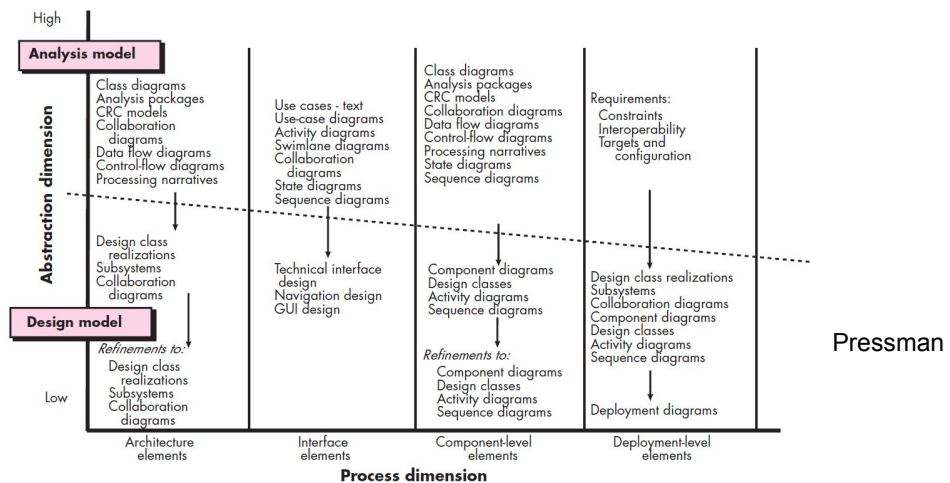


Modelado de software

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Escuela de Ciencias de la Computación
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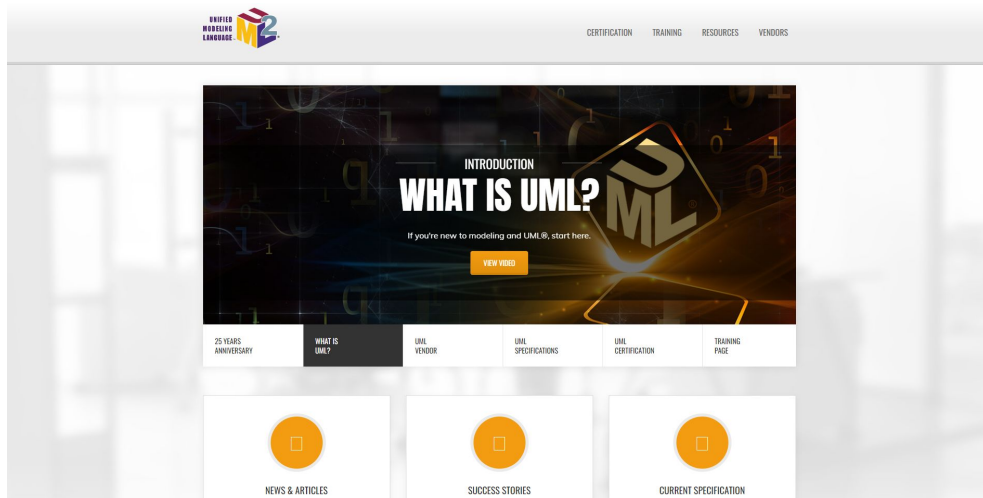
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Al modelar, estamos representando necesidad o especificaciones de sistema...



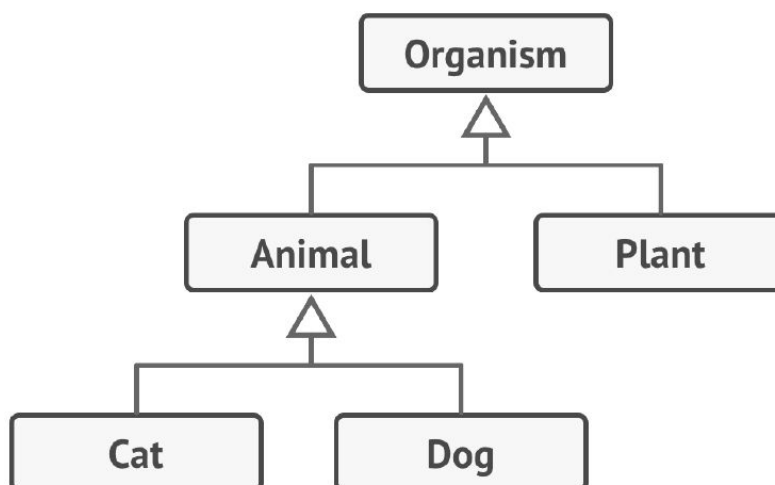
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Una de las notaciones más usadas es el Unified Modeling Language (UML)



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¿Es esto para ustedes lo que es UML?



