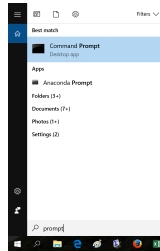


1 Initialization of the agent-based simulation

1. **Install** new version of Java or check whether you have it already installed:

1.1. Go to **Start** → **Command Prompt**



1.2. **Check** the version by writing in **Command Prompt (cmd)**:

java -version

```
C:\Users\jagob>java -version
java version "1.8.0_131"
Java(TM) SE Runtime Environment (build 1.8.0_131-b11)
Java HotSpot(TM) 64-Bit Server VM (build 25.131-b11, mixed mode)
```

The version should be at least 8 or 1.8. If there is a warning or the version is not 8 or 1.8, please install new version of Java:

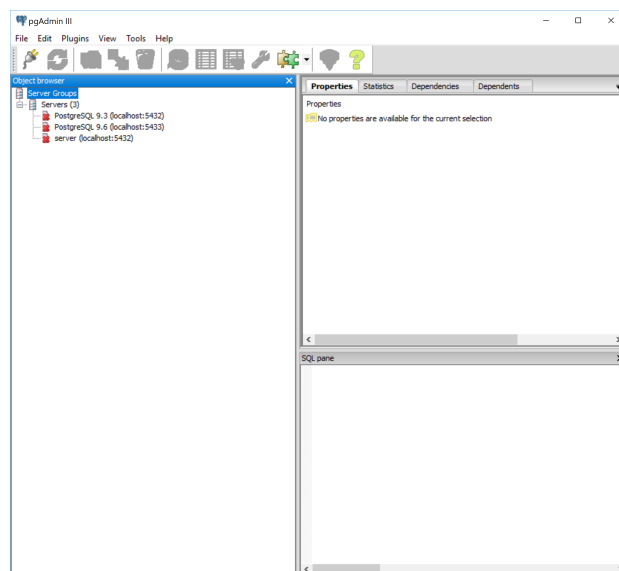
<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

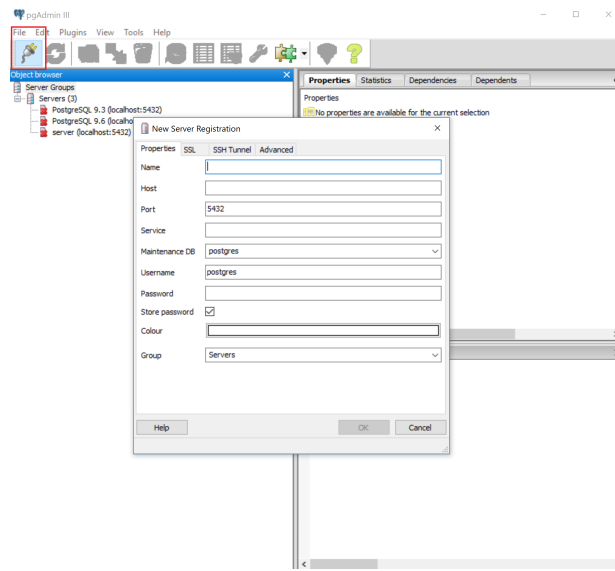
1.3. **Install PgAdminIII-PostgreSQL** (preferable version III):

<https://www.enterprisedb.com/downloads/postgres-postgresql-downloads#windows>

During instalation, please introduce password (please do not skip password!), we have to use it later, set e.g. Postgres.

1.4. **Go** to application **pgAdmin3**:





Name = server

Username = postgres

Password = password (store password!)

Host = localhost

Port = 5432

Then you should be able to see the Servers on the left.

Please introduce the password used during the installation (e.g. Postgres).

