Risk Ontology

UNIVERSITÀ DEGLI STUDI DI SALERNO

Corso di Laurea Magistrale in Informatica
Esame di Intelligent Web

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Time Step

1. Introduzione a RiskOntology
2. Modellazione dell'ontologia
3. Realizzazione Ontologia
4. Realizzazione dell'applicativo e Query SPARQL
5. Tecnologie Utilizzate
6. Conclusioni e Sviluppi Futuri

RiskOntology

Risk Ontology

IDEA

Mostrare le informazioni relativi ai rischi riscontrati durante il ciclo di vita di un prodotto software, così da supportare i Project Manager durante il Risk Management.

MOTIVAZIONE

La pratica del Risk Management e' una delle pratiche più delicate, importanti ed impattanti da realizzare durante il ciclo di vita di un prodotto software, ma non tutti i Project Manager sono in grado di svolgerla. Essa richiede molta documentazione apposita, con l'intento di lasciare "suggerimenti" e conoscenze per il futuro, ma non sempre viene realizzata, motivo per cui è stata realizzata Risk Ontology

Risk Ontology

UTILIZZO DEL WEB SEMANTICO

Il sistema realizzato permette di mostrare molte informazioni, provenienti da differenti fonti e risorse. Un database tradizionale non è in grado di utilizzare dati molto eterogenei.
Soprattutto, grazie al web semantico vi è la possibilità di prendere informazioni da risorse del web, e arricchirle con ulteriori dati.

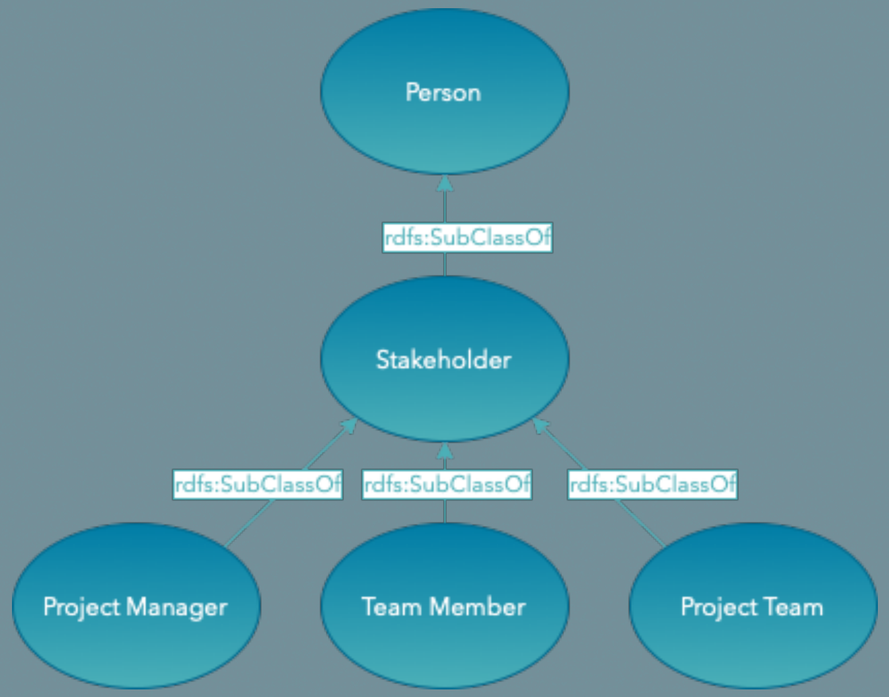
ATTENZIONE!!

Il sistema attualmente non dispone di molti dati ed informazioni, in quanto non sono stati individuati dataset da poter sfruttare.

