Lab 1

Distributed Intelligent Systems,

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Lab 1

- Part 1:
  - models of biological ants using a trail laying and following behavior to exploit a food source.
- Part 2:
  - Ant Colony Optimization (ACO) approaches can be reformulated to a shortest path problem.
  - Applied to the Travelling Salesman Problem (TSP).

- Lecture 1 and 2 of the course (and the additional readings).

Working Environment

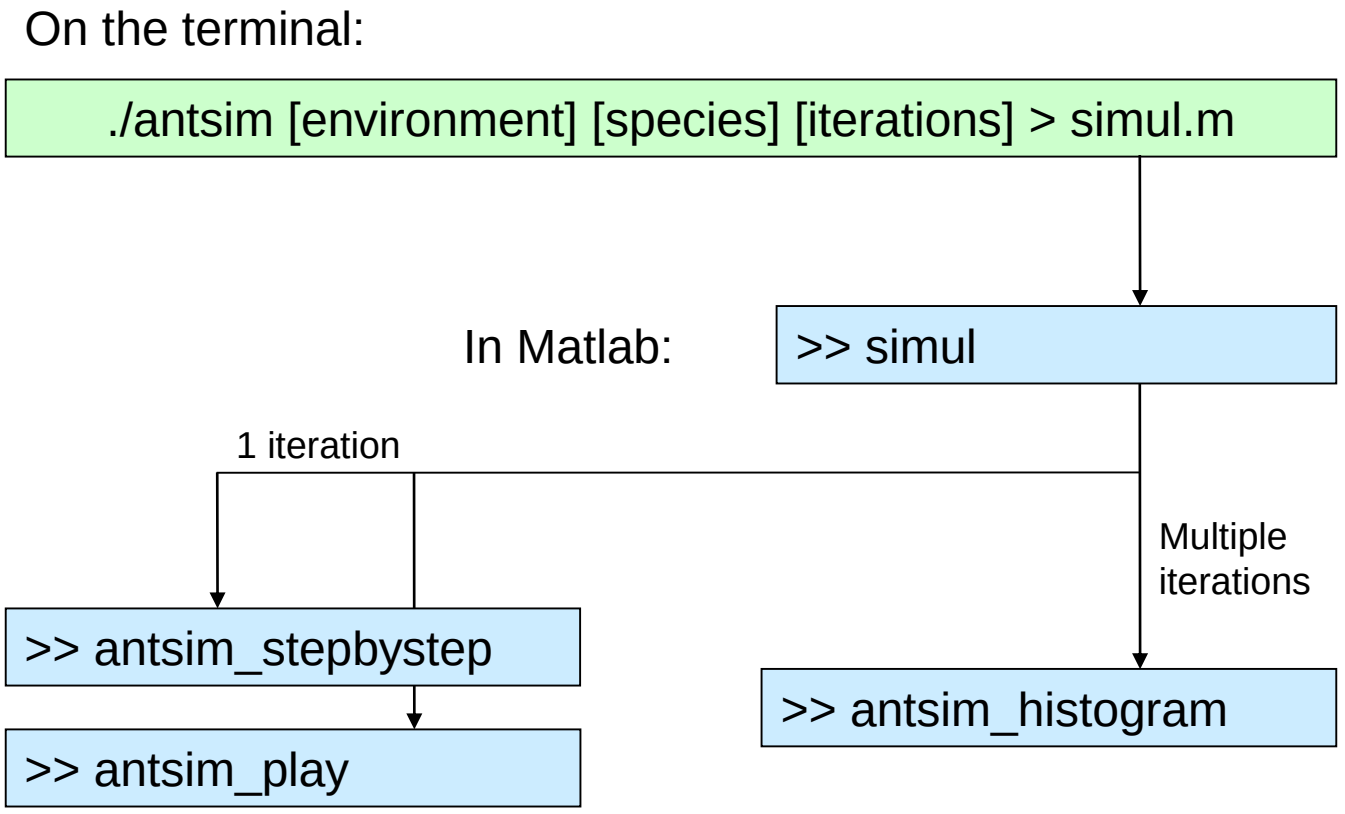
- This lab uses MATLAB and C
  - For MATLAB:
    - Instructions are given in the following link: https://www.epfl.ch/campus/services/en/it-services/it-support/pro-softwares/
    - Versions later than 2018a
  - For C compiler:
    - Install gcc
    - Instructions are given on Moodle for Windows, Mac, and Ubuntu.

