

CORMAS Tutorial

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ESSA 2007 Conference

Outline

- Introduction
- How to design a model from scratch
(StupidModel benchmark)
- Cormas and Role-Playing Games
(MejanJeu)

What is Cormas?

Common-pool **R**esources and **M**ulti-**A**gent **S**ystems

- For several years now, agent-based simulation software exist. User groups (including ecologists and sociologists) are organized around generic tools that facilitate the construction of models and offer facilities ("virtual laboratories") for monitoring and analysing simulation trials
- The “*Green*” research unit, from Cirad, is particularly interested in models for integrated renewable resource management. The multi-agent simulation software that we have developed, named **Cormas**, is oriented towards the representation of interactions between people using renewable resource



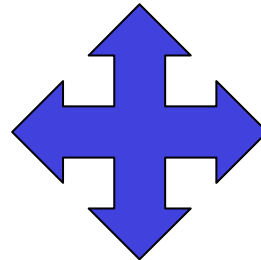
What are we doing ?

Artificial societies

Theory building

Applied models

*Understanding by knowledge
and data integration*



**Platform
implementation**

*Concrete capitalization,
Improving the methodology*

Action research

Using the models to help management



CORMAS web site

<http://cormas.cirad.fr>

The screenshot shows the website "Ressources naturelles et simulations multi-agents" in Netscape 6. The browser window title is "Ressources naturelles et simulations multi-agents - Netscape 6". The address bar shows "http://cormas.cirad.fr/". The website header features the "Cormas" logo and the text "Ressources naturelles et simulations multi-agents". Below the header, there is a navigation bar with "Cirad • Web des SAVOIRS", "ENGLISH VERSION" with a UK flag, and "RECHERCHER" with a magnifying glass icon. The main content area has a large heading "Ressources naturelles et simulations multi-agents" and a sub-heading "Cormas 2001 est disponible". A sidebar on the left contains a menu with items: Démarche, Logiciel Cormas, Applications, Bibliographie, Formation, and Réseaux. The main text area includes a welcome message "Bienvenue sur cormas.cirad.fr" and a paragraph describing the site's focus on modeling relationships between societies and their environment. It also mentions a section on the scientific approach and the availability of the Cormas simulation software. At the bottom, there is a "L'actualité du mois" section with a "NEW" icon and the text "En préparation: la nouvelle version de la plate-forme Cormas 2002." The browser status bar at the bottom shows "Document : chargé" and "Business Outils Loisirs Interactif".



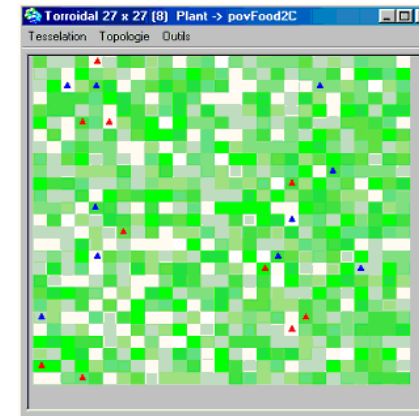
What are we doing ?

Artificial societies *Theory building*

<http://www.cormas.fr/en/applica/ecec.htm>

Pepper, J.W. and Smuts, B.B., 2000. The evolution of cooperation in an ecological context: an agent-based model.

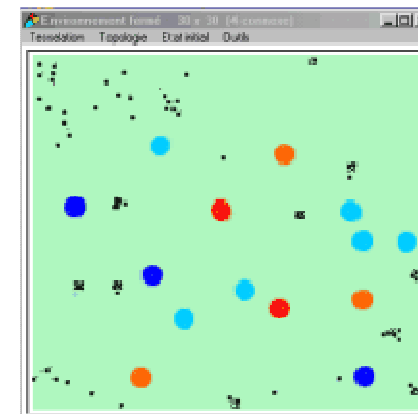
In: T.A. Kohler and G.J. Gumerman (Eds), Dynamics in human and primate societies. Oxford University Press / Sante Fe Institute, New York, pp. 45-76.



<http://www.cormas.fr/en/applica/dricol.htm>

Thébaud, O. and Locatelli, B., 2000.