Modellazione Ontologia

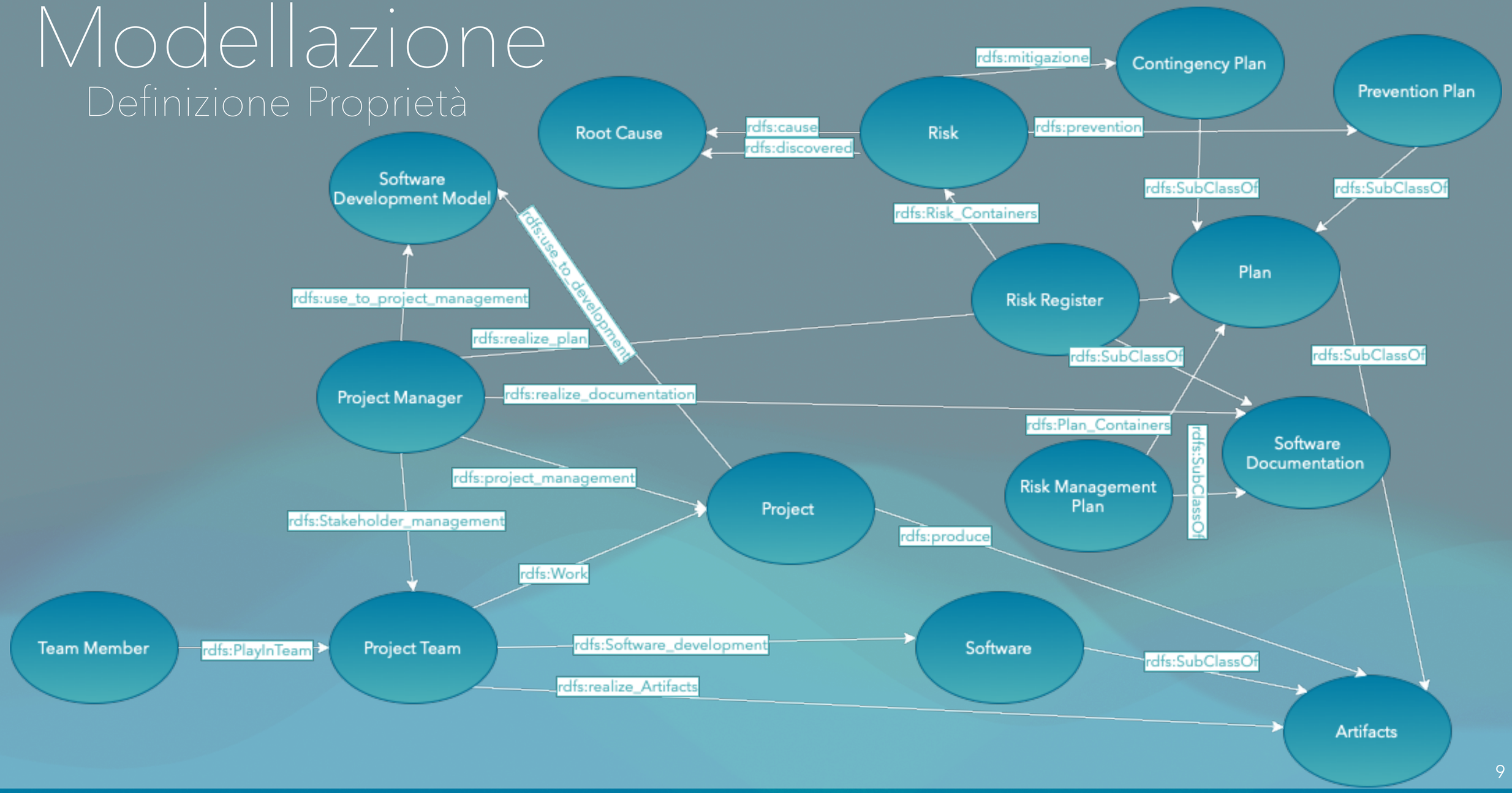
Modellazione

Definizione Sottoclassi



Modellazione

Definizione Proprietà



Realizzazione Ontologia

Realizzazione

Classi

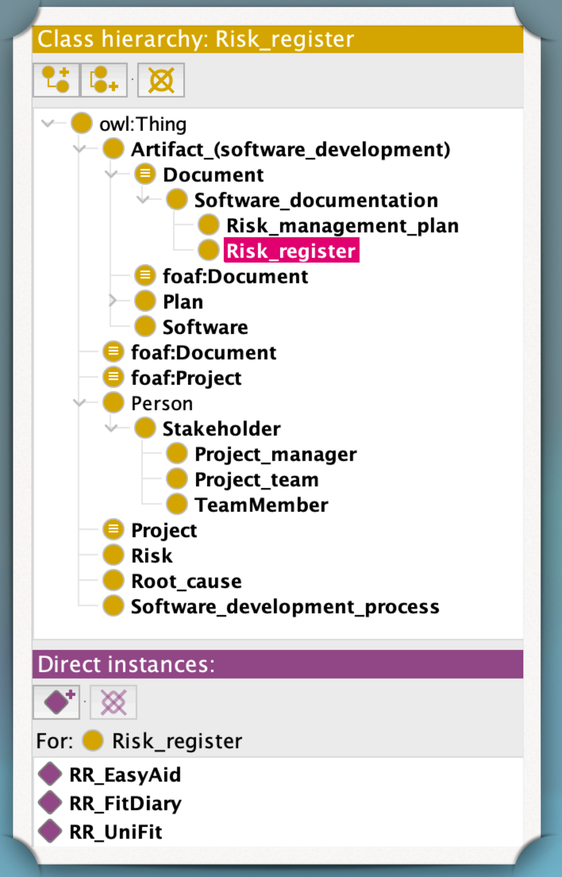
- owl:Thing
  - Artifact_(software_development)
    - Document
      - Software_documentation
        - Risk_management_plan
        - Risk_register
    - foaf:Document
    - Plan
      - Contingency_Plan
      - Prevention_Plan
    - Software
  - foaf:Document
  - foaf:Project
  - Person
    - Stakeholder
      - Project_manager
      - Project_team
      - TeamMember
  - Project
  - Risk
  - Root_cause
  - Software_development_process