Shvets

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Grady Booch

M.Sc de UC Santa Barbara.
Trabajo como ingeniero de
software, principalmente en
IBM. Es autor de varios
libros.

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Jim Rumbaugh

Dr. de MIT. Investigó,
principalmente en General
Electrics, sobre temas de
diseño y modelado de
software

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Ivar Jacobson

Dr. de Royal Institute of Technology. Investigó sobre temas de programación orientada a objetos.

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“The three amigos” que desarrollaron UML, que luego formó parte de Rational Unified Process (RUP)



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UML surge dado la diversidad de notaciones de modelado...

The Unified Modeling Language for Object-Oriented Development Versión 0.9 (Current 1996) - Purpose

"This effectively means that the scope of our activities has grown to encompass the unification of the Booch, OMT, and OOSE methods. As part of this growth we have also renamed our work, changing it from the Unified Method (UM) to the Unified Modeling Language (UML). This name change reflects the fact that we have chosen to decouple our work on notation and semantics from that of process."

UML Specification Versión 2.5.1 (Current 2017) - Scope

"This specification defines the Unified Modeling Language (UML), revision 2. The objective of UML is to provide system architects, software engineers, and software developers with tools for analysis, design, and implementation of software-based systems as well as for modeling business and similar processes."

UML fue adoptado por Object Management Group (OMG), un consorcio sin fines de lucro de estándares de computación



Actualmente, es un estándar formal...

The screenshot shows the ISO website for the ISO/IEC 19501:2005 standard. The page includes a navigation bar with links to Standards, About us, News, Taking part, and Store. A search bar is also present. The main content area features the standard's title, version (1.4.2), and a confirmation that the standard remains current as of 2019. An abstract describes the UML as a graphical language for visualizing, specifying, constructing, and documenting software-intensive systems. A 'Buy this standard' section offers the standard in PDF format for CHF 208, with a 'Buy' button. General information includes the status (Published), publication date (2005-04), edition (1), number of pages (432), and technical committee (ISO/IEC JTC 1).

← ICS ← 35 ← 35.080

ISO/IEC 19501:2005

Information technology — Open Distributed Processing — Unified Modeling Language (UML)
Version 1.4.2

This standard was last reviewed and confirmed in 2019. Therefore this version remains current.

Abstract

ISO/IEC 19501:2004 describes the Unified Modeling Language (UML), a graphical language for visualizing, specifying, constructing and documenting the artifacts of a software-intensive system. The UML offers a standard way to write a system's blueprints, including conceptual things such as business processes and system functions, as well as concrete things such as programming language statements, database schemas, and reusable software components.

General information

Status : Published Publication date : 2005-04

Edition : 1 Number of pages : 432

Technical Committee : ISO/IEC JTC 1 Information technology

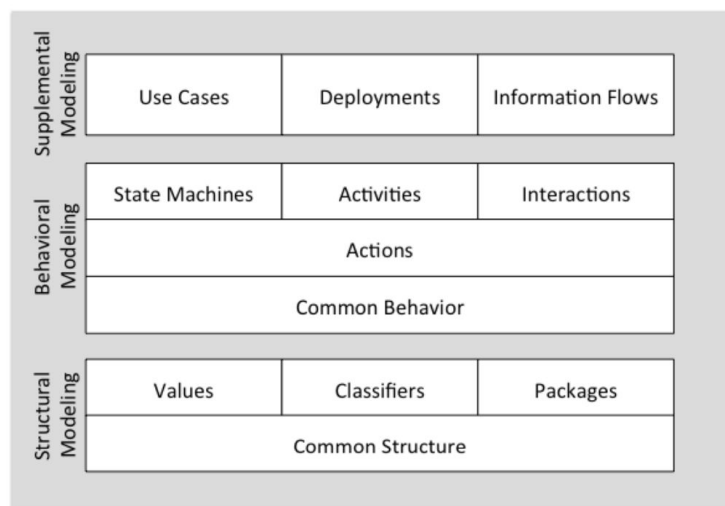
Buy this standard

Format	Language
<input checked="" type="checkbox"/> PDF	English
PDF on CD	English

CHF 208

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Se detallan muchos tipos de diagramas...



