

OBJECT PROCESS METHODOLOGY

Megan Ferguson and Anna Lutsky

Background

- Developed in the 90s by Dov Dori, professor of Information Systems Engineering at Technion in Israel
- Need for Universal Ontology
- Graphical and textual representation
- Simplifying complex systems

What is OPM?

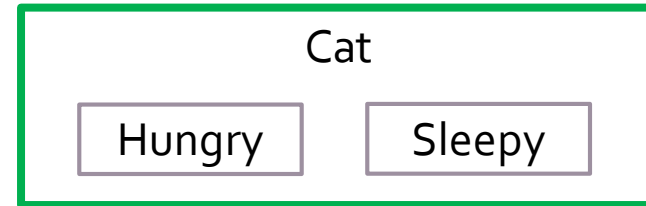
- Universe is made up of → Things and relations among them
- What can things do? Things can exist or happen.

- Things that exist are objects.

Cat

Objects could have:

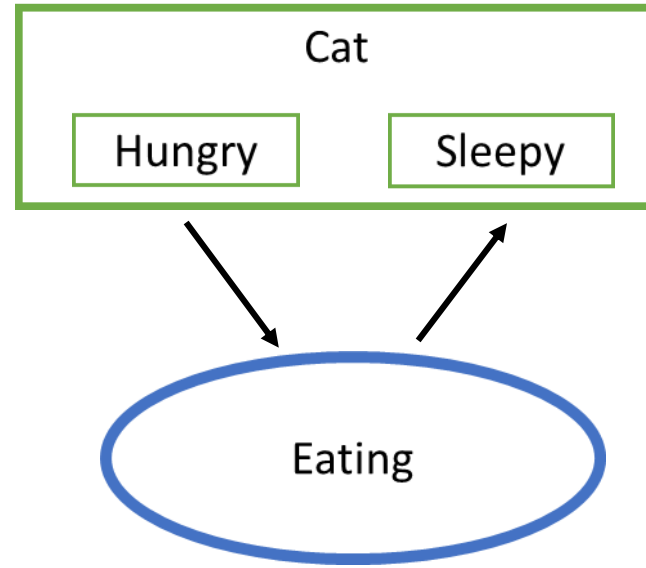
- States - situations it can exist in during its lifetime
- Values it can assume



- Things that happen are processes. Processes change an object over time.