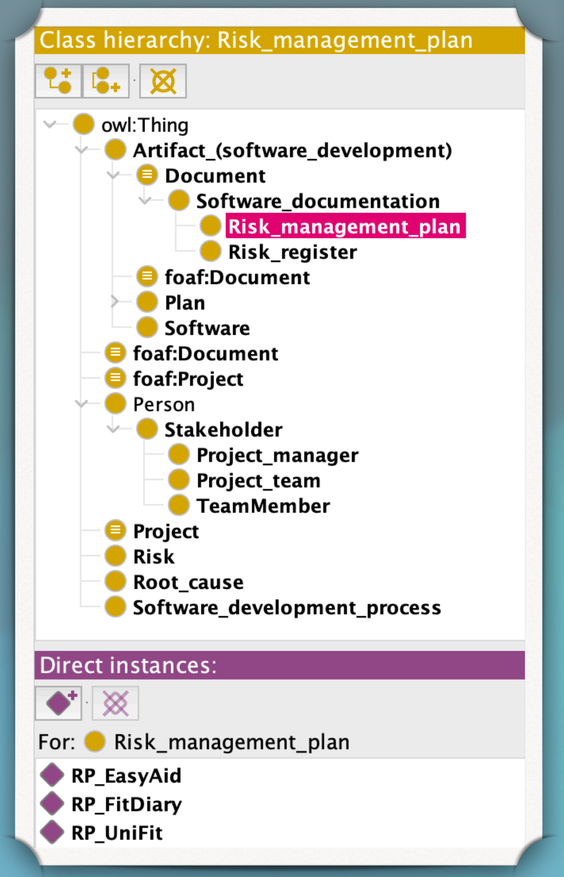
Object Property

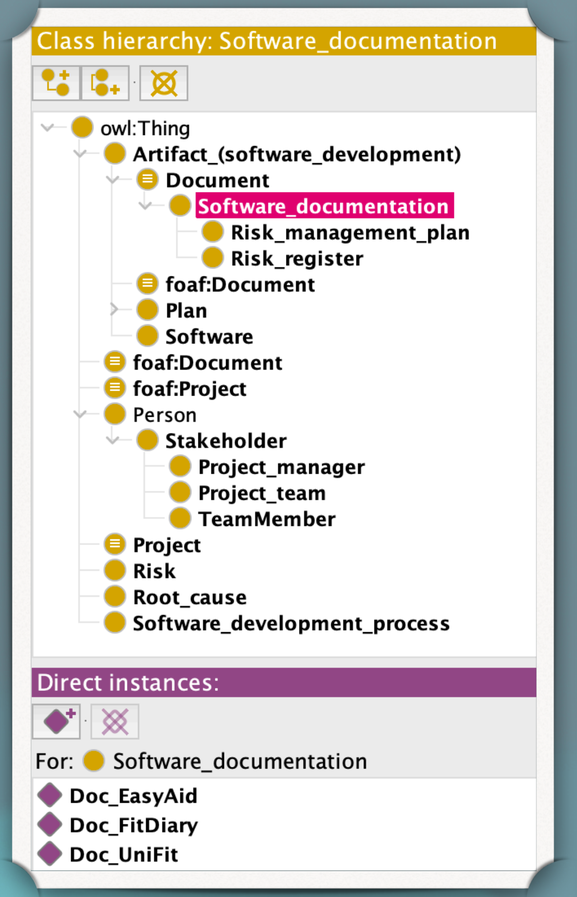
- owl:topObjectProperty
  - Category:Containers
    - Plan_Containers
    - Risk_Container
  - cause
  - discovered
  - mitigazione
  - PlayerInTeam
  - prevention
  - produce
    - produce_documentation
    - produce_software
  - Project_management
  - Realize
    - realize_Artifact
    - realize_documentation
    - realize_plan
    - realized_with
  - Risk_management
  - Software_development
  - Stakeholder_management
  - Use
    - use_to_be_deployed
    - use_to_project_management
  - Work