<http://jasss.soc.surrey.ac.uk/4/2/3.html>





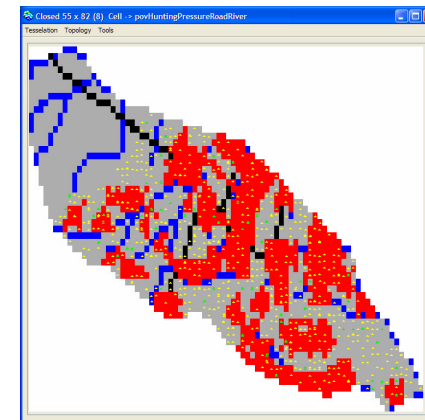
What are we doing ?

Applied models

*Understanding the co-adaptation
between resources dynamics and socio-economic organization
by knowledge and data integration*

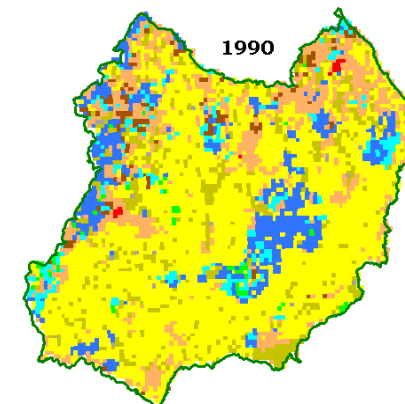
<http://www.cormas.fr/en/applica/djemiong.htm>

Bousquet, F., Le Page, C., Bakam, I. and Takforyan, A., 2001.
Multiagent simulations of hunting wild meat in a village
in eastern Cameroon. *Ecological Modelling*, 138:331-346.



<http://www.cormas.fr/en/applica/mejan.htm>

Etienne, M., Le Page, C. and Cohen, M., 2003.
A Step-by-step approach to building land management scenarios
based on multiple viewpoints on multi-agent system simulations.
<http://jasss.soc.surrey.ac.uk/6/2/2.html>





What are we doing ?

Action research

Using the models to help management

<http://www.cormas.fr/en/applica/selfCormas.htm>

D'Aquino, P., Le Page, C., Bousquet, F. and Bah, A., 2003. Using self-designed role-playing games and a multi-agent system to empower a local decision-making process for land use management: The SelfCormas experiment in Senegal. <http://jasss.soc.surrey.ac.uk/6/3/5.html>

