About Standards

and

UML

STANDARDS Organization

Why standards? Benefits / Problems? – your answers

Interoperability

Security

Standardizes input / output structure

Usability

Facilitates automation / information exchange / communication exchange

Reduction of complexity

Slow process standardization

Limitation of options

Standards – main categories

- **proprietary standards**
  - Specifications for hardware or software that are controlled by one company. When a proprietary standard such as Windows is widely used, it becomes a "***de facto standard***" even though it is not governed by a standards organization

    (see: https://www.yourdictionary.com/proprietary-standards, last visited Nov-2021)
- **open standards**
  - Specifications for hardware or software that are developed by a standards organization or a consortium involved in supporting a standard. Available to the public for developing compliant products, open standards imply "open systems;" that an existing component in a system can be replaced with that of another vendor. Although many vendors may have contributed to an open standard, and one may have contributed more than others and even have great influence, an open standard is not completely controlled by a single vendor.

  (See: https://www.yourdictionary.com/open-standards#computer, last visited Nov-2021)

Standard organizations? – can you name some?

Standard organizations? – can you name some?

OGC

ISO

OMG

CERN

INSPIRE

W3C

DIN

standard organizations relevant for the geospatial domains

OGC (Open Geospatial Consortium) https://www.ogc.org/

- OGC, a worldwide community committed to improving access to geospatial, or location information. We connect people, communities, and technology to solve global challenges and address everyday needs. The organization represents over 500 businesses, government agencies, research organizations, and universities united with a desire to make location information FAIR – Findable, Accessible, Interoperable, and Reusable.
  - Our community creates free, publicly available geospatial standards that enable new technologies. OGC also manages an agile and collaborative research & development process - the OGC Innovation Program - that anticipates and solves real-world geospatial challenges experienced by our members.
    (see: https://www.opengeospatial.org/,last visited Dec-23)
  - OGC Standards categories:
    - Abstract Specifications (Architecture for geospatial interoperability)
    - Community Standards (externally defined standards endorsed by OGC)
    - Standard Profiles (profiles of OGC standards)
  - OGC compliancy as „interoperability label“ in many industry products
  - OGC compliancy frequently demanded in „request for proposals“ / „bid requests“

standard organizations relevant for the geospatial domains

ISO TC211 (ISO Technical Committee 211)

https://committee.iso.org/home/tc211

- Scope: Standardization in the field of digital geographic information.
- This work aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth
- These standards may specify, for geographic information, methods, tools and services for data management (including definition and description), acquiring, processing, analyzing, accessing, presenting and transferring such data in digital/electronic form between different users, systems and locations
- The work shall link to appropriate standards for information technology and data where possible, and provide a framework for the development of sector-specific applications using geographic data.members' use cases.

  (see: https://committee.iso.org/home/tc211,last visited Dec-23)
- ISO Standards frequently uses as „de jure“ standards (i.e. legal regulations / laws of countries)
- Strong liaison between ISO/TC211 and OGC

standard organizations relevant for the geospatial domains

- **INSPIRE** https://inspire.ec.europa.eu/
- The INSPIRE Directive aims to create a European Union spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment. This European Spatial Data Infrastructure will enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.
- INSPIRE is based on the infrastructures for spatial information established and operated by the Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications (see: https://inspire.ec.europa.eu/about-inspire/563, last visited Dec-2023)
- See: https://www.youtube.com/embed/xew6qI-6wNk

Other standard organizations with implicit relevance

Standards with implicit but important relevance for the geospatial domain (non-comprehensive):

- World Wide Web Consortium (W3C) https://www.w3.org/
  - The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards.
  - All standards around the WWW (http / html / xml / and many more)

- Open Management Group (OMG) https://www.omg.org/index.htm
  - The Object Management Group® (OMG®) is an international, open membership, not-for-profit technology standards consortium, founded in 1989. OMG standards are driven by vendors, end-users, academic institutions and government agencies….. MG's modeling standards, including the Unified Modeling Language® (UML®) and Model Driven Architecture® (MDA®), enable powerful visual design, execution and maintenance of software and other processes.

