BioSim

Modelling the Ecosystem of Rossumøya

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Structure

BioSim
- simulate()
- add_population()
- set_animal_parameters()
- set_landscape_parameters()
- make_movie()

Animal
(Herbivores, Carnivores)
- set_params()
- fitness()
- birth()
- probability_of_migration()
- update_weight...()
- update_age()
- probability_of_death()
- herbi_list

- weight
- age

SingleCell
(Water, Desert, Lowland, Highland)
- set_params()
- animals_in_cell_eat()
- birth()
- animals_migrate()
- add_animals_after_migration()
- aging_of_animals()
- weight_loss_end_of_year()
- death()

- herbi_list
- carni_list

TheIsland
- all_animals_eat()
- animals_procreate()
- migration()
- all_animals_age()
- all_animals_losses_weight()
- animals_die()
- annual_cycle()
- add_animals_on_island()

- island_cells
- landscape
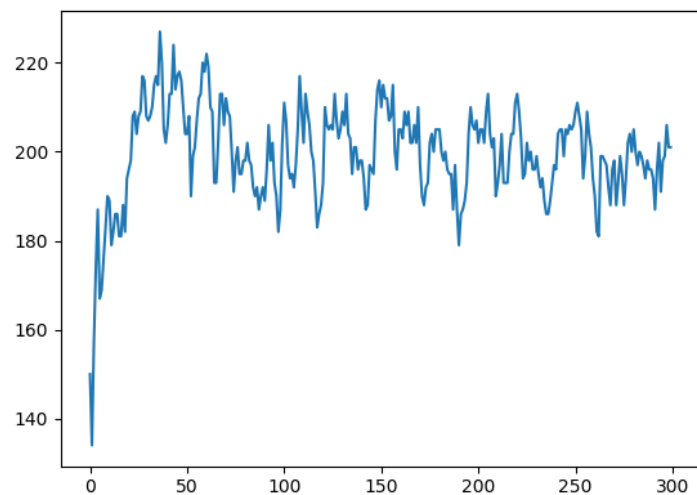
only a selection of the methods of each class

Hiccups along the way

- Problems with death

- Migration solution – ghost island

- Problems with the second round of simulation
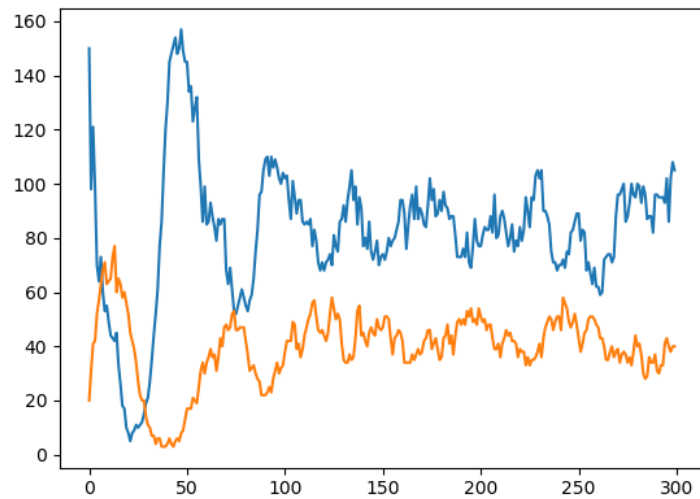
  - Used some time debugging

Trustworthy code?

- Tests and coverage

- Statistical tests

- Documentation

- Checking code along the way
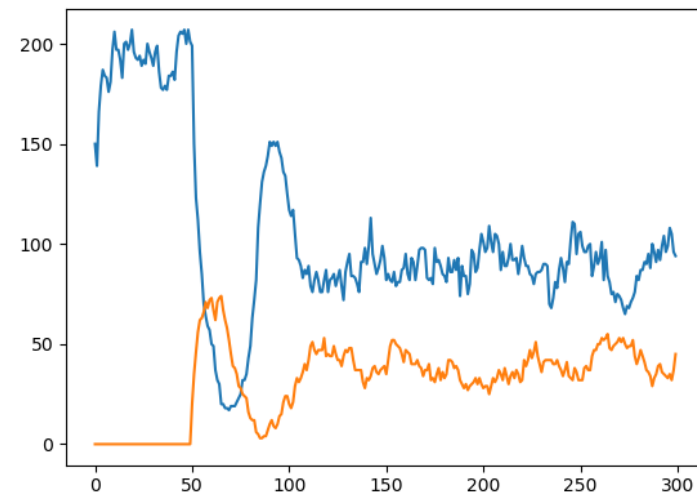 - Main-sections
  - Plots

150 herbivores 0 carnivores	150 herbivores 20 carnivores	150 herbivores 20 carnivores after 50 years
`first_herbi_sim.py`	`first_herbi_carni_sim.py`	`second_herbi_carni_sim.py`

Productive code?

