# Modelling the Ecosystem of Rossumøya

Eksamen INF200 21.06.22
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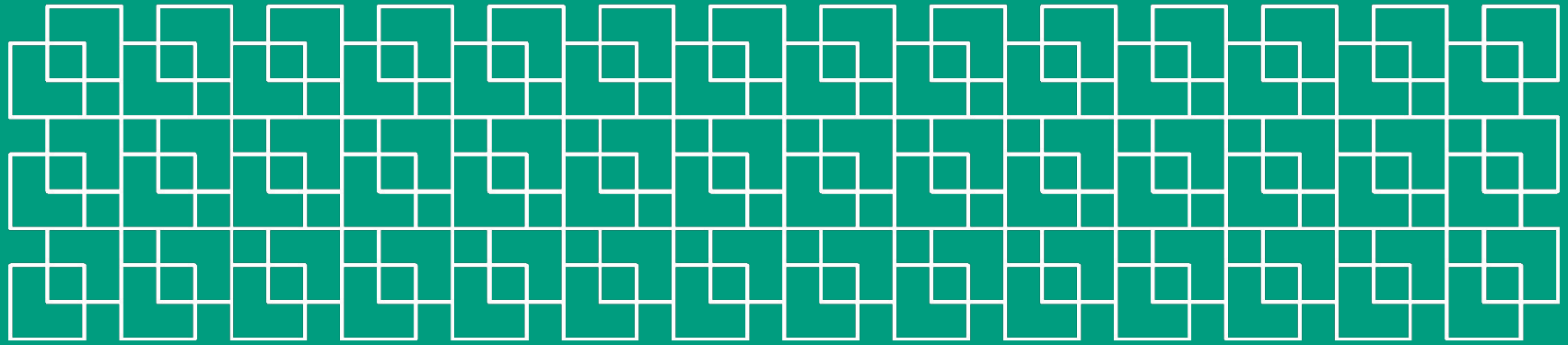
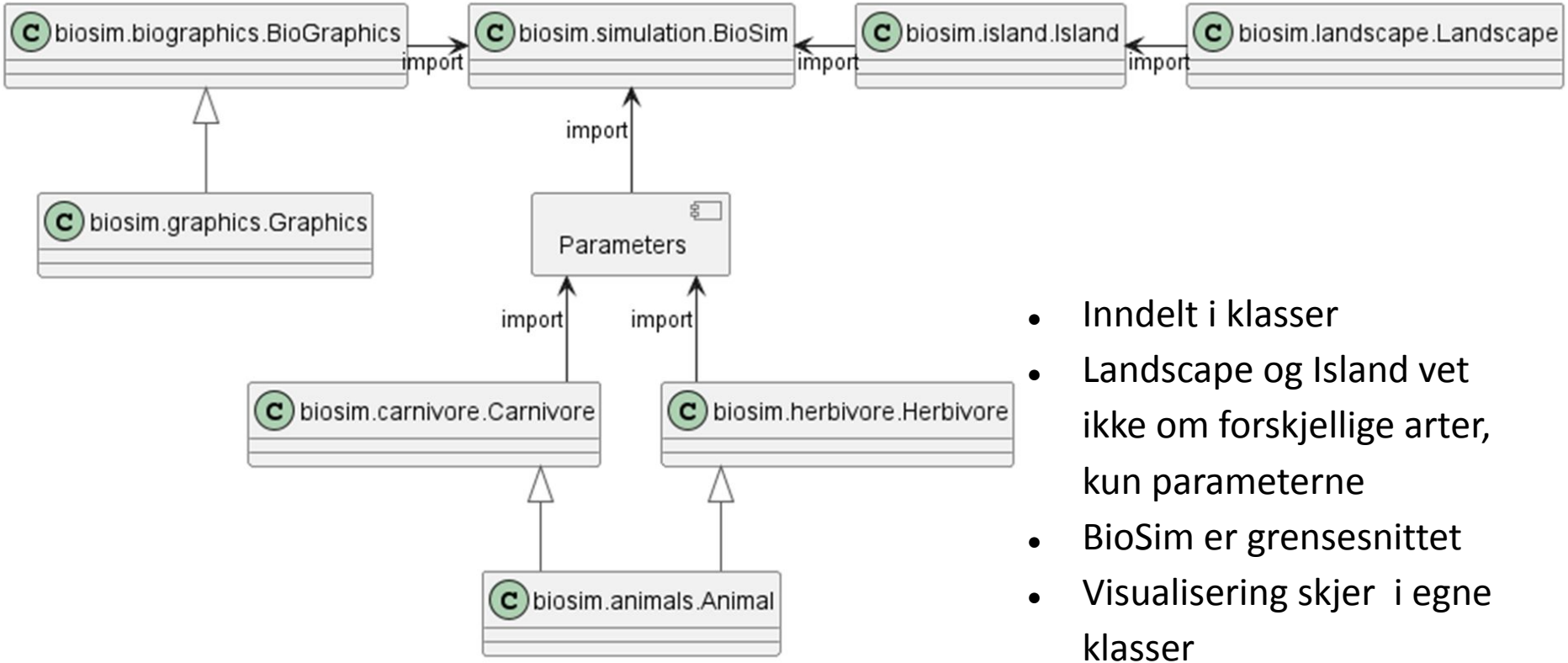


# Struktur og oppbygning




- Inndelt i klasser
- Landscape og Island vet ikke om forskjellige arter, kun parameterne
- BioSim er grensesnittet
- Visualisering skjer  i egne klasser