Object Processing Diagram Example 1



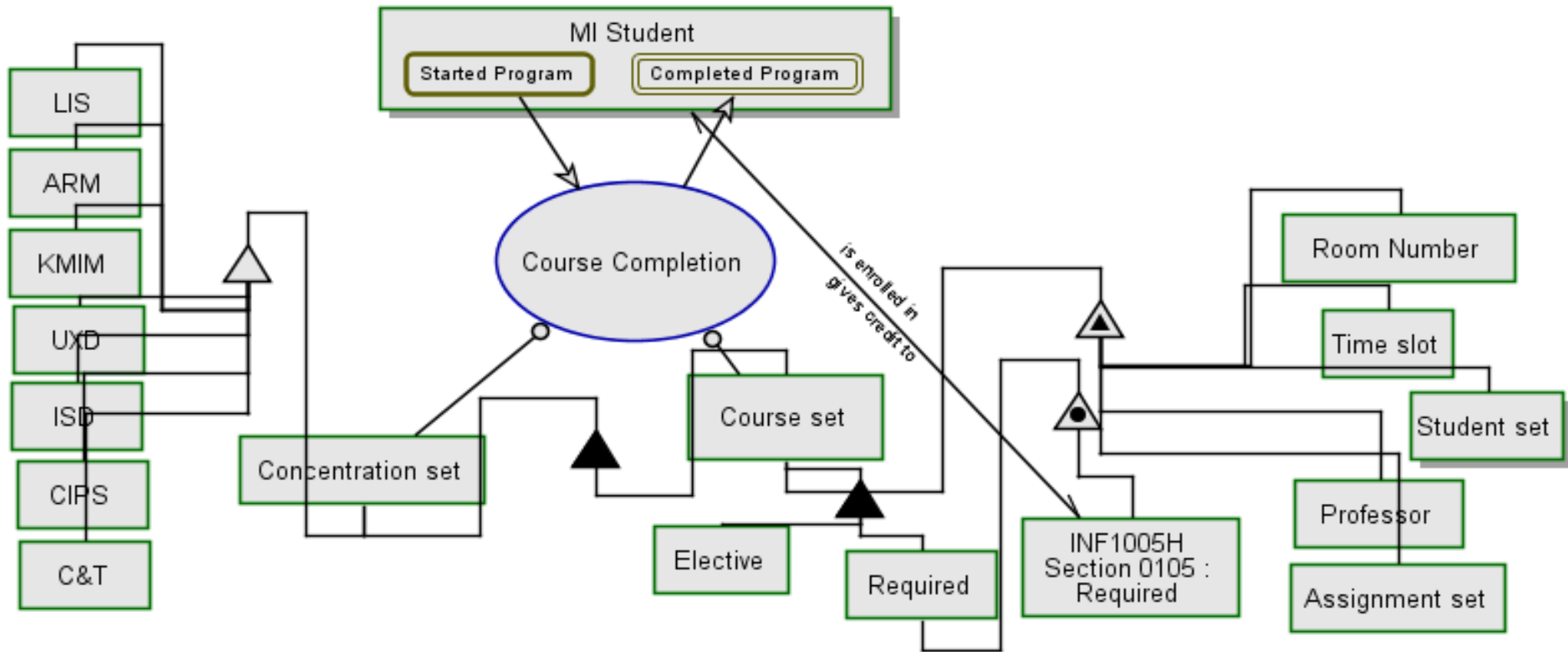
Object Processing Language

- Cat is an object.
- Cat can be hungry or sleepy.
- Eating changes cat from hungry to sleepy.

Purpose of OPM

- Simplifying complex systems and processes
- Creating a multidisciplinary language
- Facilitating stakeholder involvement
- Dual Channel assumption

Object Processing Diagram Example 2 (OPCAT)



Object Processing Language

MI Student is physical.

MI Student can be Started Program or Completed Program.

Started Program is initial.

Completed Program is final.

MI Student is enrolled in INF1005H Section 0105.

Concentration set consists of Course set.

Course set exhibits Room Number, Time slot, Professor, Assignment set, and Student set.

Student set is physical.

Course set consists of Required and Elective.

LIS is a Concentration set.

ARM is a Concentration set.

KMIM is a Concentration set.

UXD is a Concentration set.

ISD is a Concentration set.

CIPS is a Concentration set.

C&T is a Concentration set.

INF1005H Section 0105 is instance of a Required.

INF1005H Section 0105 gives credit to MI Student.

Course Completion requires Course set and Concentration set.

Course Completion changes MI Student from Started Program to Completed Program.

