COIN-OR: Software Tools for Optimization

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What is COIN-OR?

- The COIN-OR Project
  - An initiative promoting the development and use of interoperable, open-source software for operations research.
  - A consortium of researchers in both industry and academia dedicated to improving the state of computational research in OR.
  - A non-profit corporation known as the COIN-OR Foundation
- The COIN-OR Repository
  - A library of interoperable software tools for building optimization codes, as well as some stand-alone packages.
  - A venue for peer review of OR software tools.
  - A development platform for open source projects, including a CVS repository.
  - Soon to be hosted by INFORMS.

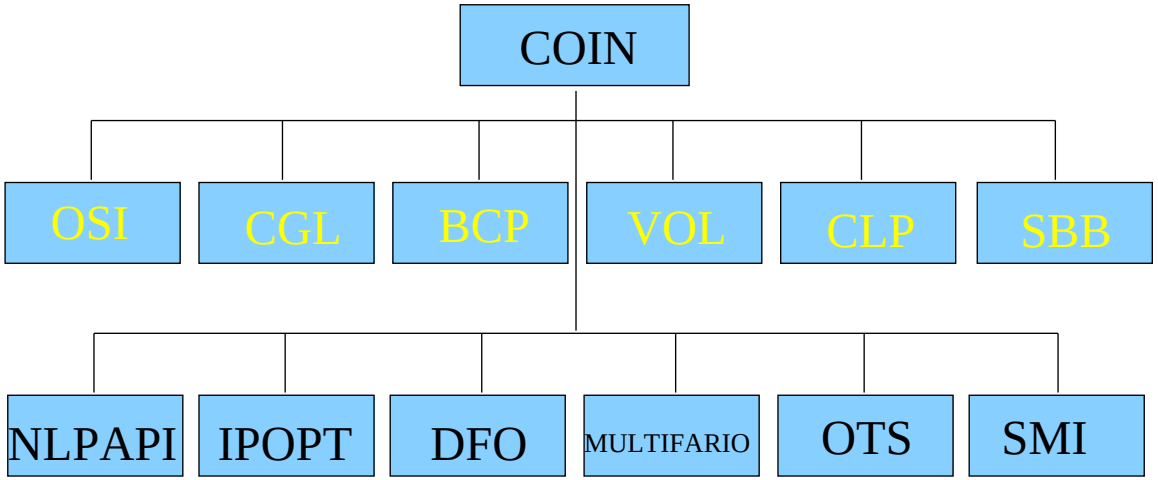
What is Open Source Development?

- *Open source development* is a coding paradigm in which development is done in a cooperative and distributed fashion.
- Strictly speaking, an open source license must satisfy the requirements of the *Open Source Definition*.
- A license cannot call itself "open source" until it is approved by the Open Source Initiative.
- Basic properties of an open source license
  - Access to source code.
  - The right to redistribute.
  - The right to modify.
- The license may require that modifications also be kept open.
- Most COIN-OR codes are licensed under the Common Public License.

Our Agenda

- Accelerate the pace of research in computational OR.
  - Reuse instead of reinvent.
  - Reduce development time and increase robustness.
  - Increase interoperability (standards and interfaces).
- Provide for software what the open literature provides for theory.
  - Peer review of software.
  - Free distribution of ideas.
  - Adherence to the principles of good scientific research.
- Define standards and interfaces that allow software components to interoperate.
- Increase synergy between various development projects.
- Provide robust, open-source tools for practitioners.

Components of the COIN-OR Library



Branch, cut, price toolbox

- OSI: Open Solver Interface
- CGL: Cut Generator Library
- BCP: Branch, Cut, and Price
- VOL: Volume Algorithm
- CLP: COIN-OR LP Solver
- SBB: Simple Branch and Bound
- COIN: COIN-OR Utilities

Stand-alone components

- IPOPT: Interior Point Optimization
- NLPAPI: Nonlinear Solver Interface
- DFO: Derivative Free Optimization
- MULTIFARIO: Solution Manifolds
- OTS: Open Tabu Search
- SMI: Stochastic Modeling Interface

Workshop Agenda

- OSI
- Installing COIN-OR in Windows
- SMI
- SBB
- SYMPHONY/BCP
- Web COIN