    self._recompute_phi = True
```

| Name | Call Count | Time (ms) | | Own Time (ms) | |
|---|---|---|---|---|---|
| fitness | 44886712 | 22208 | 20.6% | 19113 | 17.7% |
| <built-in method builtins.input> | 1 | 13416 | 12.4% | 13416 | 12.4% |
| eating | 385315 | 32561 | 30.2% | 10680 | 9.9% |
| eating_probability | 12192071 | 19121 | 17.7% | 10298 | 9.5% |
| weight | 21593736 | 4127 | 3.8% | 4127 | 3.8% |
| migrate | 54600 | 19836 | 18.4% | 2911 | 2.7% |
| <method 'random' of '_random.Random | 21746039 | 2872 | 2.7% | 2872 | 2.7% |
| reproduction_probability | 1893405 | 4594 | 4.3% | 2611 | 2.4% |
| find_cell_position | 109746 | 3081 | 2.9% | 2591 | 2.4% |
| reproduction | 54600 | 12571 | 11.7% | 2223 | 2.1% |
| <listcomp> | 156792 | 3997 | 3.7% | 2181 | 2.0% |
| animal_weight_loss | 2358188 | 3299 | 3.1% | 2025 | 1.9% |
| death | 2358188 | 8753 | 8.1% | 1980 | 1.8% |
| migration_probability | 2359538 | 7764 | 7.2% | 1929 | 1.8% |
| <method 'append' of 'list' objects> | 15459171 | 1720 | 1.6% | 1720 | 1.6% |

# Documentation for the modelling of the ecosystem of Rossumøya:

## INF200 January 2020

This library provides a population dynamics simulation of Rossumøya's ecosystem.

## Contents:


- Motivation for the coursework
- Our thought process for solving the task
  - Structure
- Examples
  - BioSim simulation
  - Population generator
- API Reference
  - Module `simulation`
  - Module `island`
  - Module `landscape`
  - Module `animals`


## Indices and tables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- Module Index
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# API Reference

## Module simulation

`biosim.simulation` defines the BioSim class interface for simulation of Rossumøya's ecosystem.

*class* **biosim.simulation.BioSim**(*island_map, ini_pop, seed, ymax_animals=None, cmax_animals=None, img_base=None, img_fmt='png'*) [source]

This class generates the outline for the simulation of Rossumøya's ecosystem, with visualisation.

**Attributes:**

`animal_distribution`

Pandas DataFrame with animal count per species for each cell on island.

`num_animals`

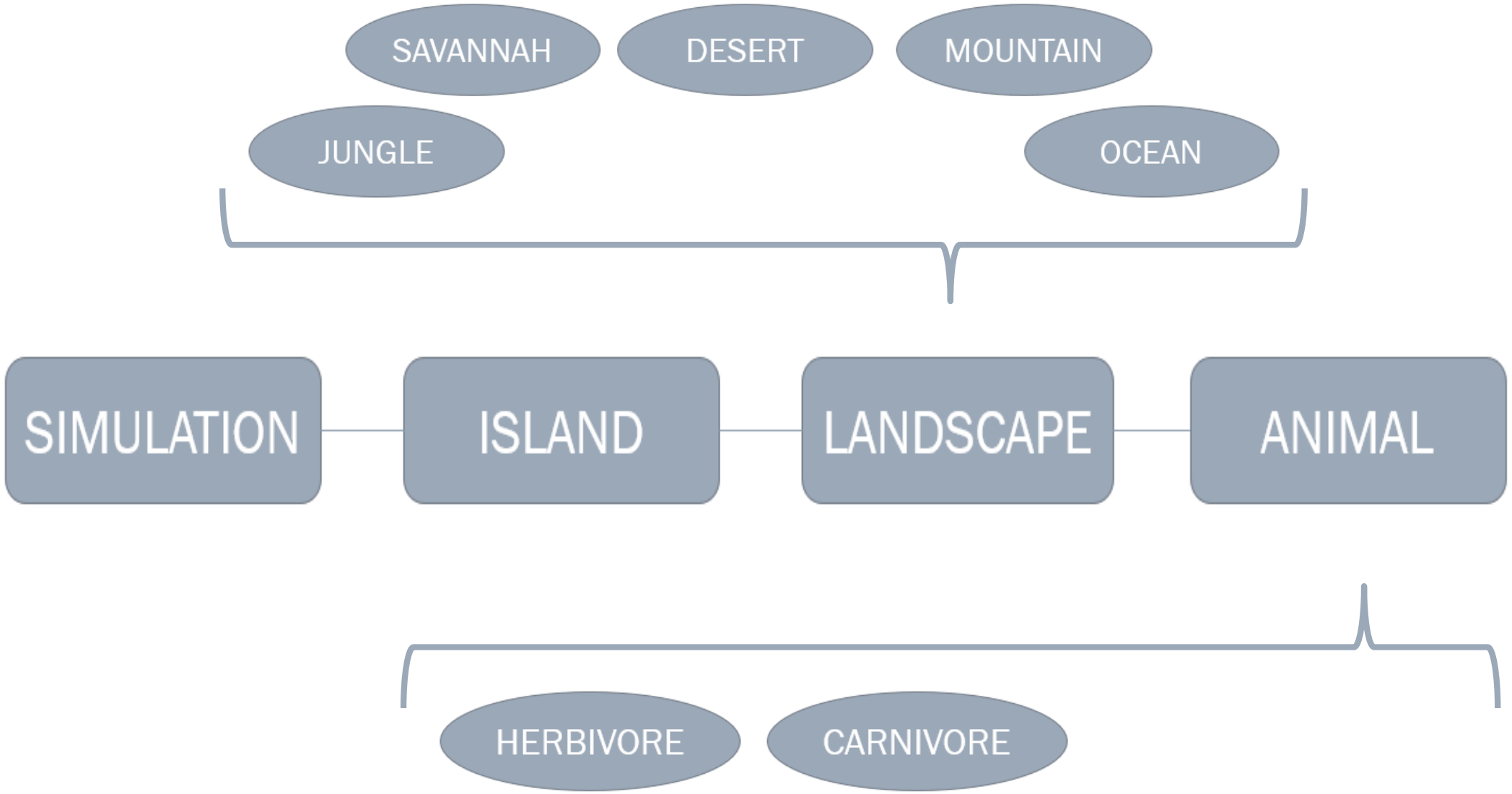
Total number of animals on island.

`num_animals_per_species`

Number of animals per species in island, as dictionary.

`year`

Last year simulated.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