OMG

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Los modelos se utilizan en situaciones particulares

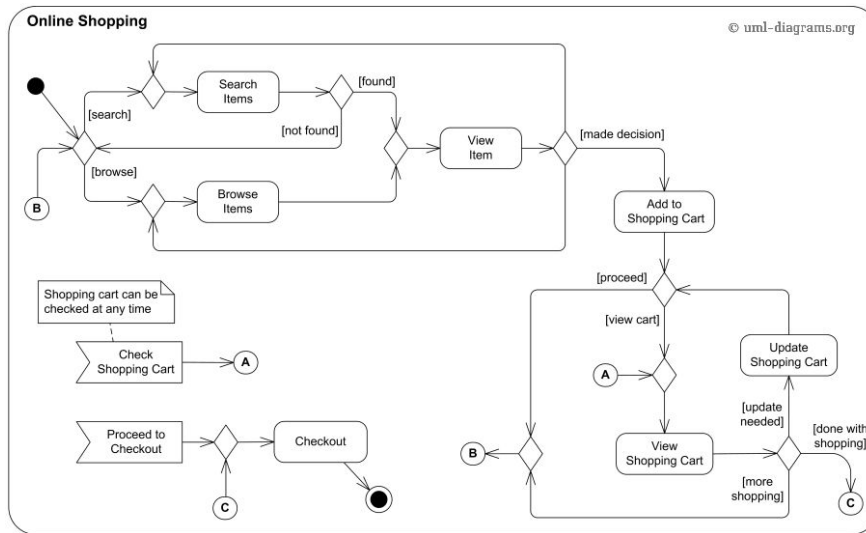


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Diagramas de comportamiento..

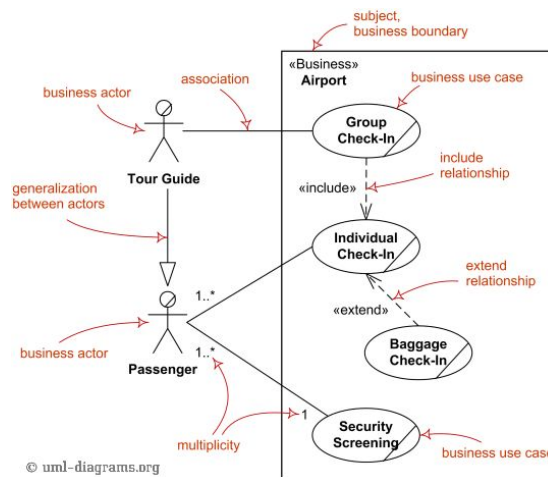
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Los diagramas de actividad muestran el flujo de control