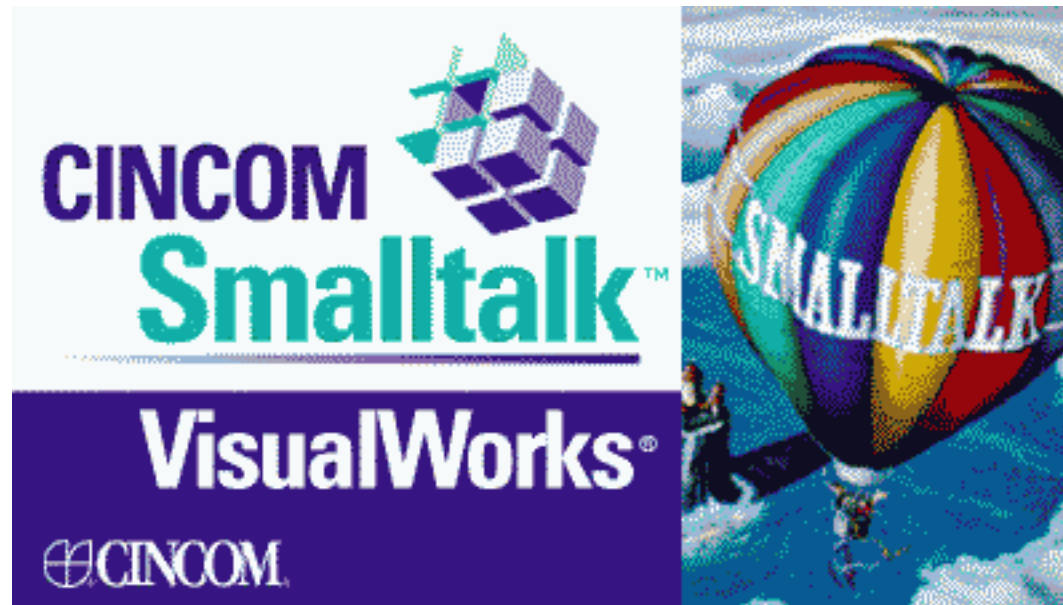


<http://www.ecole-commod.sc.chula.ac.th/>

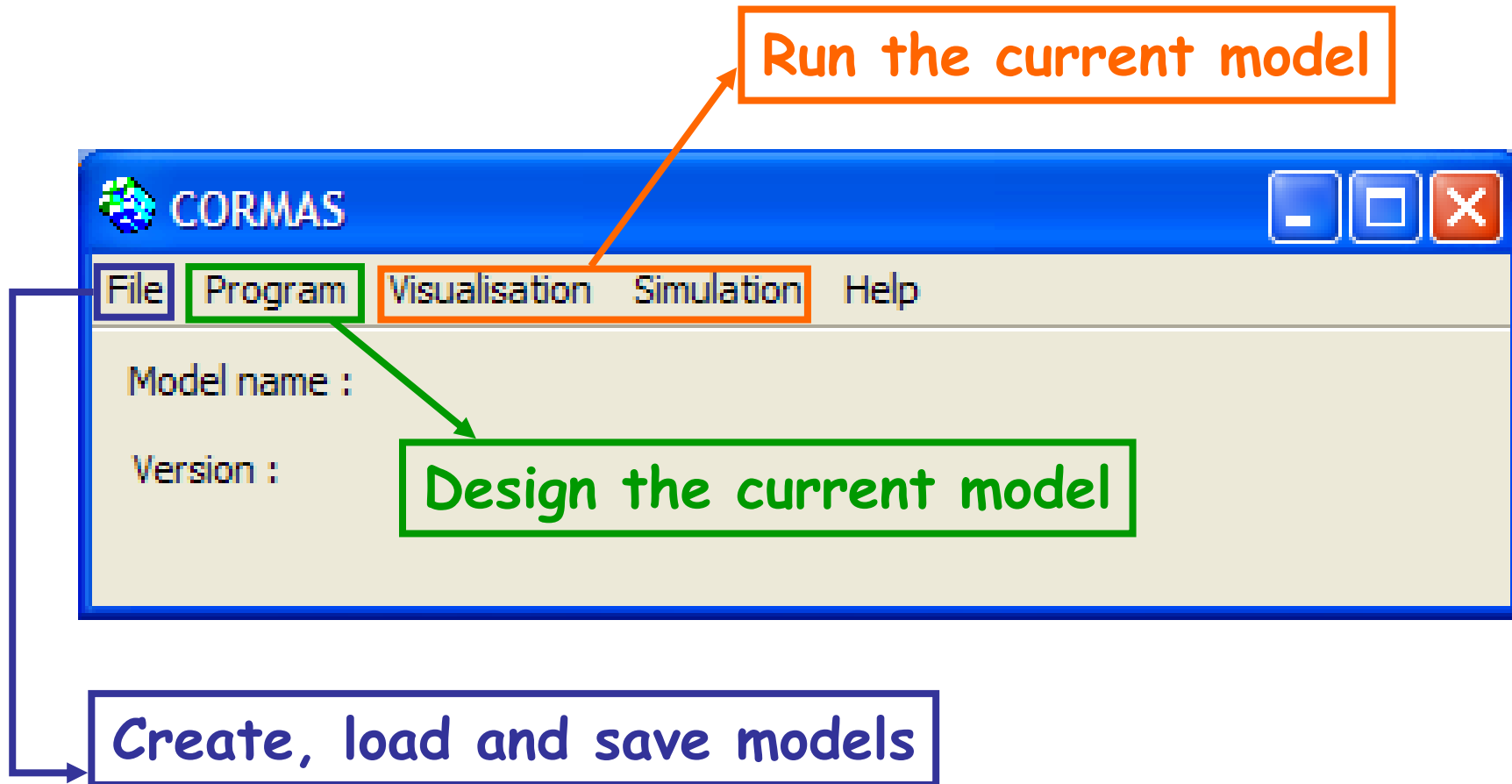
Gurung, T.R., Bousquet, F. and Trébuil, G., 2006. Companion modeling, conflict resolution, and institution building: sharing irrigation water in the Lingmuteychu watershed, Bhutan. *Ecology and Society*, 11:36. <http://www.ecologyandsociety.org/vol11/iss2/art36/>

What is Cormas?