Getting started

- Download Lab01.tar.gz from Moodle
- Decompress it in your directory:

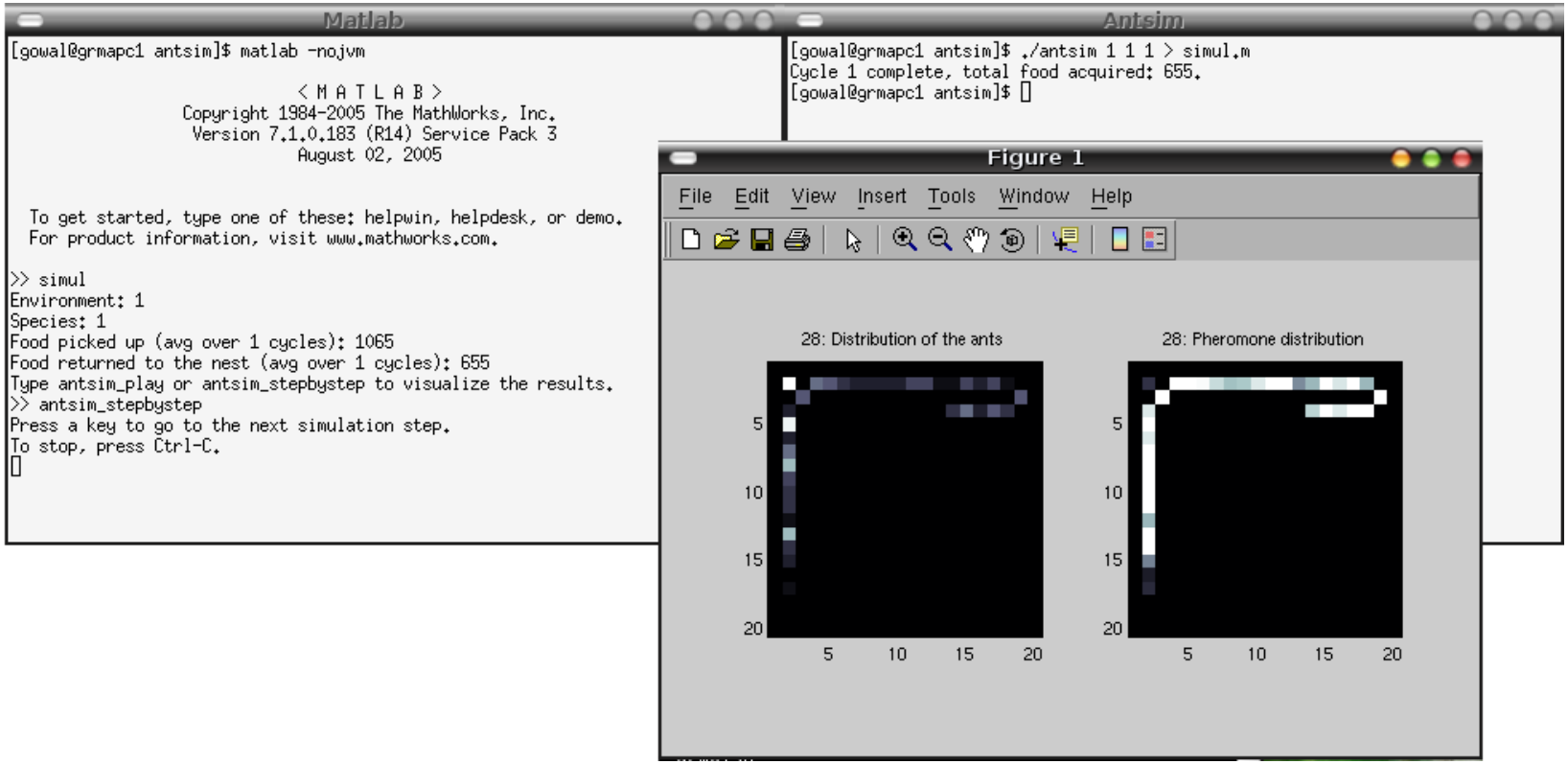
```
tar xvzf Lab01.tar.gz
```

Tools – Part 1 (C and Matlab)



Example (1 iteration)

1.