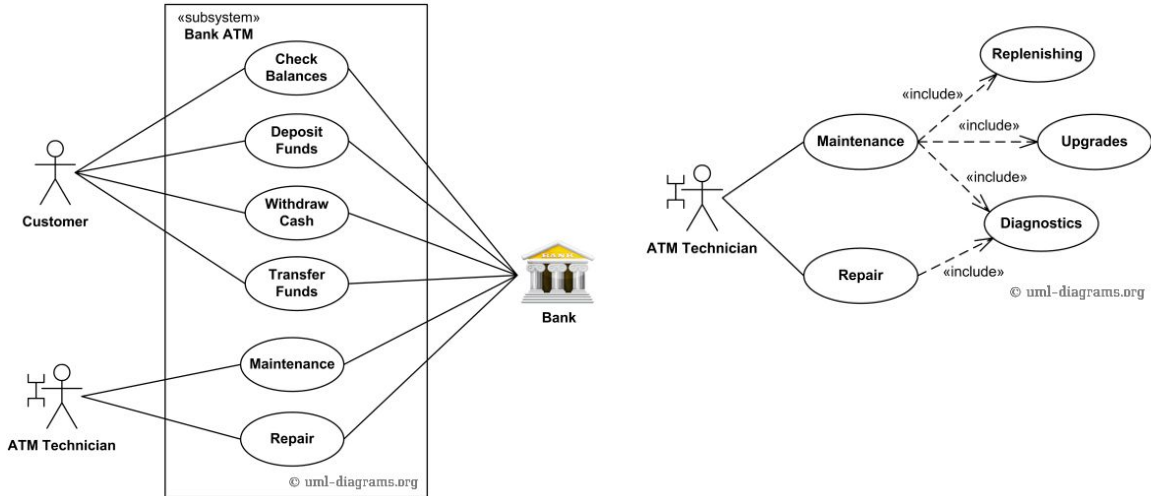
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Los diagramas de caso de uso describen acciones de actores dentro de un sistema

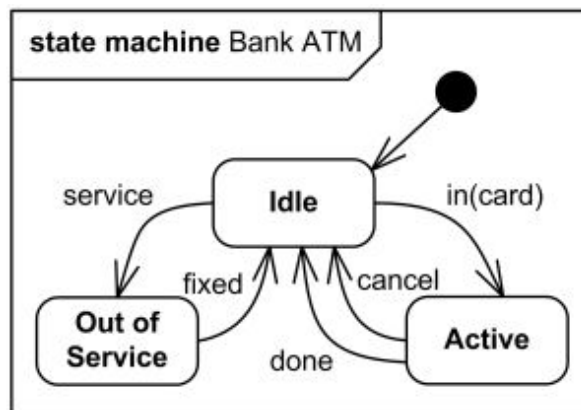


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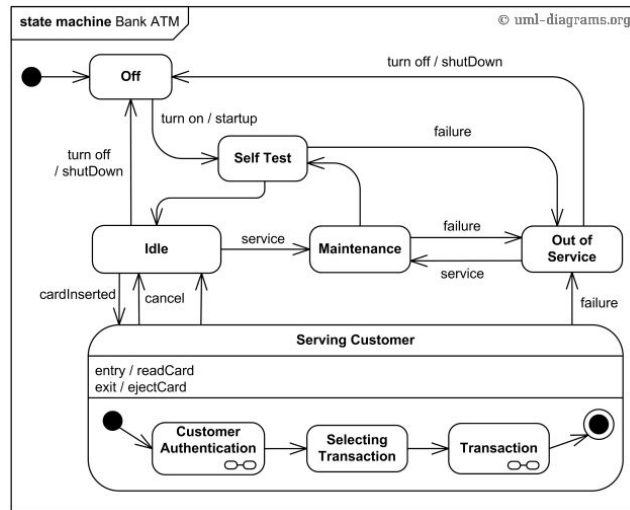
Un ejemplo de caso de uso en un banco...



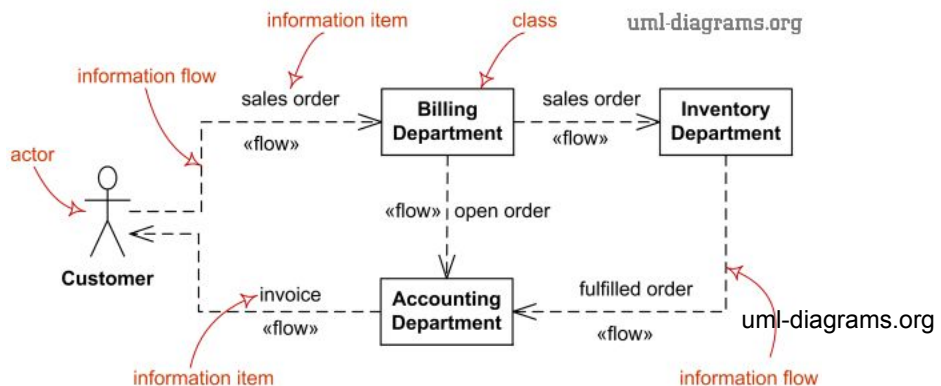
Los diagramas de estado describen cómo cambian los estados de un sistema