- **Cormas** has been developed with **VisualWorks**, a programming environment based on the object-oriented language **Smalltalk**

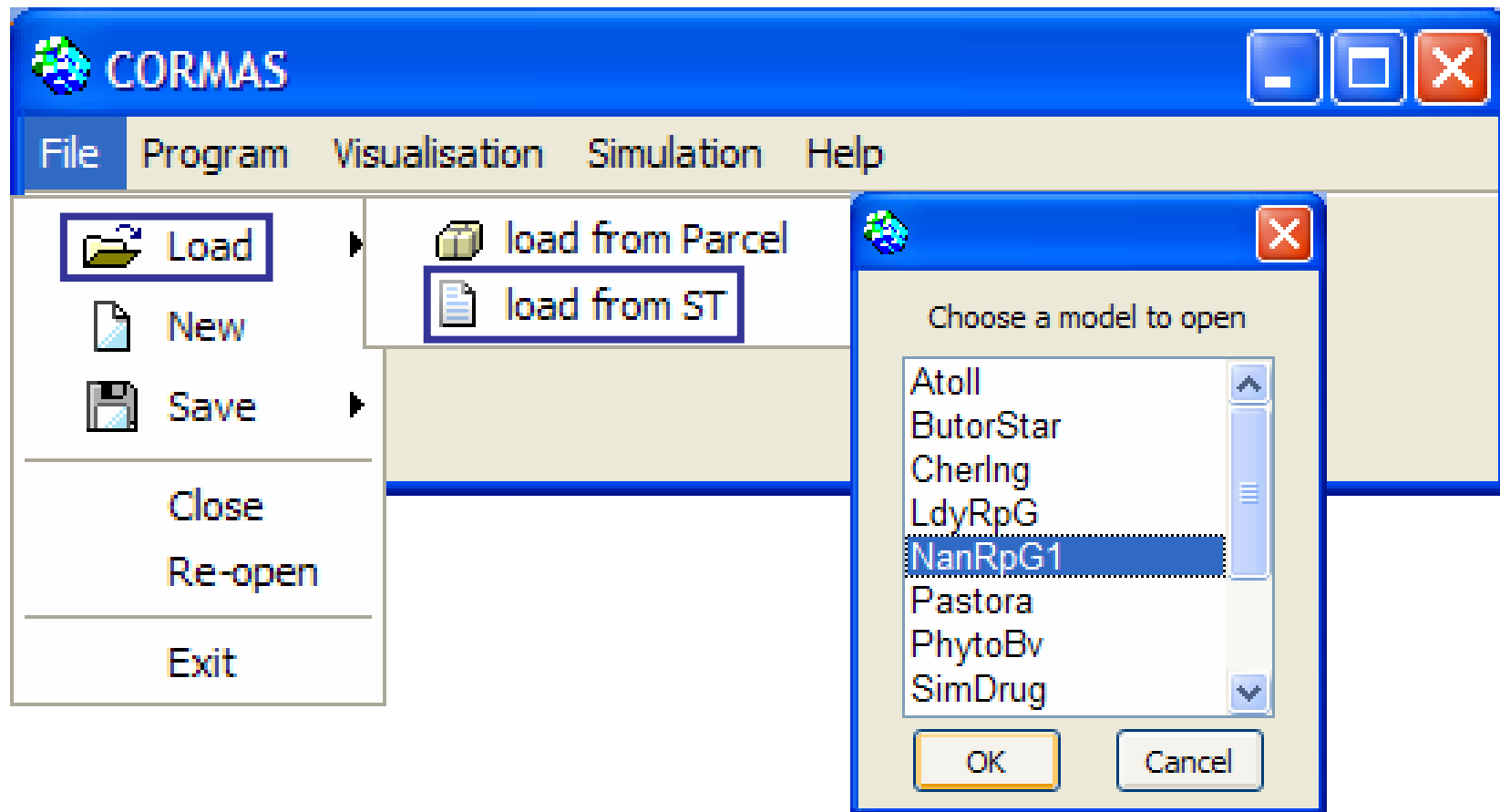


Cormas at a glance



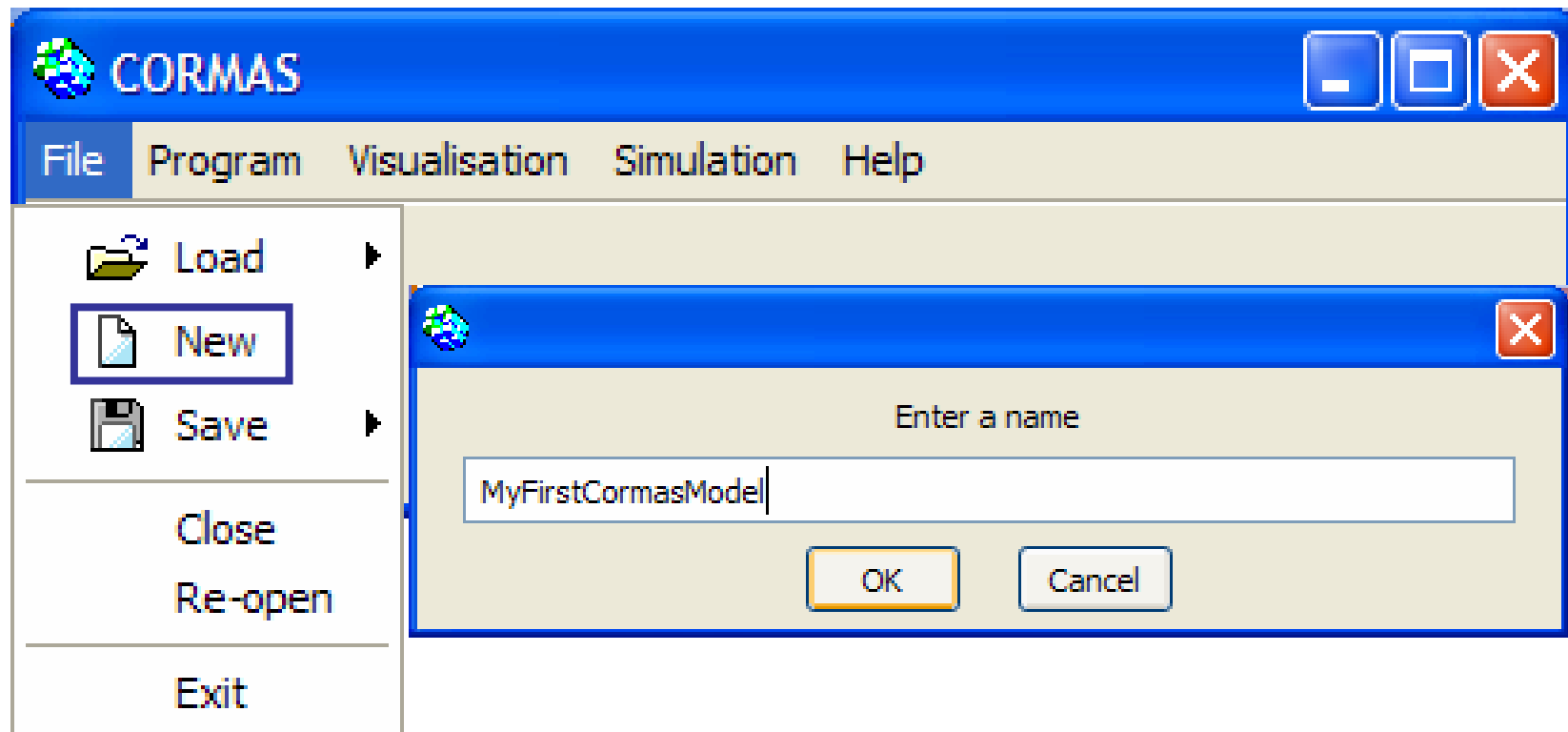
Cormas at a glance