Create database

Click the right button to create a database

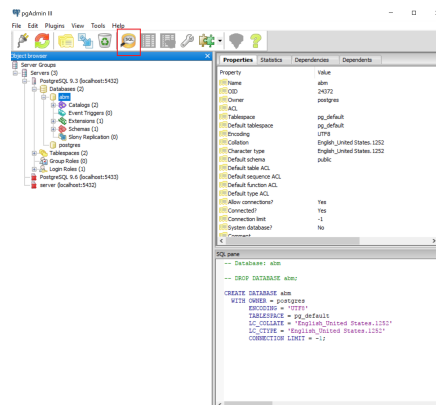
Select the name of the database

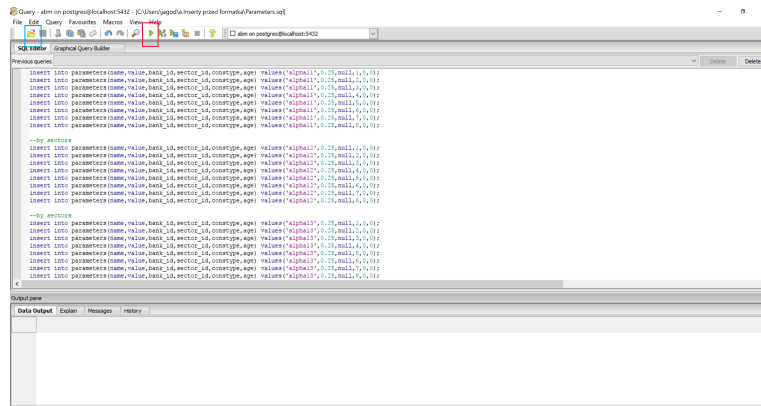
Name = abm

In order to assess the server PostgreSQL (localhost) use the password: password

To create tables, please open cmd and enter: *java -jar abm create*

Then fill the tables with the data from the sql inserts using PgAdmin3-PostGresql or cmd:

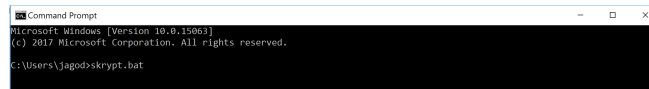




Banks
Sectors
Properties
Households
Property_owner
Firms
Firm_sector
Establishments
Individuals
Firm_owner
Suppliers
Consumers
Parameters

Open cmd and write: *skrypt.bat*

3



Sometimes, you may need to adjust skrypt.bat file and introduce different directory in " ":

E.g. in my case the following skrypt was used:

```
"C:\Program Files\PostgreSQL\9.3\bin\dropdb" -U postgres abm
"C:\Program Files\PostgreSQL\9.3\bin\createdb" -U postgres abm
java -jar abm create
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Banks.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Sectors.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Properties.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Households.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Property_owner.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Firms.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Firm_sector.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Establishments.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_1.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_2.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_3.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_4.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_5.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_6.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_7.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_8.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_9.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_10.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Individuals_11.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Firm_owner.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Supplier.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Consumers_1_2.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Consumers_3_4.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Consumers_5_6.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Consumers_7_8.sql_fmt
"C:\Program Files\PostgreSQL\9.3\bin\psql" -U postgres -d abm -E -q -f Parameters.sql_fmt
```

The expression in the commas may be for instance:

```
"C:\Program Files (x86)\PostgreSQL\9.6\bin\dropdb"
"C:\Program Files (x86)\PostgreSQL\9.6\bin\createdb"
"C:\Program Files (x86)\PostgreSQL\9.6\bin\psql"
```

If the sql inserts need to be checked and modified, we recommend doing it in Notepad ++ to be downloaded from:

<https://notepad-plus-plus.org/download/v7.5.1.html>

Please ensure the appropriate format and encoding (UTF-8) using the format command:

Open cmd and write:

```
java -jar abm format Banks.sql
```

where Banks.sql is the name of the file and can be change for another name. No special characters, other than _ , are allowed in the names.

2 How to use the simulation?

Open cmd and write:

```
java -jar abm it 1
```

where 1 is the number of iterations and can be modified.

We can also analyse only a few modules, then write:

```
java -Xms2G -Xmx4G -jar abm it 1
```

where 11 is the number of module (and in fact pseudocode) and can be modified.

This option is not available for the following pseudocodes:

09 – 10 – we always get results for 9–10 when 8 is initiated;

15 – 19 – we always get results for 15–19 when 14 is initiated;

25 – 26 – we always get results for 25–26 when 24 is initiated;

29 – 30 – we always get results for 29–30 when 28 is initiated;

39 – 41 – we always get results for 39–41 when 38 is initiated.