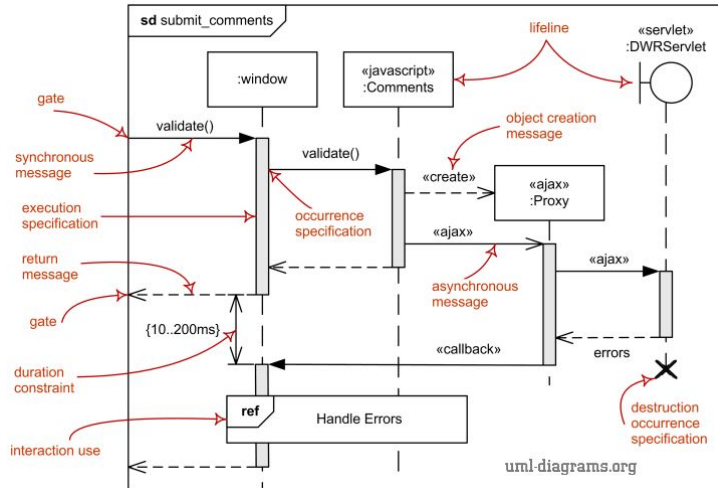
Siguiendo el ejemplo del banco...



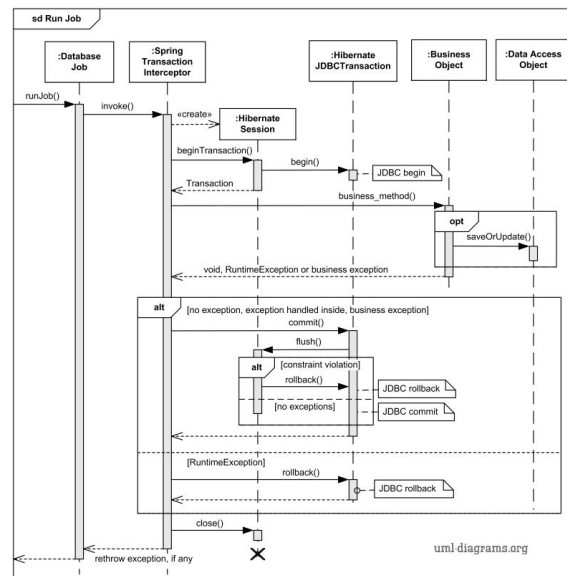
Los diagramas de flujo muestran como entidades de alto nivel intercambian información



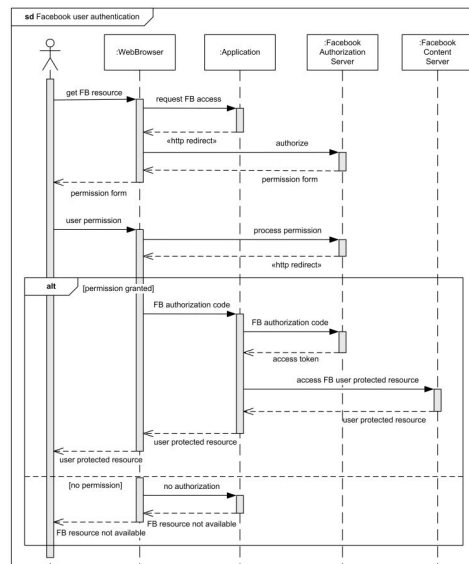
Los diagramas de secuencia muestra como un mensaje se interactúa con participantes



Un diagrama de secuencia de manejo de un framework...