Start to play with an existing model



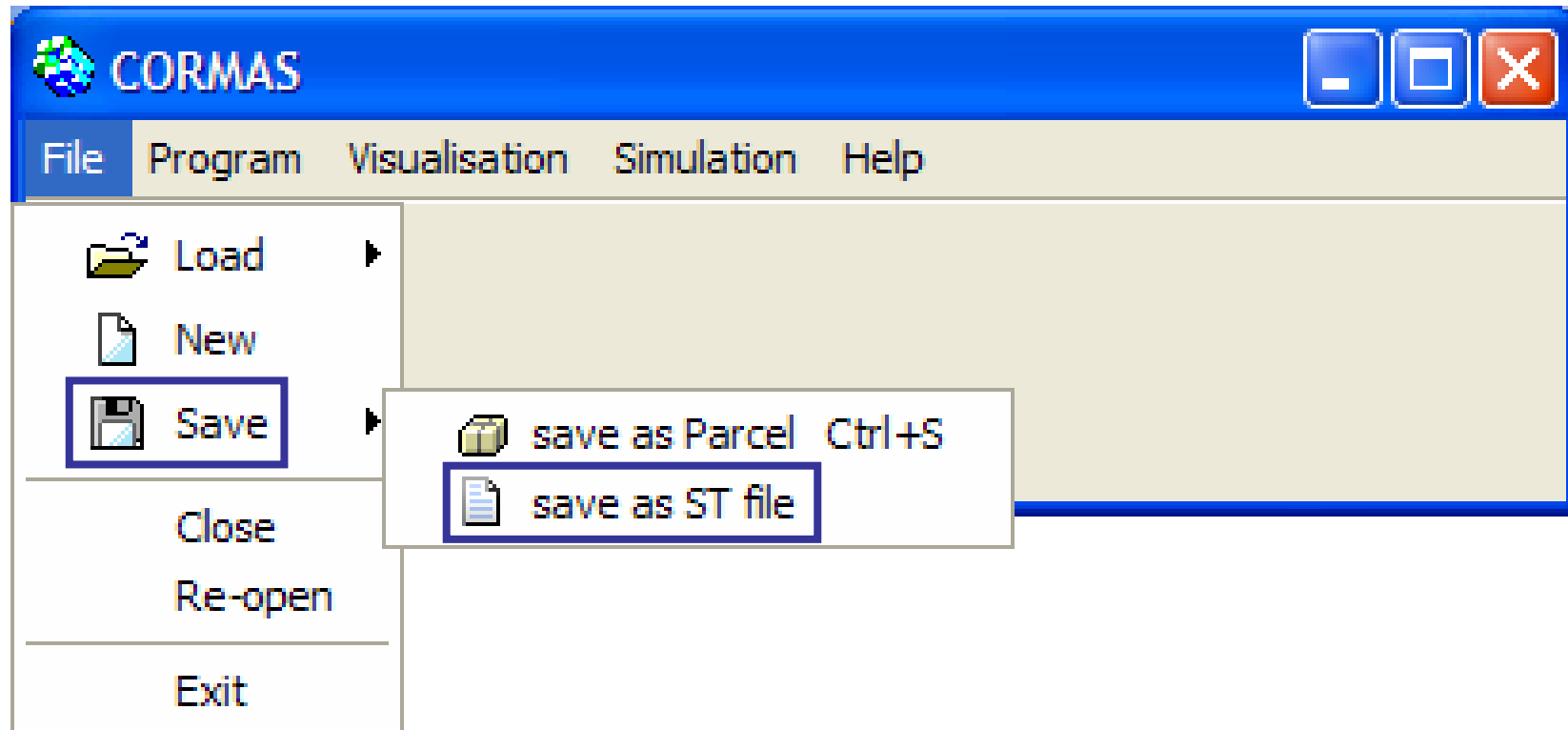
Cormas at a glance

Start to create a brand new model