- All parameters can be changed
- Error messages makes it is easy to correct "user mistakes"
- Running an easy simulation:


```python
if __name__ == '__main__':
    plt.ion()

    island = """\
            WWWW
            WLHW
            WLDW
            WWWW"""
    island = textwrap.dedent(island)

    ini_herbs = [{'loc': (2, 2),
                  'pop': [{'species': 'Herbivore', 'age': 5, 'weight': 20}
                          for _ in range(150)]}]

    sim = BioSim(island_map=island, ini_pop=ini_herbs, seed=123456)

    # Simulate first 100 years with only herbivores
    sim.simulate(num_years=100, vis_years=1, img_years=1)
```
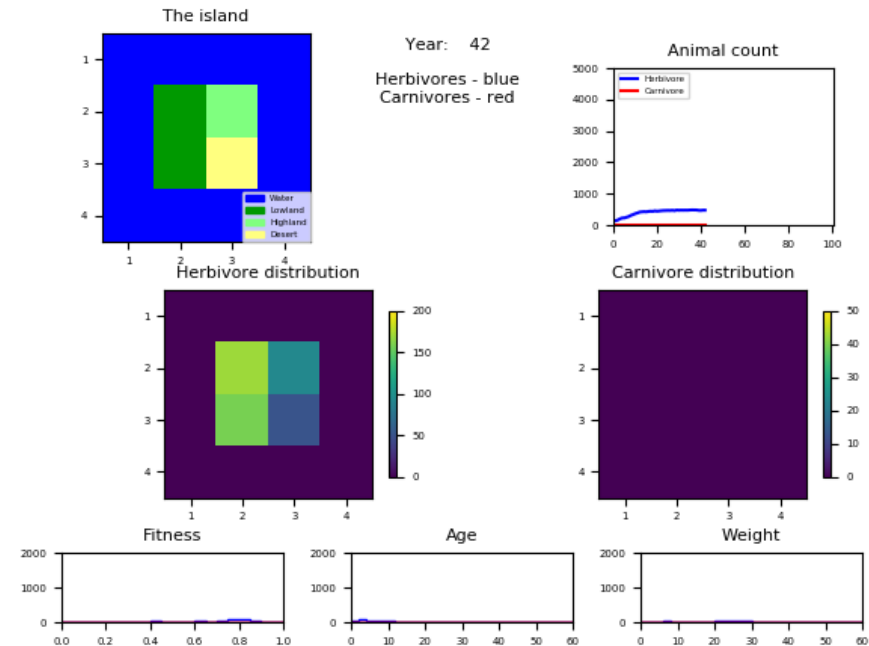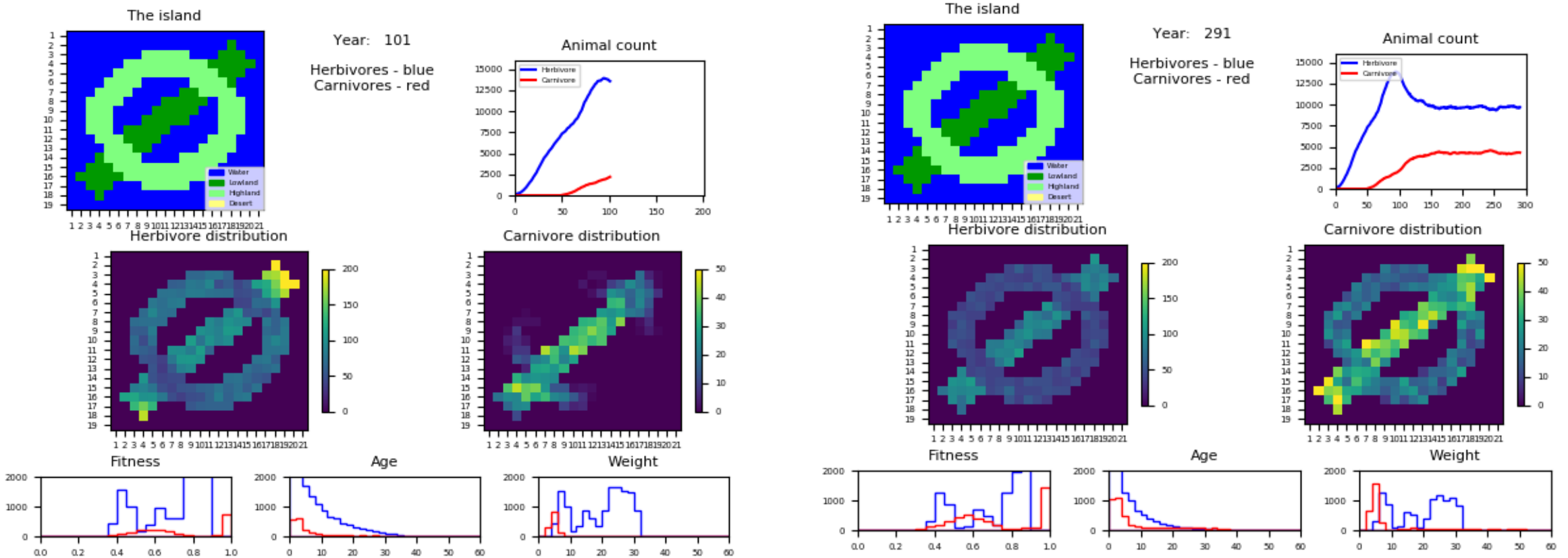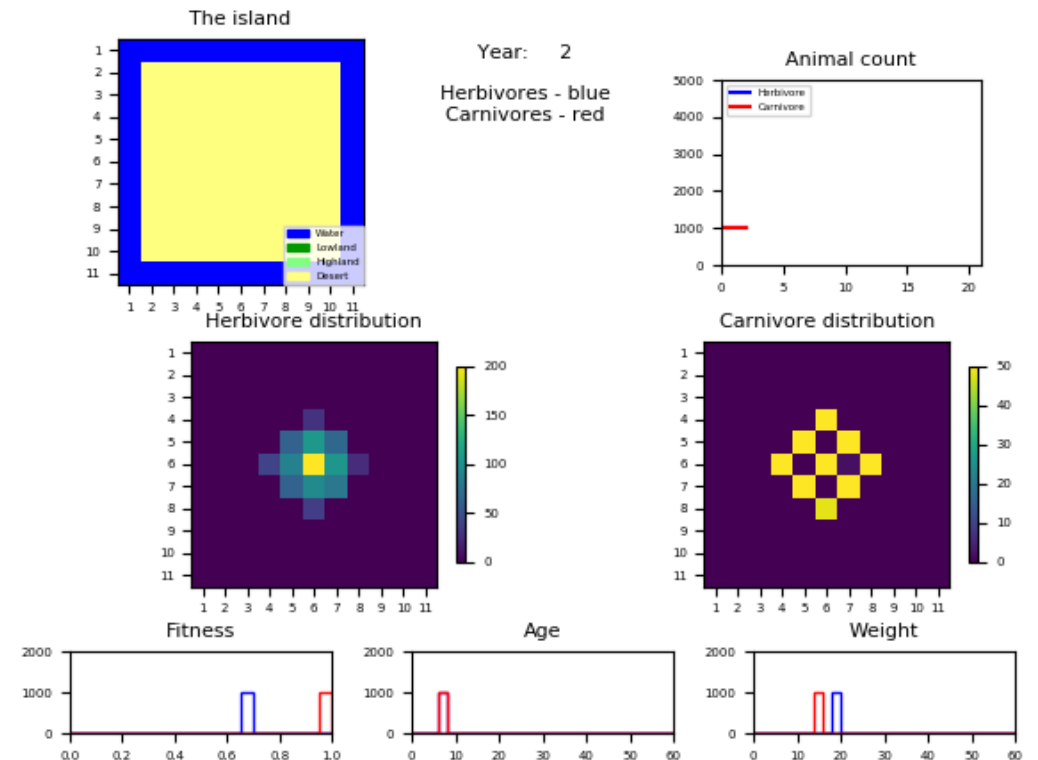
easy_to_use.py   (Not a part of our submission)