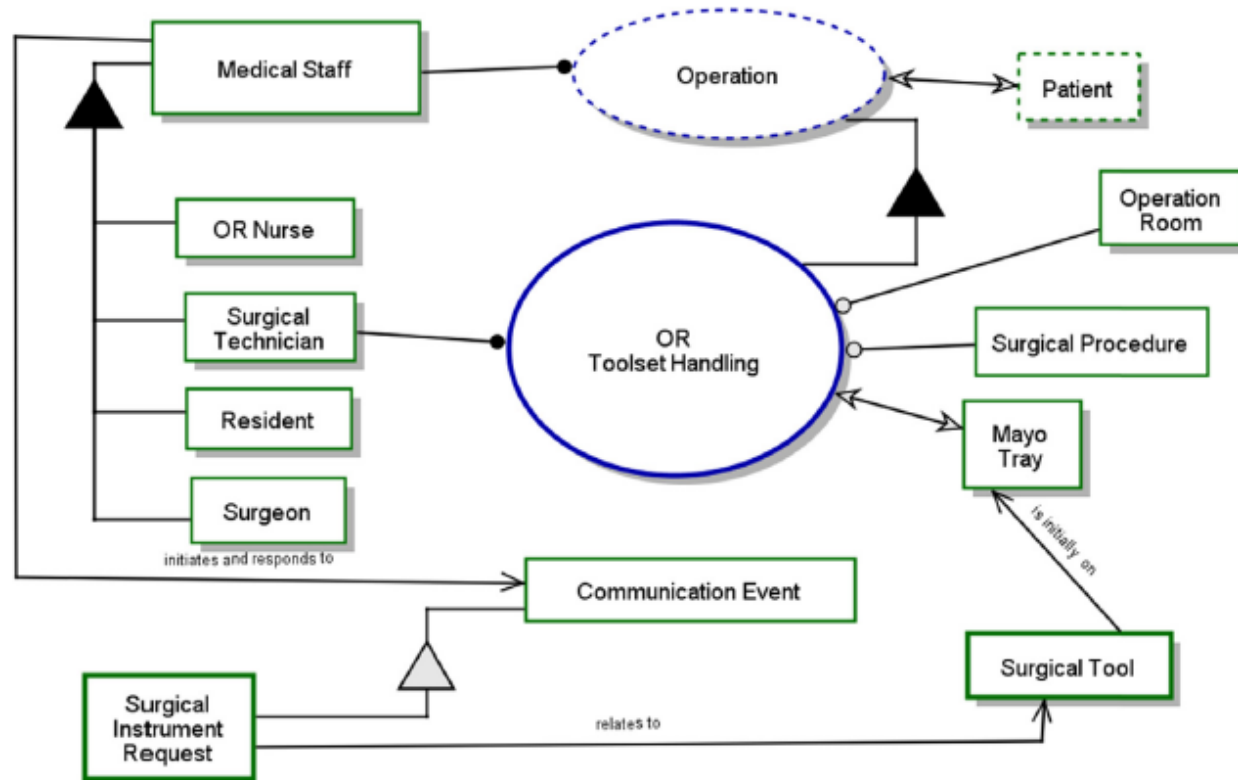


Fig. 1. The system (top-level) OPD of the **OR Toolset Handling** function and the objects involved in it.

- Operation Room is physical.
- Patient is environmental and physical.
- Mayo Tray is physical.
- Surgical Tool is physical.
- Surgical Tool is initially on Mayo Tray.
- Medical Staff is physical.
- Medical Staff consists of OR Nurse, Surgeon, Surgical Technician, and Resident.
- OR Nurse is physical.
- Surgeon is physical.
- Surgical Technician is physical.
- Surgical Technician handles OR Toolset Handling.
- Resident is physical.
- Medical Staff initiates and responds to Communication Event.
- Medical Staff handles Operation.
- Surgical Instrument Request is a Communication Event.
- Surgical Instrument Request relates to Surgical Tool.
- Operation is environmental and physical.
- Operation consists of OR Toolset Handling.
- OR Toolset Handling is physical.
- OR Toolset Handling requires Surgical Procedure and Operation Room.
- OR Toolset Handling affects Mayo Tray.
- Operation affects Patient.

Why/Why Not Use OPM?

For

- Simple
- Logical
- Universally understood
- Intuitive – User Friendly

Against

- Accessibility barriers
- Less structures fields

Where/When to Use OPM?

- Computer science - database modeling
- Education
- What-would-happen-if scenarios
- Strategic games - chess, Sudoku
- Library catalogue
- UXD - product lifecycle management
- Museum exhibitions
- Proposal presentations

Group Work Scenarios:

- Traveling across town on the TTC
- Building a snowman
- Researching/writing a paper
- Making breakfast
- Learning another language
- Training for a sport
- Knitting a scarf

Questions?