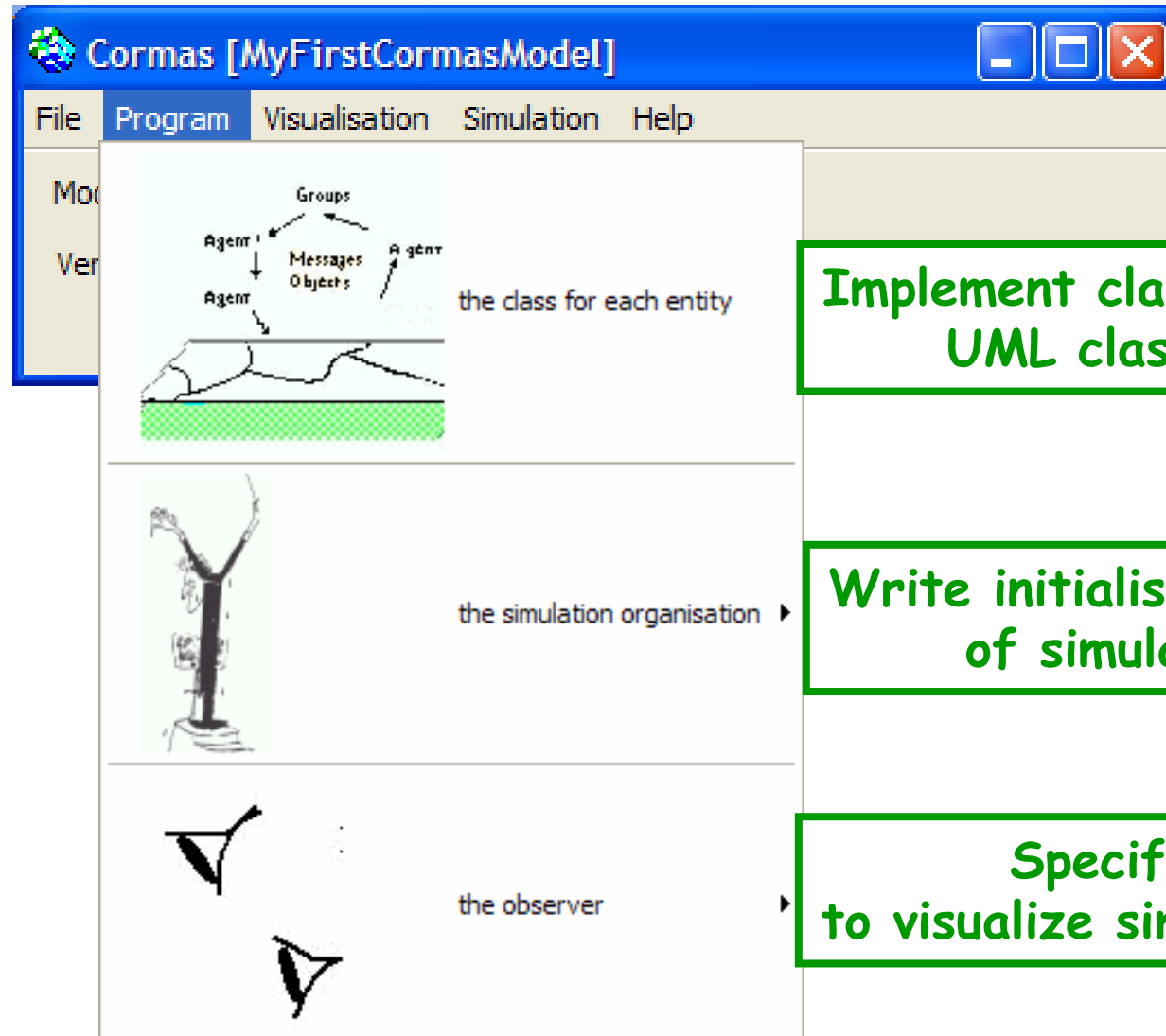


Cormas at a glance

Make your brand new model an existing one...