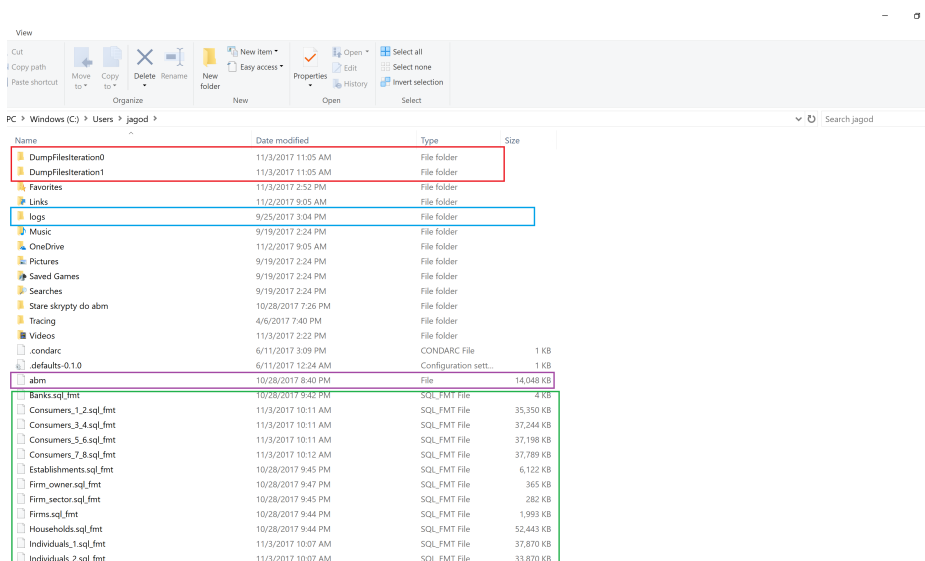
3 Data analysis and visualisation

After each initialization of simulation three files are created: *logs* (technical note about the initiated simulation), *report.out* (user-friendly document) and *DumpIterations* files (tables from the database after each iteration or partial simulation of modules).

CAUTION! The log file is huge! The user will not be able to open the report out file in word/notepad. Please download glogg program in order to analyze the complete simulation with commentaries.

The program can be downloaded from the website: <http://glogg.bonnefon.org/download.html>
It is free version and virus free.

In the same directory where the abm simulation (*abm file*) and the data (*inserts*) are, the folder *logs* is created.



Name	Date modified	Type	Size
DumpFileIteration0	11/3/2017 11:05 AM	File folder	
DumpFileIteration1	11/3/2017 11:05 AM	File folder	
Favorites	11/3/2017 2:52 PM	File folder	
Links	11/2/2017 9:05 AM	File folder	
logs	9/25/2017 3:04 PM	File folder	
Music	9/19/2017 2:24 PM	File folder	
OneDrive	11/2/2017 9:05 AM	File folder	
Pictures	9/19/2017 2:24 PM	File folder	
Saved Games	9/19/2017 2:24 PM	File folder	
Searches	9/19/2017 2:24 PM	File folder	
Stare skyppy do abm	10/28/2017 7:26 PM	File folder	
Tracing	4/6/2017 7:40 PM	File folder	
Videos	11/3/2017 2:22 PM	File folder	
.condarc	6/11/2017 3:09 PM	CONDARC File	1 KB
defaults-0.1.0	6/11/2017 12:24 AM	Configuration sett...	1 KB
abm	10/28/2017 8:40 PM	File	14,048 KB
Banks.sql_fmt	10/28/2017 9:42 PM	SQL_FMT File	4 KB
Consumers_1_2.sql_fmt	11/3/2017 10:11 AM	SQL_FMT File	35,350 KB
Consumers_3_4.sql_fmt	11/3/2017 10:11 AM	SQL_FMT File	37,244 KB
Consumers_5_6.sql_fmt	11/3/2017 10:11 AM	SQL_FMT File	37,198 KB
Consumers_7_8.sql_fmt	11/3/2017 10:12 AM	SQL_FMT File	37,789 KB
Establishments.sql_fmt	10/28/2017 9:45 PM	SQL_FMT File	6,122 KB
Firm_owner.sql_fmt	10/28/2017 9:47 PM	SQL_FMT File	365 KB
Firm_sector.sql_fmt	10/28/2017 9:45 PM	SQL_FMT File	282 KB
Firms.sql_fmt	10/28/2017 9:44 PM	SQL_FMT File	1,993 KB
Households.sql_fmt	10/28/2017 9:44 PM	SQL_FMT File	52,443 KB
Individuals_1.sql_fmt	11/3/2017 10:07 AM	SQL_FMT File	37,870 KB
Individuals_2.sql_fmt	11/3/2017 10:07 AM	SQL_FMT File	33,870 KB