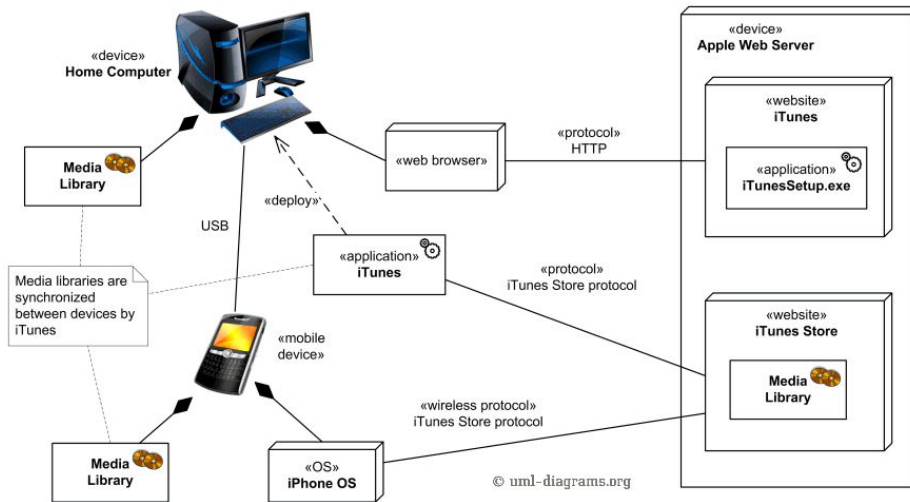
Un diagrama de secuencia de autenticación de facebook...



uml-diagrams.org

Diagramas de estructura...

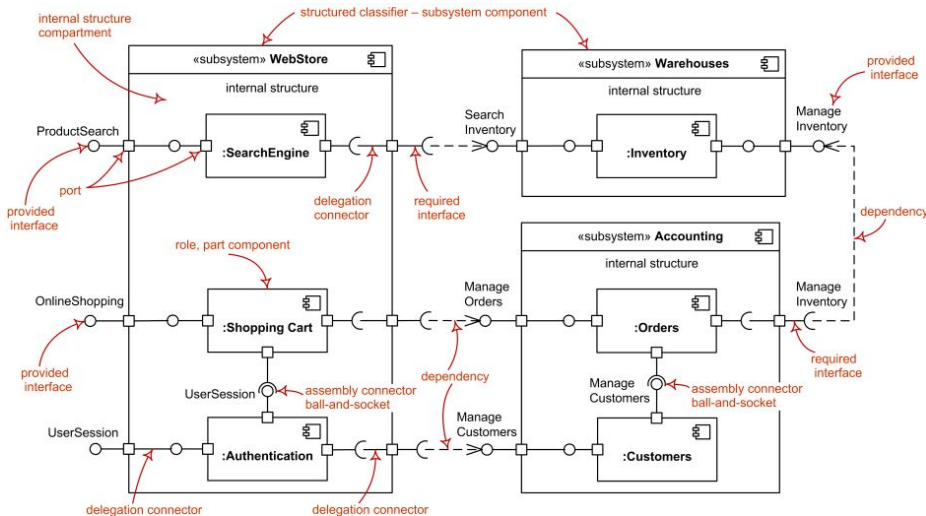
En un diagrama de deployment describe la arquitectura de ejecución de un sistema



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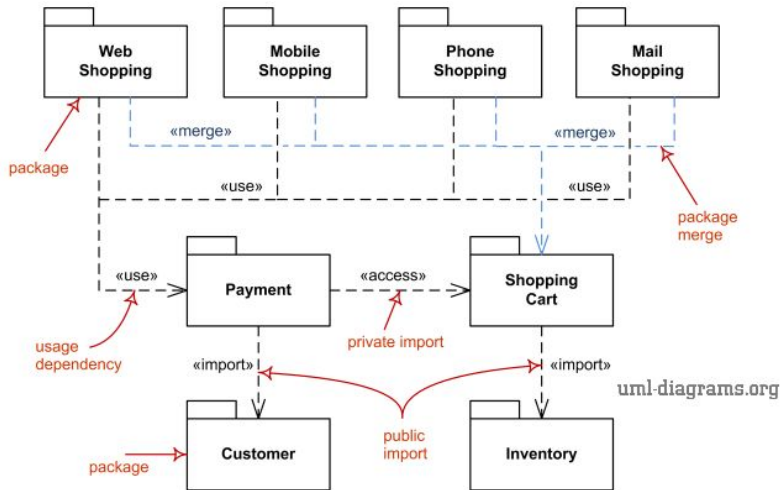
Los diagramas de componentes muestra componentes con puertos, interfaces y relaciones entre ellos