Cormas at a glance

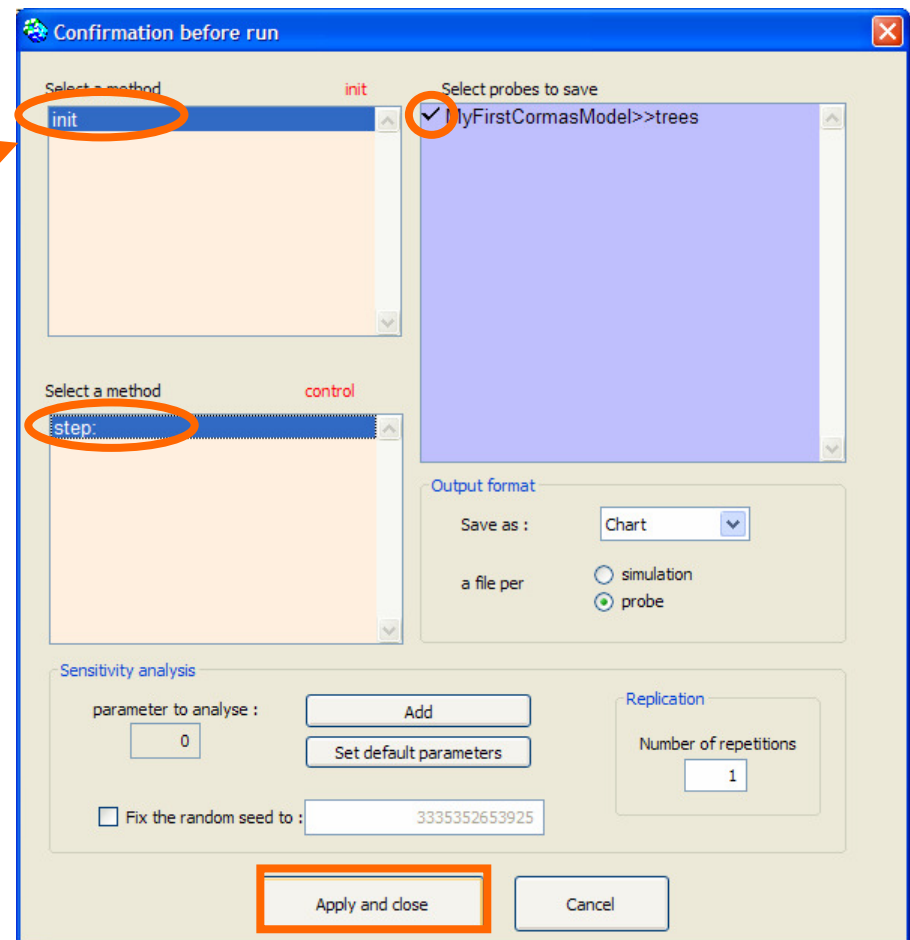
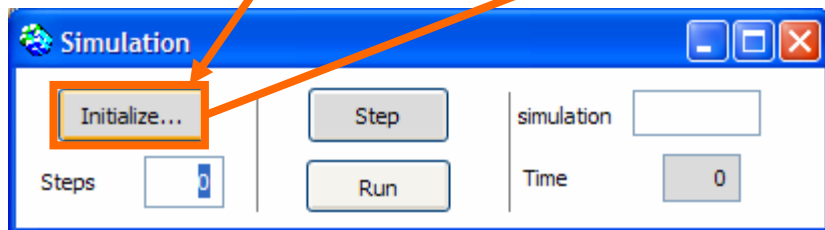
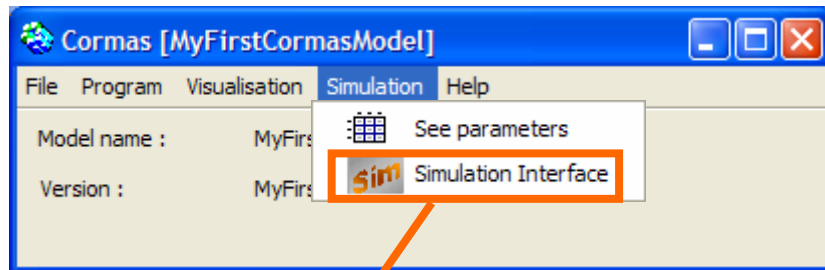


Implement classes from your UML class diagram

Write initialisation and scheduling of simulation scenarios

Specify means to visualize simulation scenario

Cormas at a glance



Cormas at a glance

The image displays the Cormas software interface, which is used for simulating multi-agent systems. The main window, titled "Cormas [MyFirstCormasModel]", features a menu bar with "File", "Program", "Visualisation", "Simulation", and "Help". Below the menu bar, there are three main sections: "Probes", "Messages", and "Space".

- Probes:** This section contains a bar chart icon and the text "Probes". An orange arrow points from this section to the "Charts - Global Level" window.
- Messages:** This section contains a network diagram icon and the text "Messages". An orange arrow points from this section to the "Communications' Observer" window.
- Space:** This section contains a grid icon and the text "Space". An orange arrow points from this section to the "Torroidal 10 x 10 (4) SpacePortion -> pov" window.

The "Charts - Global Level" window shows a line graph with a red line representing the number of "trees" over time. The y-axis ranges from 0 to 50, and the x-axis represents time steps from 0 to 100. The graph shows a sharp decline from approximately 40 trees at time step 0 to about 15 trees by time step 100.

The "Communications' Observer" window displays a network graph with 10 nodes, numbered 1 through 10. The nodes are connected by lines, representing communication links. The nodes are colored: 1 (black), 2 (blue), 3 (red), 4 (green), 5 (cyan), 6 (magenta), 7 (black), 8 (green), 9 (purple), and 10 (red).

The "Torroidal 10 x 10 (4) SpacePortion -> pov" window shows a 10x10 grid of cells. The cells are colored green and white, representing the spatial layout of the simulation. A dropdown menu is visible in the center of the grid, showing "SpacePortion" and "pov" as options.