Ø-island – BioSim works for islands of your choice!
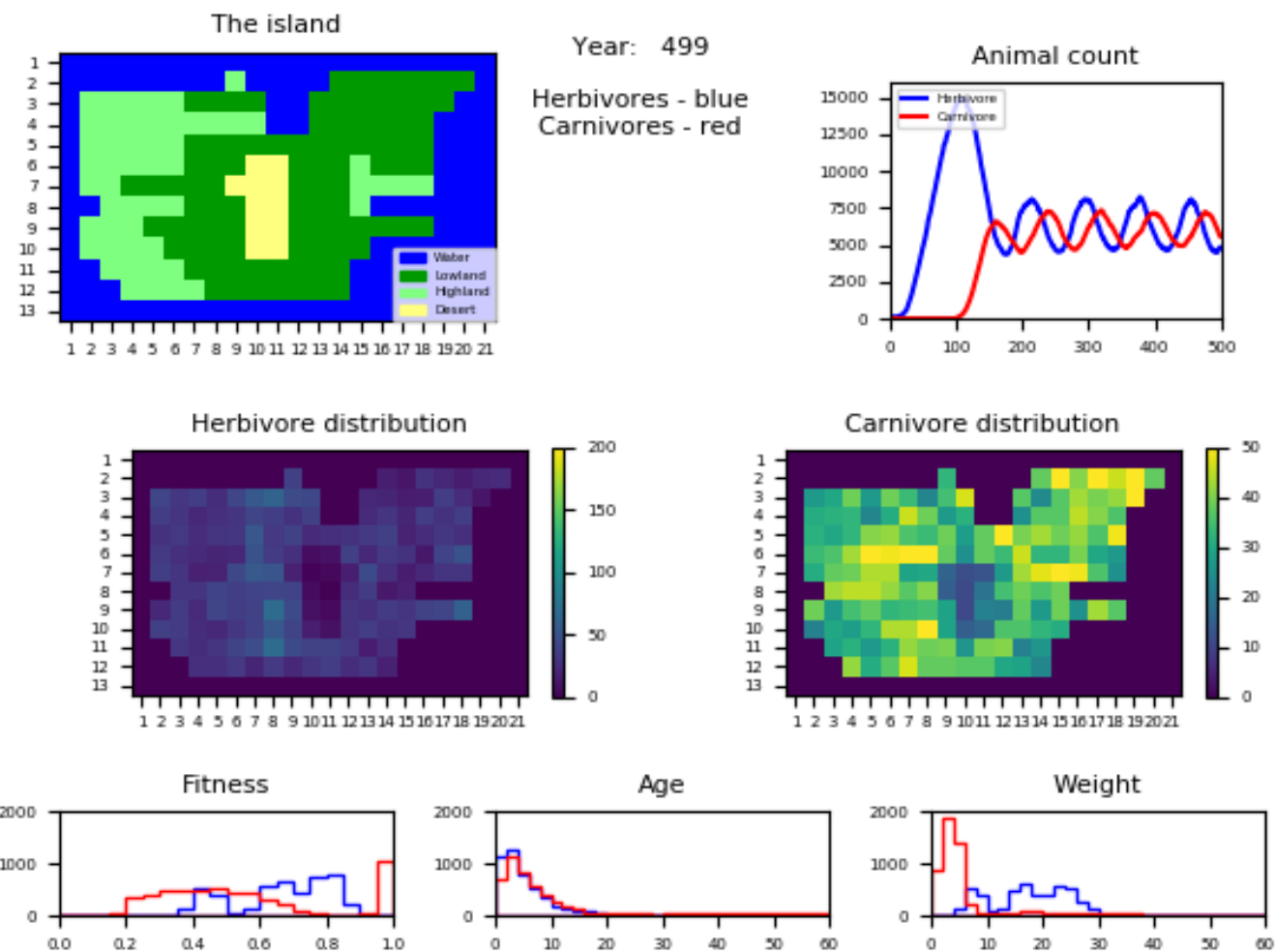

check_oe_island.py

We wish we had time to

- Made a fitness-attribute in Animal

- Look more at the checkerboard-test for migration

- Run simulation with different seeds

- Test other islands and parameters

- Optimize

Movie

check_sim.py