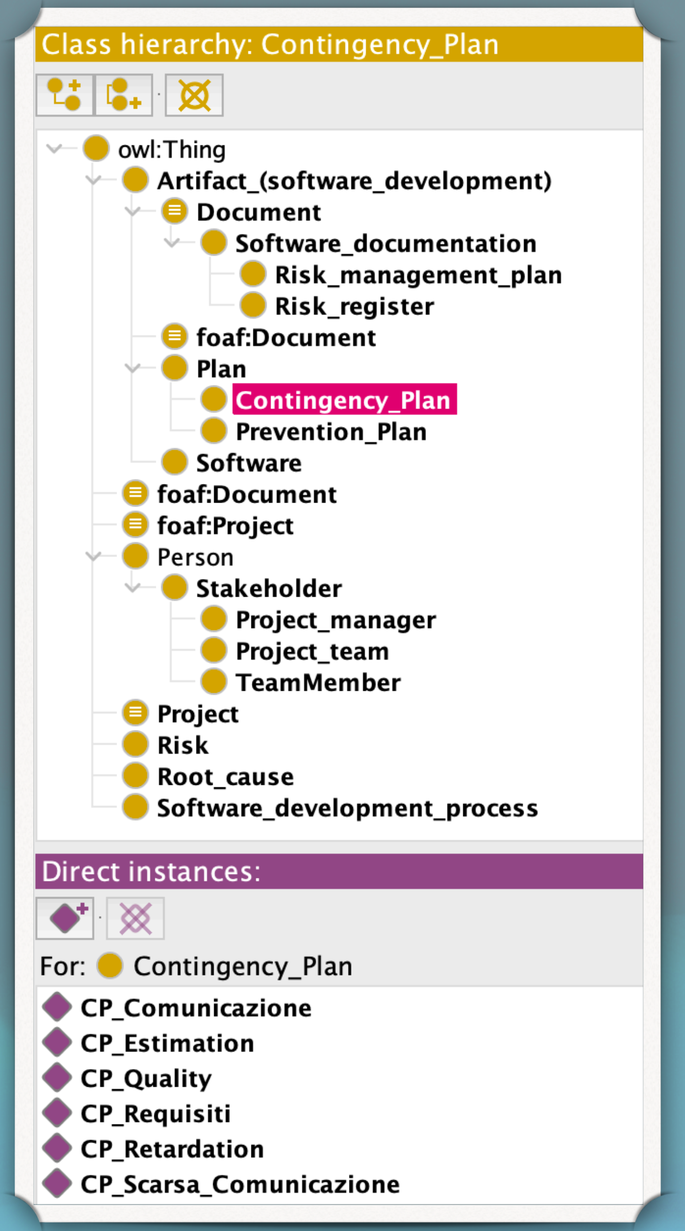
Realizzazione

Popolamento



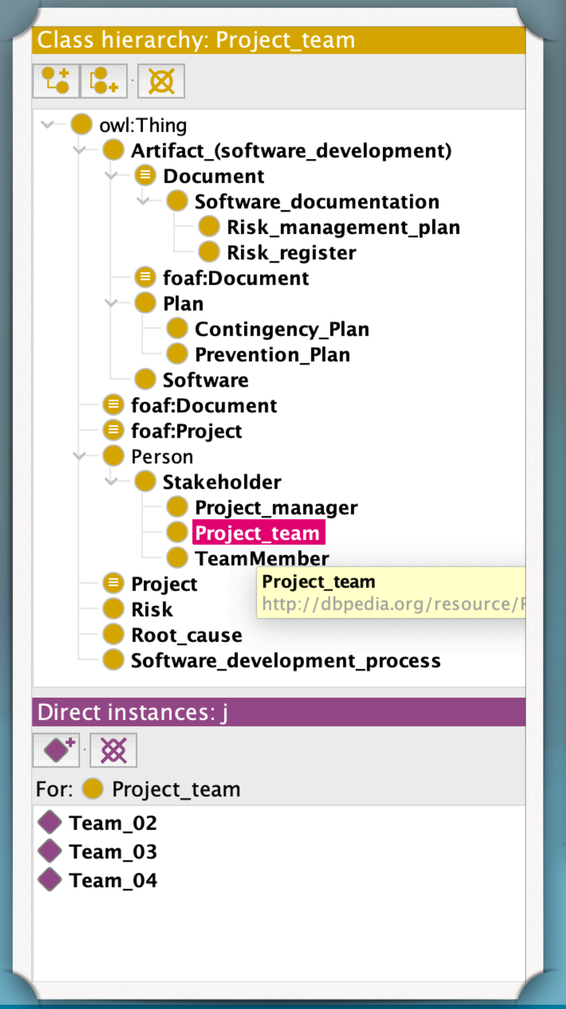


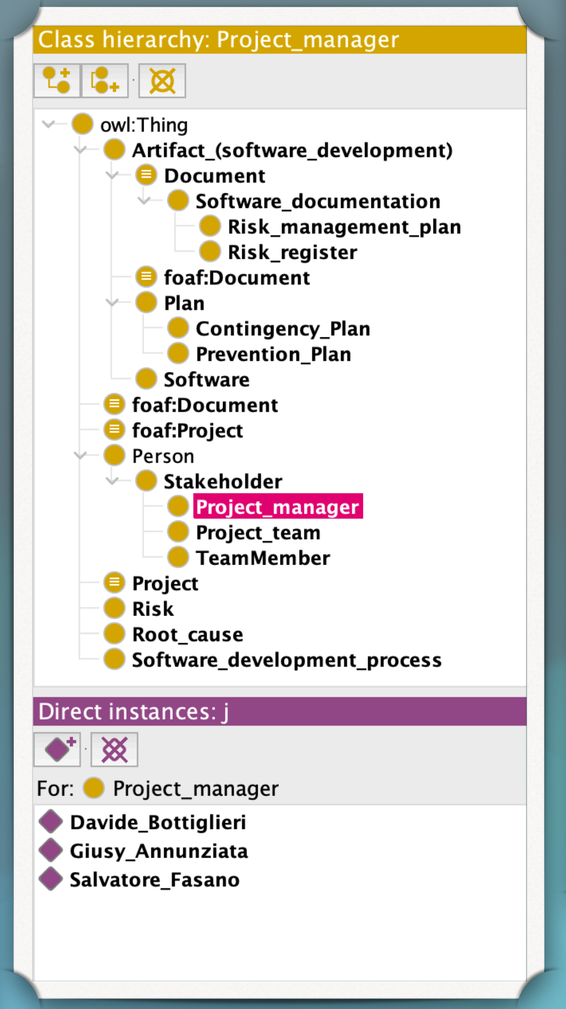


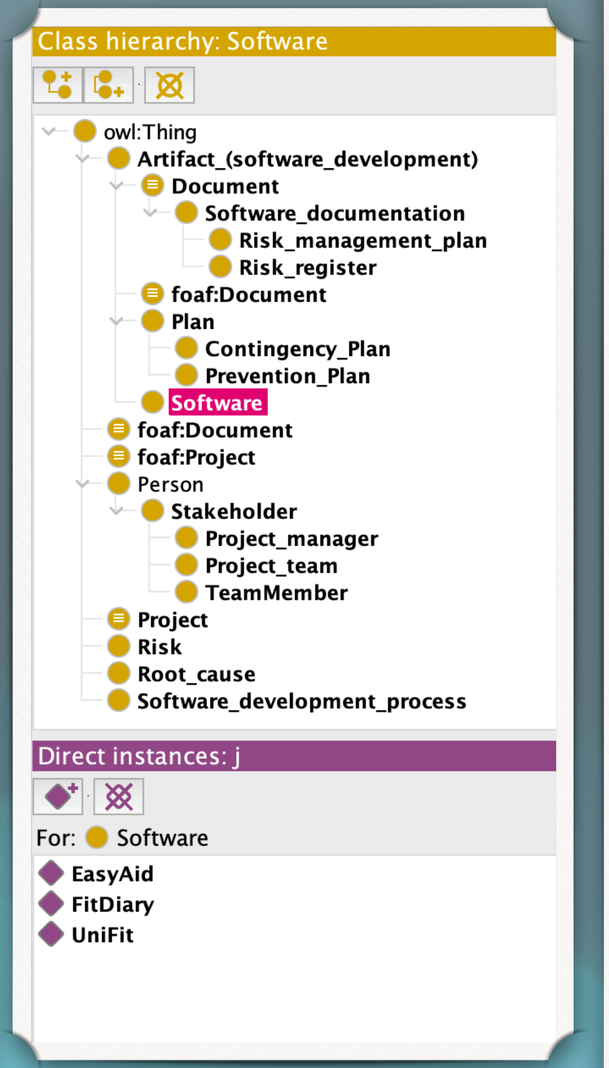


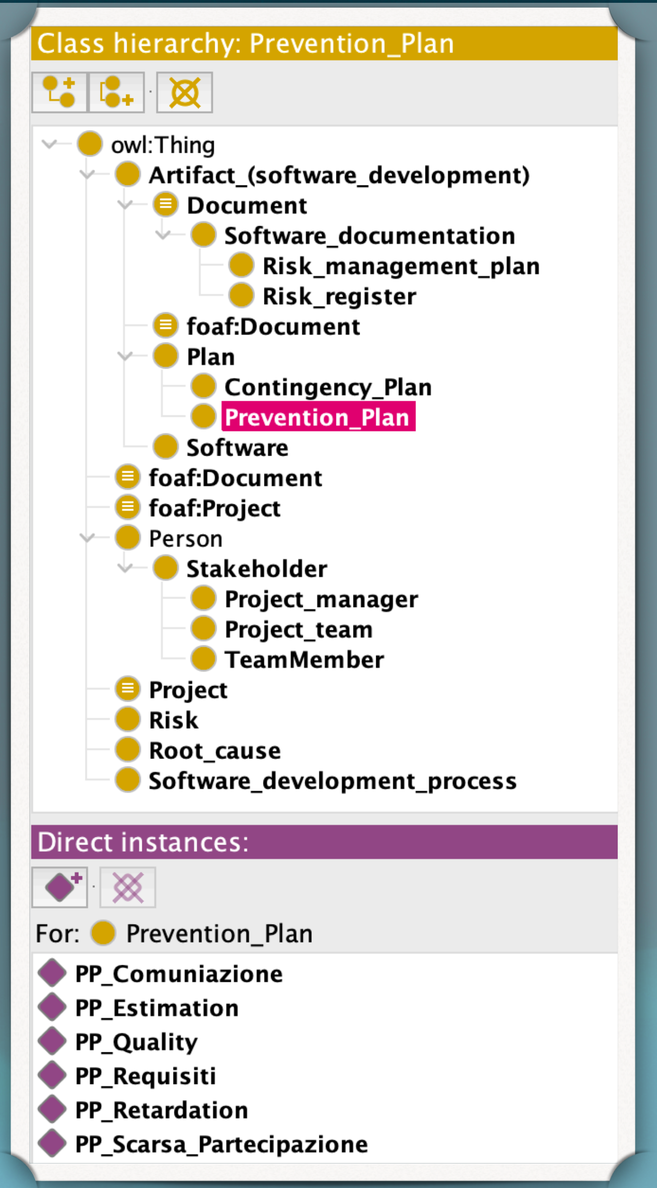
Realizzazione

Popolamento



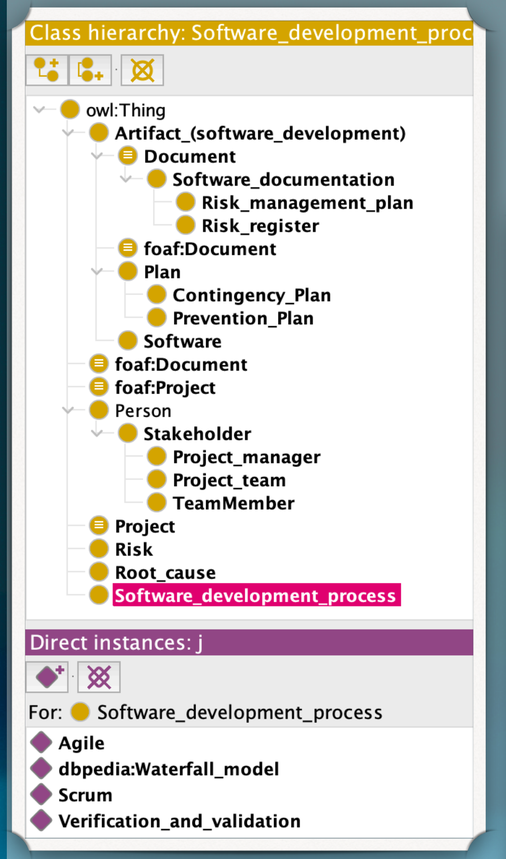


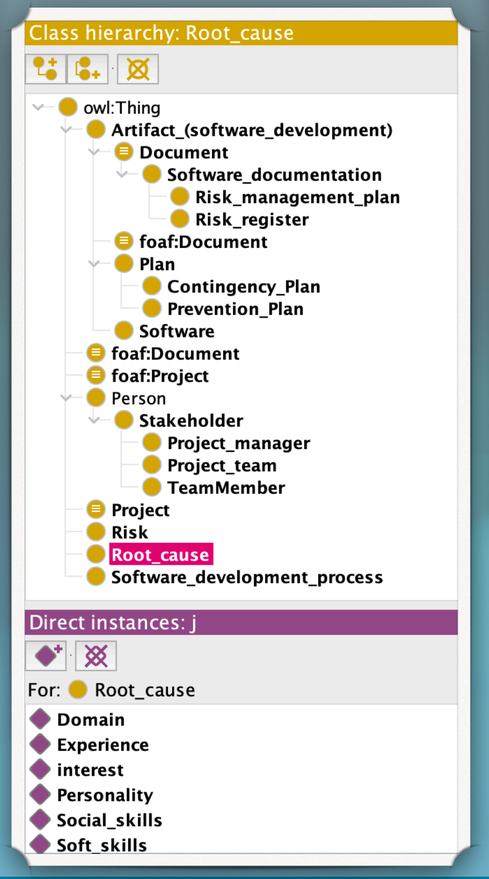


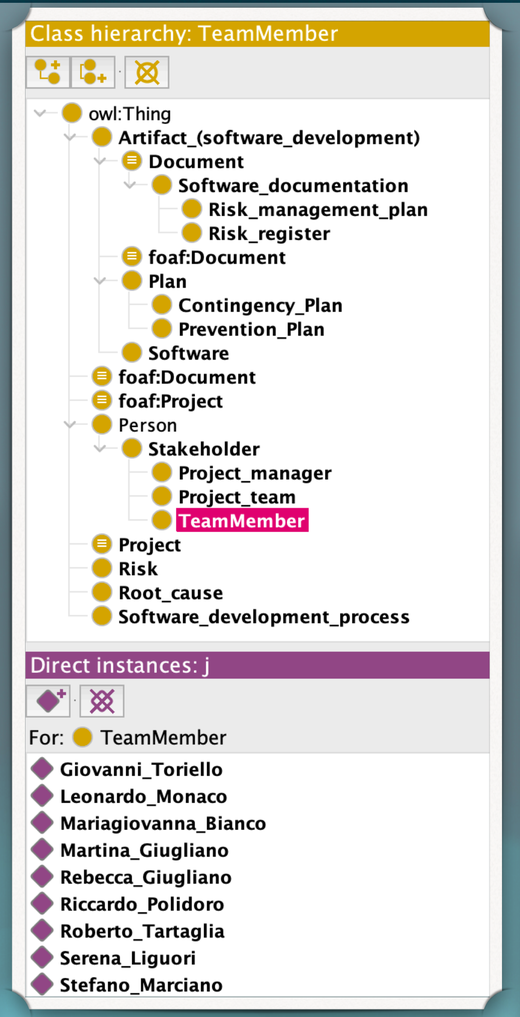


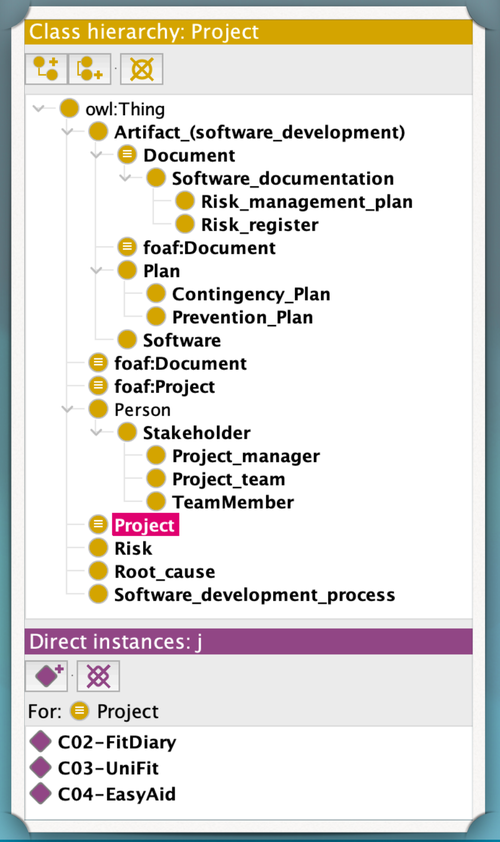
Realizzazione

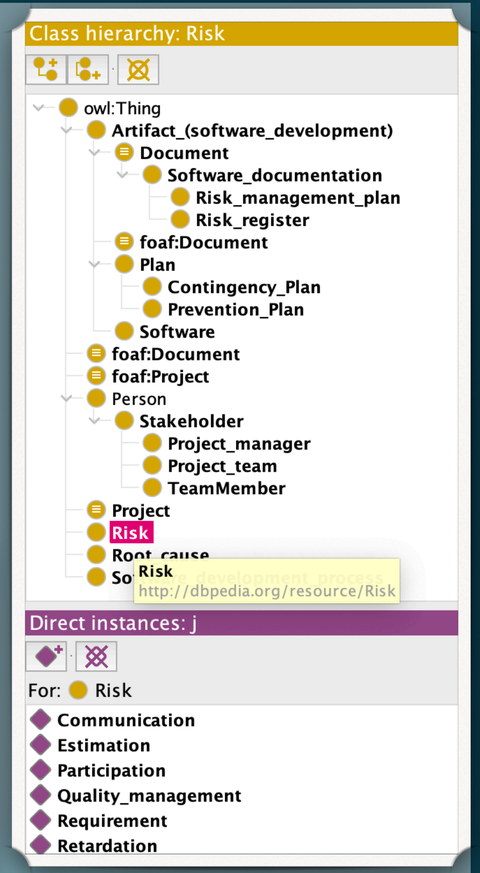
Popolamento











Realizzazione

Inferenza

Description: realize_documentation

Equivalent To

SubProperty Of
- Realize

Inverse Of

Domains (intersection)
- Project_manager

Ranges (intersection)
- Document
