

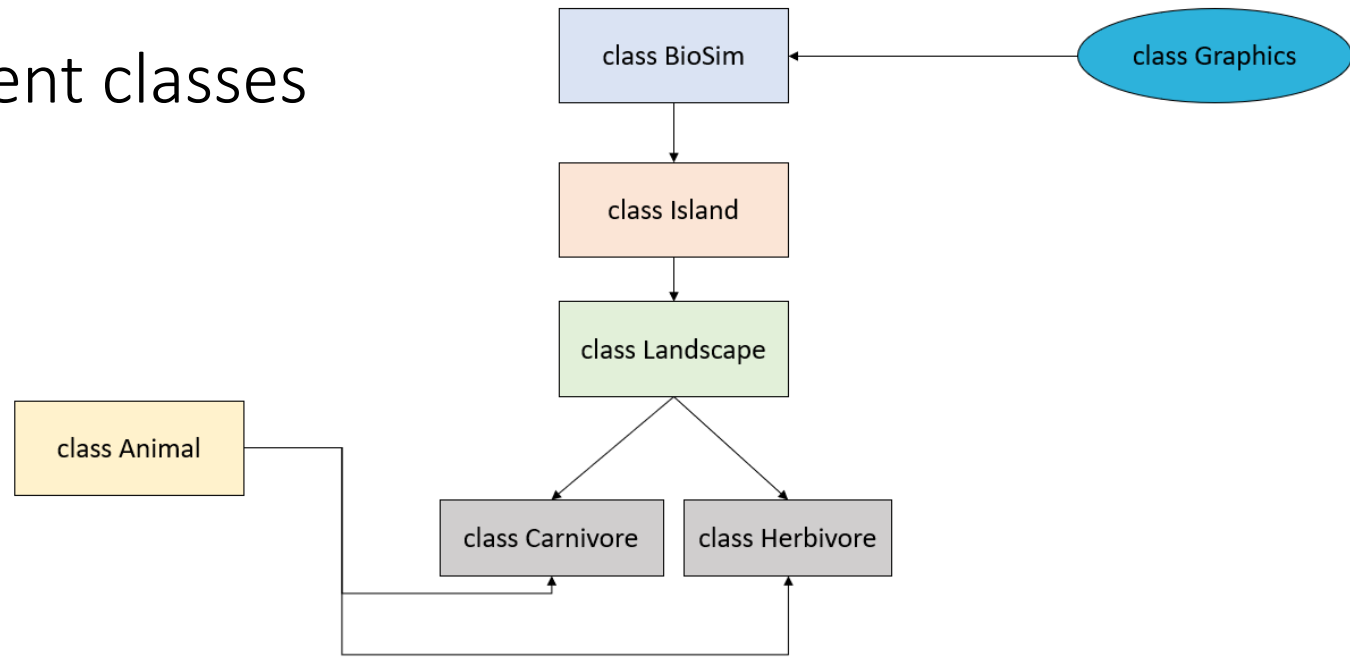
The background features a solid dark blue field. Overlaid on this are several large, irregular, blocky shapes in two shades of green: a medium forest green and a darker, more saturated forest green. These shapes are arranged in a complex, non-representational pattern, some overlapping each other. A single, solid olive-green rectangle is positioned centrally, partially behind the main title text.