References

- Dori, Dov. 2006. "Modeling Knowledge with Graphics and Text Using Object-Process Methodology." In *Encyclopedia of Knowledge Management*, 683–93. Hershey, PA: Idea Group. <http://esml.iem.technion.ac.il/wp-content/uploads/2011/08/Object-Process-Methodology.pdf>.
- Lavi, R., D. Dori, and Y. J. Dori. 2016. "Implementing an International Standard for Manufacturing System Lifecycle Management Using Object-Process Methodology." In 2016 *IEEE International Conference on Software Science, Technology and Engineering (SWSTE)*, 71–76. <https://doi.org/10.1109/SWSTE.2016.18>.
- Wachs, Juan P., Boaz Frenkel, and Dov Dori. 2014. "Operation Room Tool Handling and Miscommunication Scenarios: An Object-Process Methodology Conceptual Model." *Artificial Intelligence in Medicine* 62 (3):153–63. <https://doi.org/10.1016/j.artmed.2014.10.006>.
- Somekh, Judith, Mordechai Choder, and Dov Dori. 2012. "Conceptual Model-Based Systems Biology: Mapping Knowledge and Discovering Gaps in the mRNA Transcription Cycle." *PLOS ONE* 7 (12):e51430. <https://doi.org/10.1371/journal.pone.0051430>.
- Dori, Dov, and Hillary Sillitto. 2017. "What Is a System? An Ontological Framework." *Systems Engineering* 20 (3):207–19. <https://doi.org/10.1002/sys.21383>.
- Sillitto, Hillary, Dov Dori, Regina M. Griego, Scott Jackson, Daniel Krob, Patrick Godfrey, Eileen Arnold, James Martin, and Dorothy McKinney. 2017. "Defining 'System': A Comprehensive Approach." *INCOSE International Symposium* 27 (1):170–86. <https://doi.org/10.1002/j.2334-5837.2017.00352.x>, also at https://www.researchgate.net/publication/318601827_Defining_System_a_Comprehensive_Approach
- Dori, Dov. 2016. "Conceptual Modeling: Purpose and Context." In *Model-Based Systems Engineering with OPM and SysML*, 75–96. Springer, New York, NY. http://doi.org/10.1007/978-1-4939-3295-5_9. <http://go.utlib.ca/cat/10589690>
- Dori, Dov. 2016. "Things: Objects and Processes." In *Model-Based Systems Engineering with OPM and SysML*, 97–121. Springer, New York, NY. http://dx.doi.org/10.1007/978-1-4939-3295-5_10. <http://go.utlib.ca/cat/10589690>
- Dori, Dov. 2016. "Object-Process Language: The Text." In *Model-Based Systems Engineering with OPM and SysML*, 123–33. Springer, New York, NY. http://doi.org/10.1007/978-1-4939-3295-5_11. <http://go.utlib.ca/cat/10589690>
- Dori, Dov. 2002. *Object-Process Methodology: A Holistics Systems Paradigm*. Berlin: Springer. <http://go.utlib.ca/cat/4819493>
- Dori, Dov. 2015. *Formalizing the Conceptual Modeling Thought Process to Benefit Engineers and Scientists*. Web Video. MIT. <https://www.youtube.com/watch?v=LO1bTKDkx8>.
- Dori, Dov. 2014. *OPM as the ISO Conceptual Modeling Language Standard*. Web Video. MIT. <https://www.youtube.com/watch?v=X8io71hTg8A>.
- Dori, Dov. 2013. *Seminar: Object-Process Methodology In Service of Science and Systems Engineering*. Web Video. Thayer School of Engineering at Dartmouth. <https://www.youtube.com/watch?v=FTFnf6yoHiA>.
- Enterprise Systems Modeling Laboratory site - <http://esml.iem.technion.ac.il/>

THE END