- foaf:Document

Disjoint With

SuperProperty Of (Chain)
- Risk_management SubPropertyOf: realize_documentation

Description: realize_plan

Equivalent To

SubProperty Of
- Realize

Inverse Of

Domains (intersection)
- Project_manager

Ranges (intersection)
- Plan

Disjoint With

SuperProperty Of (Chain)
- realize_documentation o Plan_Containers SubPropertyOf: realize_plan

Realizzazione Applicativo e Query SPARQL

Prefissi

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX db: <http://dbpedia.org/>
PREFIX dbo: <http://dbpedia.org/ontology/>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

Development's Model

```
SELECT DISTINCT  ?sub ?abs
WHERE{
  {
  ?sub rdfs:label "Software_development_process" .
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')
  }
  }UNION {
  ?individual rdf:type owl:NamedIndividual .
  ?individual rdf:type ?sub .
  ?sub rdfs:label "Software_development_process" .
   SERVICE <http://dbpedia.org/sparql> {
     ?individual rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')
  }
  }
}
```

Development's Models

Software_development_process

In software engineering, a software development process is the process of dividing software development work into smaller, parallel or sequential steps or subprocesses to improve design, product management. It is also known as a software development life cycle (SDLC). The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain an application.

Software_development

Software development is the process of conceiving, specifying, designing, programming, documenting, testing, and bug fixing involved in creating and maintaining applications, frameworks, or other software components. Software development involves writing and maintaining the source code, but in a broader sense, it includes all processes from the conception of the desired software through to the final manifestation of the software, typically in a planned and structured process. Software development also includes research, new development, prototyping, modification, reuse, re-engineering, maintenance, or any other activities that result in software products.