# BioSim A15

Developed for EPAP

# The structure of the program

- 5 modules
- The roles of the different classes



# Our solution for migration

The view

●	●	
	X	
	●	

X → The location  
of the animal

T = True  
F = False

● → Population  
in the landscape

Possible directions

	N	
E	X	W
	S	

Animal chooses  
north

The updated mask

F	T	F
F	F	F
F	F	F

Migration map

T	T	T
T	T	F
T	T	F

&

The updated mask

F	T	F
F	F	F
F	F	F

=

The result array

F	T	F
F	F	F
F	F	F

The view

●	●	
	X	
	●	

&

The result array

F	T	F
F	F	F
F	F	F

=

Landscape object where  
the animal is moving

# Quality control

- Traceable development
- Test coverage
- Documentation
- Examples

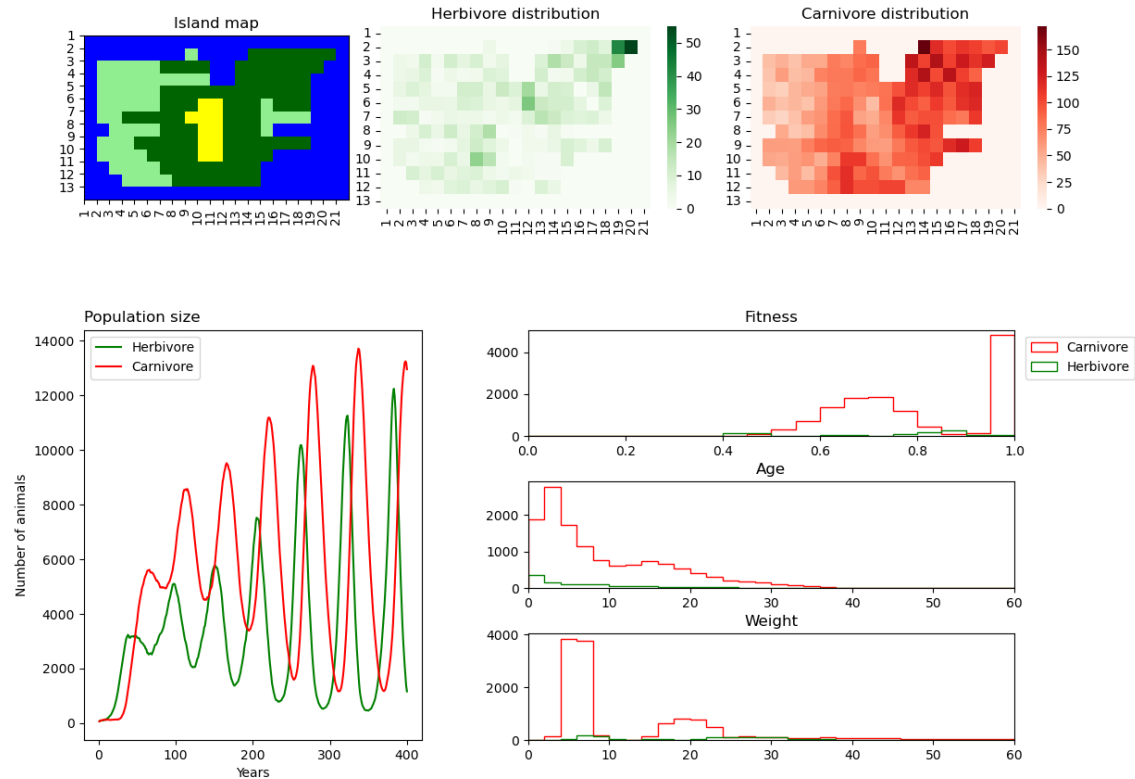
```
----- coverage: platform win32, python 3.8.11-final-0 -----
```

Name	Stmts	Miss	Cover
.tox\py38\Lib\site-packages\biosim\__init__.py	3	0	100%
.tox\py38\Lib\site-packages\biosim\animals.py	126	0	100%
.tox\py38\Lib\site-packages\biosim\base_logger.py	7	0	100%
.tox\py38\Lib\site-packages\biosim\graphics.py	162	3	98%
.tox\py38\Lib\site-packages\biosim\island.py	113	0	100%
.tox\py38\Lib\site-packages\biosim\landscape.py	106	1	99%
.tox\py38\Lib\site-packages\biosim\simulation.py	239	5	98%
TOTAL	756	9	99%

# Results

- Play movie
- Simulation of 400 years on the island
  - Initial population: 40 carnivores and 150 herbivores
- The population influences each other

Year: 399



# Further development

- Limitations
- Optimization

Before:

Name	Call Count	Time (ms)	Own Time (ms) ▼
do_migration	200	43604 30,9 %	29039 20,6 %
fitness	19659023	57445 40,7 %	28444 20,2 %
q	39318046	22407 15,9 %	16557 11,7 %

After:

Name	Call Count	Time (ms)	Own Time (ms) ▼
do_migration	200	37571 38,1 %	28881 29,3 %
_calculate_fitness	5038486	13929 14,1 %	6901 7,0 %
q	10076972	5523 5,6 %	4050 4,1 %