    (see: https://www.omg.org/about/index.htm, last visited Dec-2022)

UML

(in the context of ISO / TC211 conceptual schema language)

UML

- Unified Modeling Language (current version 2.5.1, December 2017)
- *“The UML is the standard language for specifying, visualizing, constructing, and documenting all the artifacts of a software system.”*
- is a standardized general-purpose modeling language in the field of object-oriented software engineering

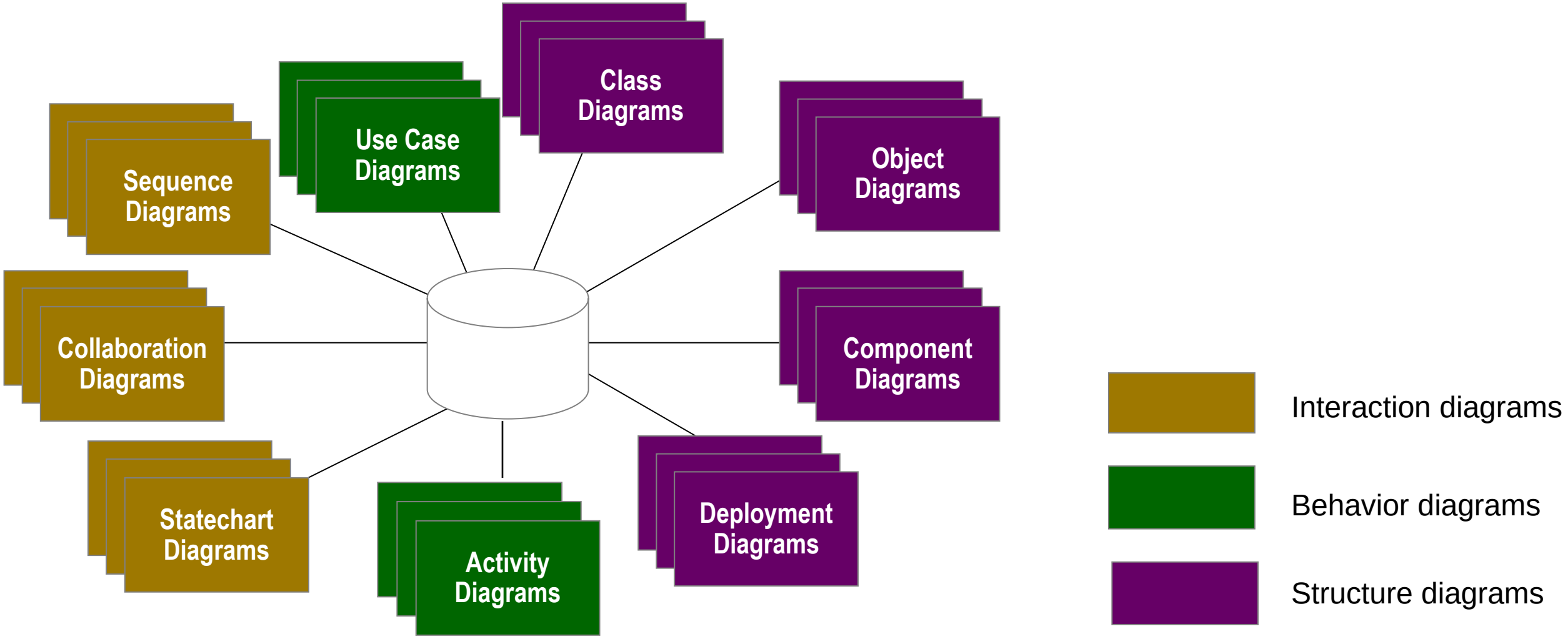
  (Standard is defined by the Object Management Group OMG)
- Is used a the conceptual schema language for OGC and ISO TC211 standard for spatial information processing.

PS: You find plenty of materials (documents, tools, tutorials) under the URL: http://www.uml.org/