uml-diagrams.org

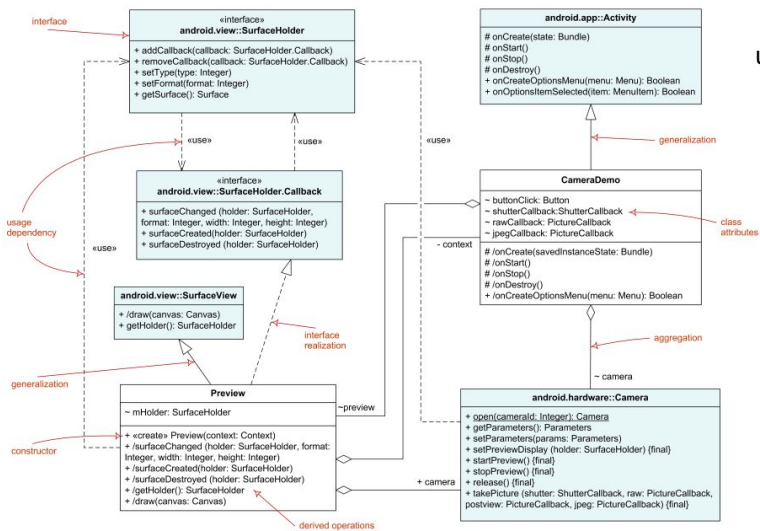


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Los diagramas de paquetes detalla la estructura de elementos semánticamente relacionados (paquete)

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Los diagramas de clases detallan clases e interfaces con sus relaciones

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La relación de asociación indica si los elementos se encuentran enlazados o se pueden combinar lógicamente



UML Association. Professor communicates with students.

Shvets

La relación de dependencia indica si un elemento requiere de otro en su especificación o implementación (supplier-client)



UML Dependency. Professor depends on salary.

Shvets

La relación de composición es una asociación donde un elemento es parte de otro



UML Composition. University consists of departments.

Shvets

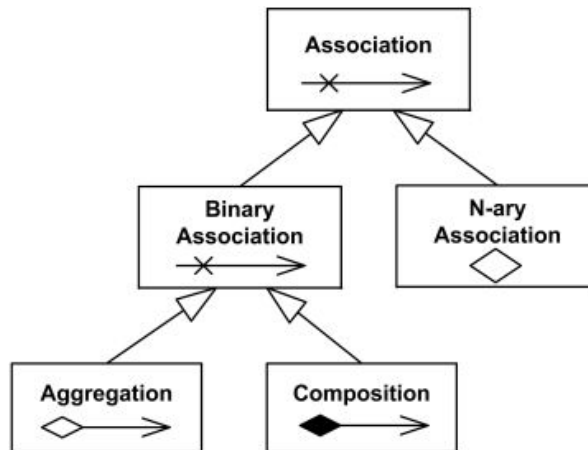
La relación de agregación es una asociación donde agrupan a un conjunto de instancias



UML Aggregation. Department contains professors.

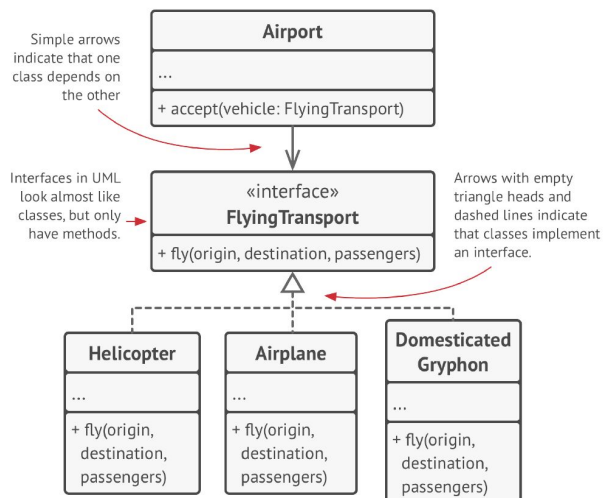
Shvets

La relación entre asociación y subtipos...