2.

Example (10 iterations)

Matlab

```
[gowal@grmapc1 antsim]$ matlab -nojvm

                         < M A T L A B >
             Copyright 1984-2005 The MathWorks, Inc.
              Version 7.1.0.183 (R14) Service Pack 3
                         August 02, 2005


  To get started, type one of these: helpwin, helpdesk, or demo.
  For product information, visit www.mathworks.com.

>> simul
Environment: 1
Species: 1
Food picked up (avg over 10 cycles): 986
Food returned to the nest (avg over 10 cycles): 640.4
Type antsim_histogram to visualize the results.
>> antsim_histogram
>>
```

2.

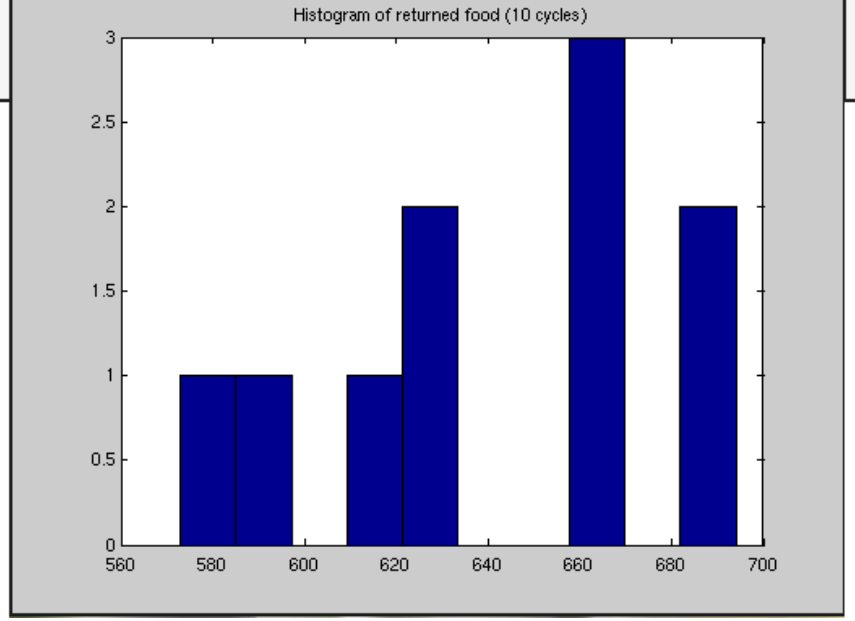
Antsim

```
[gowal@grmapc1 antsim]$ ./antsim 1 1 10 > simul.m
Cycle 1 complete, total food acquired: 666.
Cycle 2 complete, total food acquired: 624.
Cycle 3 complete, total food acquired: 683.
Cycle 4 complete, total food acquired: 573.
Cycle 5 complete, total food acquired: 694.
Cycle 6 complete, total food acquired: 590.
Cycle 7 complete, total food acquired: 669.
Cycle 8 complete, total food acquired: 615.
Cycle 9 complete, total food acquired: 666.
Cycle 10 complete, total food acquired: 624.
[gowal@grmapc1 antsim]$
```

1.

Figure 1

File Edit View Insert Tools Window Help



Tools – Part 2 (Matlab)

- A Matlab script will allow you to implement different parts of the assignment:

```
tsp('random',cities) % random
tsp('guess',cities) % ?
tsp('ant',cities) % EAS
```

Additional recommendations

- Read the first page of the lab carefully.
- Please fill in the feedback form on Moodle.
- This lab is not graded and you will be given a solution sheet after the session.
- This means that you can collaborate with each other.

Questions

- Office hours: email to TA mailing list
- TA mailing list: dis-ta@groupes.epfl.ch