In the folder we can find the *report.out* where the information about the modules or iterations can be found.

```

=====
****Report Name****
**** 10:00:00 Mon May 04 ****
****Initial Name****
****Iteration Name****
Iteration: 1
*****
*****START OF MODULE: M2_SectorProfitability*****
*****
*****REPORT: 2000*****
*****Calculated Temp: 60.00000000*****
*****
*****REPORT: 2001*****
*****Calculated Temp: 130.00000000*****
*****
*****REPORT: 2002*****
*****Calculated Temp: 65.50000000*****
*****
*****REPORT: 0000*****
*****Calculated Temp: 126.36370000*****
*****
*****REPORT: 2003*****
*****Calculated Temp: 200.00000000*****
*****Calculated sector exposure*****
temp.M2_SectorExp_ExpFrac 200.0000
M2_Market 1
temp.M2_SectorExp_FracProd 126.3637
M2_Market 4
*****
*****REPORT: 1000*****
*****Calculated supply values*****
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_SectorExp 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
*****
*****REPORT: 2000*****
*****Calculated supply values*****
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_SectorExp 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
temp.SUPPLY_M2_ML_10000 1.0000
*****
*****END OF MODULE: M2_SectorProfitability*****
*****START OF MODULE: M2_Computing*****
*****

```

At the same time, after each iteration the *DumpFilesIterations* folder with data in tables is created.

Both files are useful in the analysis. The data from the simulation can be then analysed in SigmaPlot, R, Matlab, Gretl, STATA or other econometric packages.

Due to the fact that the simulation allows us to analyse the changes in distributions, we highly recommend SigmaPlot to visualize these changes (histograms, BoxPlots, 3D mesh plots, countour maps) and R (heat-maps) as well as Gaphi to visualize the changes e.g. in the networks of customers and suppliers on the market that in fact also represent the dynamic interactions between sectors known from the input-output table, or other network effects in the model. The spatial data can be visualised using GIS lub R, for instance the spatial dimension of inequality.

Additional information

In order to assess the technicalities of the Java program, access through e.g. Eclipse or NetBeans. In order to run the simulation good computer is required, at least:

View basic information about your computer

Windows edition

Windows 10 Home

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System

Manufacturer:	ASUSTek Computer Inc.
Model:	N552VW
Processor:	Intel(R) Core(TM) i7-6700HQ CPU @ 2.60GHz 2.59 GHz
Installed memory (RAM):	16.0 GB
System type:	64-bit Operating System, x64-based processor
Pen and Touch:	No Pen or Touch Input is available for this Display

ASUSTek Computer Inc. support

Website: [Online support](#)

Computer name, domain, and workgroup settings

Computer name:	DESKTOP-FQLSTA8
Full computer name:	DESKTOP-FQLSTA8
Computer description:	
Workgroup:	WORKGROUP

Windows activation

Windows is activated [Read the Microsoft Software License Terms](#)

On this specification, the simulation (it=4) runs approximately 8–10 hours if all mechanisms to speed up are used (sequences, indexes, skrypt.bat etc.). If you obtain the error on the black command screen, please contact: jagoda.kaszowska@gmail.com or call +48 607 32 96 13, however, it may be the sign that your computer is running out of memory. After the initiation of simulation, you will obtain a common Java warning that should not bother you. If in short you get the time of computation of first module or update in raport.out, the simulation is running.