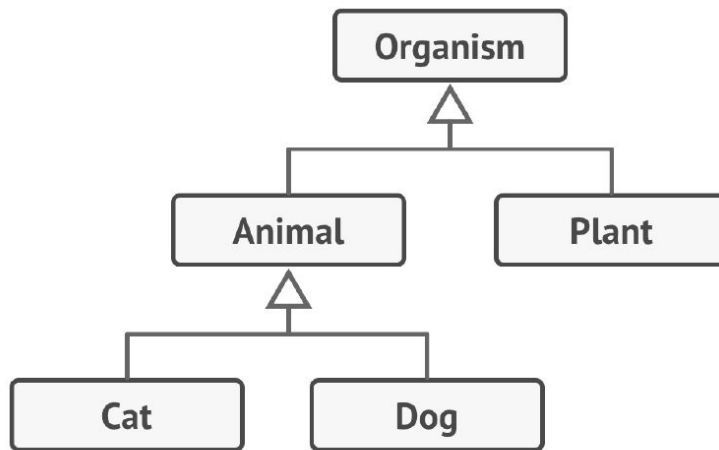
uml-diagrams.org

Una interface es un elemento que declara un contrato que se debe cumplir para que se le provea servicios



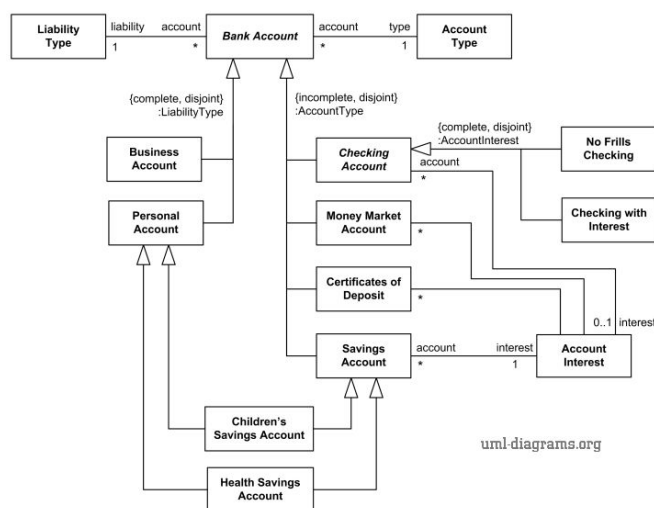
Shvets

Una relación de generalización define la relación entre un elemento general (*superclase) y específicos (subclase)



Shvets

Un diagrama de clases para banco...



uml diagrams.org

¿Cuándo vale la pena modelar?



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En la práctica el modelado se usa informalmente

The majority of sketches and diagrams were informal. Whereas 40% of them contained no UML elements at all, 48% contained at least some, and only 9% consisted solely of UML elements. Respondents' remarks indicate that if UML is used, it is often not used strictly as defined in the standard.

Survey - Baltes and Diehl (2014)



Los beneficios que las personas practicantes indican tener...

Papers	Categories	Number of issues mentioned	Number of papers
[4, 28, 33, 41]	Modeling is useful and beneficial for several stakeholders	9	4
[34, 39]	Cost savings	2	2
[28, 33]	Modeling is easy to use	2	2
[3, 29, 34, 38, 39, 41]	Improved productivity	26	6
[3, 34, 38, 39, 41]	Improved quality	15	5
[3, 4, 29, 33, 38]	Improved understanding of the system	13	5
[3, 4, 34, 39]	Provides support for software development activities	13	4

Systematic literature review last 5 years - Verbruggen and Snoeck (2022)

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Los retos que las personas practicantes indican enfrentar...

Papers	Categories	Number of issues mentioned	Number of papers
[27]	Continuity of technology	2	1
[3, 34, 38]	High effort in acquiring MBSE skills	5	3
[3, 34, 39]	High effort in using tool	5	3
[38]	Lack of method maturity	1	1
[3, 34, 35, 39, 40]	Missing tool functionalities	24	5
[34]	Modeling (tools) comes with a high cost	1	1
[3]	Negative previous experiences with modeling can inhibit adoption	1	1
[38]	The organization's culture inhibits the adoption of modeling practices	4	1
[2, 3, 36, 39, 43]	Visual notations should follow the principles of PoN	23	5

Systematic literature review last 5 years - Verbruggen and Snoeck (2022)

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