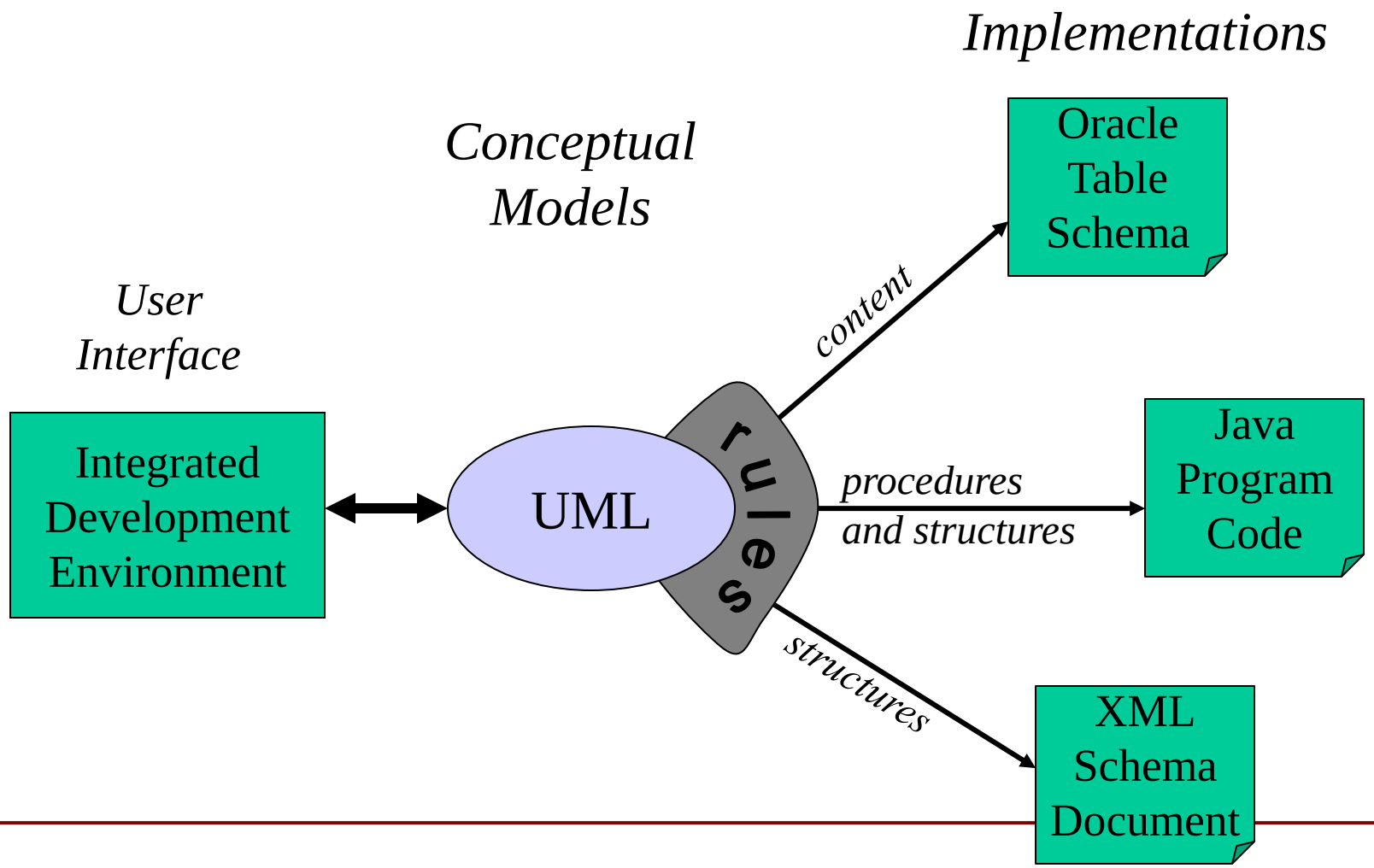
ISO Standard 19103

- Part of the ISO TC 211 series of standards
- ISO 19103 defines the UML profile – as a conceptual schema language for the ISO TC211 standards

UML Diagrams



UML Capabilities



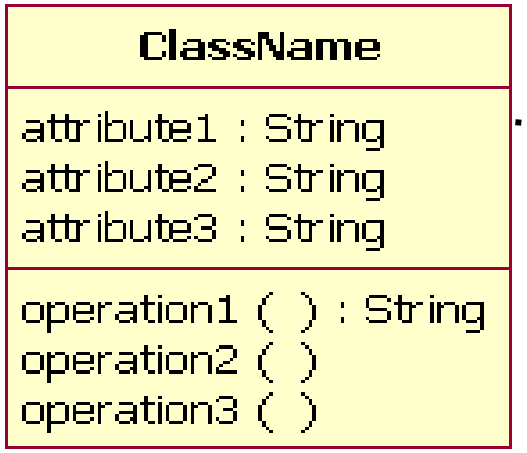
UML class diagrams - basics

- Modeling the static structure / concepts of a system
- Object oriented modeling paradigm
- Classes and relationship between classes are shown
- Class attributes / class operations / class constraints are shown
- Examples
  - Design of database schemas
  - Design of information models (XML Schema, etc.)
  - Software – structural desing (Program classes, Code framework, interfaces)

UML class diagrams – what is a CLASS

- Class:
  - A class is a description of objects.
  - All objects of a class share the same attribute description, associations to classes, operations and methods.
  - A class represents a concept in a model.
  - A class does have a name, a set of attributes, a set of operations and constraints

UML Class Diagrams – Elements of classes



Name of the class (Singular)

Attributes of the Class

Operations (or behavior) of the Class (Methods/ Functions)

An example: