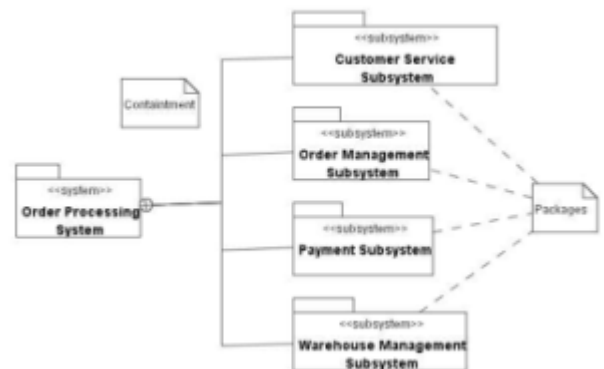


4. 軟體塑模

4.1 軟體塑模(Software Modeling)

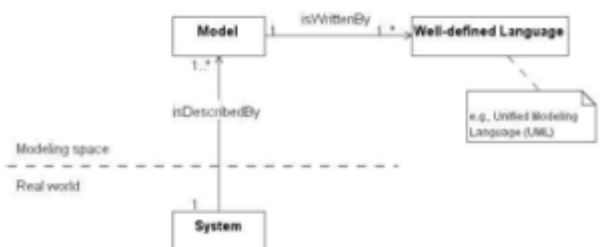
- To develop software is to build a MACHINE, simply by describing.¹⁾
- A software engineer needs only make a description of the required machine. Describing the required machine is usually not a simple task.
- A system is “a set or arrangement of elements that are organized to accomplish some predefined goal by processing information.”²⁾
 - 舉例來說：學生選課系統、銷售系統或是一輛車等等
- 一個系統(System)可分解成數個子系統(Subsystem)的集合

Fig. 1: 系統與子系統



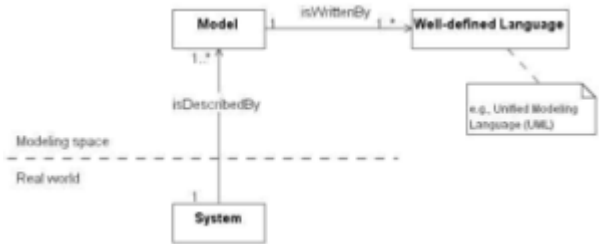
- A model is a simplified representation of (part of) a system. It is written in a language with well-defined syntax and semantics, and represents certain specific aspects of a system.
- A model is a simplification of reality.
- We build models so that we can better understand the system we are developing.
- We build models of complex systems because we cannot comprehend such system in its entirety.
- The choice of what models to create has a profound influence on how a problem is attacked and how a solution is shaped.
- Every model may be expressed at difference levels of precision.
- The best models are connected to reality.
- No single model is sufficient. Every nontrivial system is best approached through a small set of nearly independent models.
- Models are not right or wrong; they are more or less useful.³⁾

Fig. 2: 系統與模型



- 一個特定的系統可以被各式各樣的模型的從不同的觀點呈現，例如：靜態和動態的模型等等

Fig. 3: 系統可以擁有不同的模型



- Modeling(塑模)就是軟體工程的活動
 - 塑模允許我們去使用某些比現實簡單、可靠或便宜的東西。
 - 塑模允許我們以簡單的方式處理，來避免複雜性和危險。
- Modeling的構思⁴⁾
 - 物件導向設計就是關於塑模
 - 模型中的基本元件應該描述“things”而非“action”或“processing”
 - Modeling allows us to use something that is simpler, safer or cheaper than reality instead of reality for some purpose. A model represents reality for the given purpose; the model is an abstraction of reality in the sense that it cannot represent all aspects of reality. This allows us to deal with the world in a simplified manner, avoiding the complexity, danger and irreversibility of reality.⁵⁾
 - So, modeling is a means for dealing with the complexity. Complex systems are generally described by more than one model from the various kinds of views. Modeling then means constructing an abstraction of a system that focuses on interesting aspects and ignore irrelevant details.

¹⁾

Michael Jackson, “The World and the Machine”, ICSE, pp. 283-292, 1995.

²⁾

Webster Dictionary

³⁾

Martin Fowler, “Analysis Patterns: Reusable Object Models”, Addison-Wesley, ISBN 0-201-89542-0, 1997.

⁴⁾

John Daniels, “Models and Abstraction”, Object Expert, Vol.1(3), Mar./Apr. 1998.

⁵⁾

Jeff Rothenberg, “The Nature of Modeling”, Artificial Intelligence, Simulation, and Modeling, John Wiley & Sons, New York, pp. 75-92, 1989.

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