# Kvalitetssikring

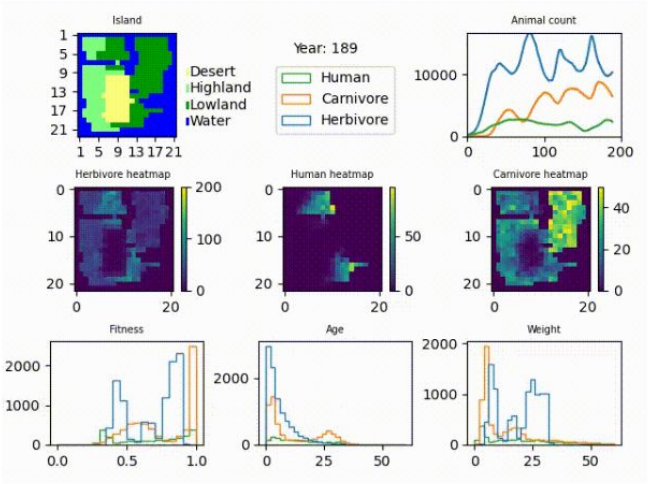
- 77 tester, 93% dekningsgrad
- Enhets-, Integrasjons- og Statistiske tester
- GitLab Pipeline for tester og PEP8
- Brukervennlige instruksjoner i Sphinx
- Utviklingsvennlig med ryddig oppsett og kommentarer

# Humans

`humans` is an extra module that can be imported to extend the BioSim simulation. `Human` is a subclass of `Animal` and comes with its own default parameters, shown in the table below. These can be user specified, and even changed during simulations, like all other animals.

For examples of using the human, see `examples/humans_sim.py`.

Humans have the ability to eat both prey and fodder. But they are not able to give birth until the age of 18. They also prefer eating the fittest prey in their cell, if possible.




**Default Human Parameters**

| Parameter | Human | Description |
|---|---|---|
| $w_{\text{birth}}$, `w_birth` | 5.0 | Expected value of weight of newborn |
| $\sigma_{\text{birth}}$, `sigma_birth` | 0.7 | Standard deviation of weight of newborn |
| $\beta_{\text{fodder}}$, `beta_fodder` | 0.75 | Weight gained in kg from eating 1 kg of fodder |
| $\Delta\Phi_{\text{max}}$, `DeltaPhiMax` | 20 | Likelihood of killing a prey is equal to fitness difference divided by $\Delta\Phi_{\text{max}}$ |
| $BirthAge_{\text{min}}$, `BirthAge_min` | 18 | Maximum weight of food and prey one can eat per year |

*class* humans.human.**Human**(*age, weight, parameters*) [source]

Class for a species of animal called carnivore

**Parameters:**
- **age** – Age of carnivore as an integer
- **weight** – Weight of carnivore as a float
- **parameters** – Dict with valid parameter specification for carnivores

*property* **eating_priority**

See `Animal.eating_priority` All humans (-2) eat in random order, after all carnivores (-1) and herbivores [0,1]

**feed**(*fodder, prey_list*) [source]

**Parameters:**
- **fodder** – plant food available
- **prey_list** – list of preys for carnivores to eat

See `Animal.feed`.

First tries to eat up to $F_{\text{fodder}}$ fodder. If still hungry, starts hunting for prey. Unlike carnivore, it tries to eat the fittest prey first. Keeps trying until full (total food eaten reaches $F$), or it has tried every prey.

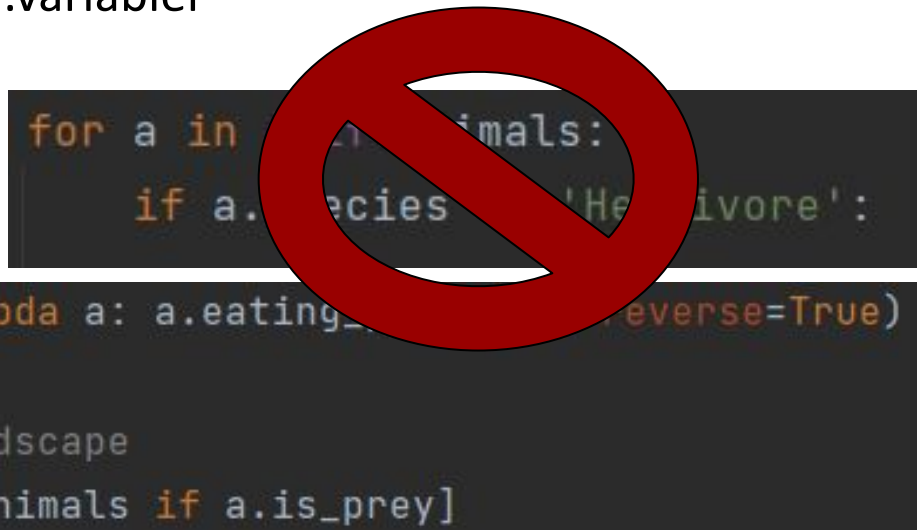
The chance of successfully killing and eating a given prey, is given by $\frac{\Phi - \Phi_{\text{prey}}}{\Delta\Phi_{\text{max}}}$.

When consuming a unit of fodder, the body weight increases by $\beta_{\text{fodder}}$. When consuming a unit of prey, the body weight increases by $\beta_{\text{prey}}$.

**Returns:** the amount of fodder eaten

# Oversiktlig kode

- Skiller mellom public/private
- Metoder fremfor lange.kjeder.med.variabler
- Lite duplisering



# Rask kode

- Gjort profiling, optimalisert hotspots
- Fitness reevalueres kun ved behov
  - Fra 40% til 20% av kjøretid

```python
@property
def age(self):
    return self._age

@age.setter
def age(self, new_age):
    self._age = new_age
    self._calculated_fitness = None
```

# Interessante resultater

- Enkelt å legge til nye arter
  - La til mennesker uten å endre på biosim-modulen (utenom litt visualisering)