Waterfall_model

The waterfall model is a breakdown of project activities into linear sequential phases, where each phase depends on the deliverables of the previous one and corresponds to a specialization of tasks. The approach is typical for certain areas of engineering design. In software development, it tends to be among the less iterative and flexible approaches, as progress flows in largely one direction ("downwards" like a waterfall) through the phases of conception, initiation, analysis, design, construction, testing, deployment and maintenance.

Agile_Unified_Process

Agile Unified Process (AUP) is a simplified version of the Rational Unified Process (RUP) developed by Scott Ambler. It describes a simple, easy to understand approach to developing business application software using agile techniques and concepts yet still remaining true to the RUP. The AUP applies agile techniques including test-driven development (TDD), agile modeling (AM), agile change management, and database refactoring to improve productivity.

Scrum

Within project management, scrum is a framework for developing, delivering, and sustaining products in a complex environment, with an initial emphasis on software development, although it has been used in other fields including research, sales, marketing and advanced technologies. It is designed for teams of ten or fewer members, who break their work into goals that can be completed within time-boxed iterations, called sprints, no longer than one month and most commonly two weeks. The scrum team assess progress in time-boxed daily meetings of 15 minutes or less, called daily scrums (a form of stand-up meeting). At the end of the sprint, the team holds two further meetings: the sprint review which demonstrates the work done to stakeholders to elicit feedback, and sprint retrospective which

Verification_and_validation

Verification and validation (also abbreviated as V&V) are independent procedures that are used together for checking that a product, service, or system meets requirements and specifications and that it fulfills its intended purpose. These are critical components of a quality management system such as ISO 9000. The words "verification" and "validation" are sometimes preceded with "independent", indicating that the verification and validation is to be performed by a disinterested third party. "Independent verification and validation" can be abbreviated as "IV&V".

Artifacts

Artifacts

An artifact is one of many kinds of tangible by-products produced during the development of software. Some artifacts (e.g., use cases, class diagrams, and other Unified Modeling Language (UML) models, requirements and design documents) help describe the function, architecture, and design of software. Other artifacts are concerned with the process of development itself?such as project plans, business cases, and risk assessments. Much of what are considered artifacts is software documentation. To collect, organize and manage artifacts, a Software development folder may be utilized.

Software_documentation

Software documentation is written text or illustration that accompanies computer software or is embedded in the source code. The documentation either explains how the software operates or how to use it, and may mean different things to people in different roles. Documentation is an important part of software engineering. Types of documentation include:

Risk_management_plan

A risk management plan is a document that a project manager prepares to foresee risks, estimate impacts, and define responses to risks. It also contains a risk assessment matrix. A risk is "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives." Risk is inherent with any project, and project managers should assess risks continually and develop plans to address them. The risk management plan contains an analysis of likely risks with both high and low impact, as well as mitigation strategies to help the project avoid being derailed should common problems arise. Risk management plans should be periodically reviewed by the project team to avoid having the analysis become stale and not reflective of actual potential project risks.

Risk_register

A risk register (PRINCE2) is a document used as a risk management tool and to fulfill regulatory compliance acting as a repository for all risks identified and includes additional information about each risk, e.g., nature of the risk, reference and owner, mitigation measures. It can be displayed as a scatterplot or as a table. ISO 73:2009 Risk management?Vocabulary defines a risk register to be a "record of information about identified risks".

Software

Software is a collection of instructions that tell a computer how to work. This is in contrast to hardware, from which the system is built and actually performs the work. At the lowest programming level, executable code consists of machine language instructions supported by an individual processor?typically a central processing unit (CPU) or a graphics processing unit (GPU). Machine language consists of groups of binary values signifying processor instructions that change the state of the computer from its preceding state. For example, an instruction may change the value stored in a particular storage location in the computer?an effect that is not directly observable to the user. An instruction may also invoke one of many input or output operations, for example displaying some text on a co

```
SELECT DISTINCT ?sub ?abs
WHERE {
{  ?sub rdfs:label "Artifact_(software_development)" .
    SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')  }
} UNION {
   ?sub rdfs:label "Software_documentation" .
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')   }
}  UNION {
   ?sub rdfs:label "Risk_management_plan" .
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')  }
}   UNION {
   ?sub rdfs:label "Risk_register" .
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')   }
}    UNION {
   ?sub rdfs:label "Software" .
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
    FILTER(LANG(?abs) = 'en')  } }
}
```

Project Management Aspects

```
SELECT DISTINCT  ?sub ?abs
WHERE{
 {  ?sub rdfs:label "Risk_management" .
  SERVICE <http://dbpedia.org/sparql> {
    ?sub rdfs:comment ?abs
   FILTER(LANG(?abs) = 'en')
   }} UNION {
 ?sub rdfs:label "Project_management" .
  SERVICE <http://dbpedia.org/sparql> {
    ?sub rdfs:comment ?abs
   FILTER(LANG(?abs) = 'en')     }
 }  UNION {
 ?sub rdfs:label "Stakeholder_management" .
  SERVICE <http://dbpedia.org/sparql> {
    ?sub rdfs:comment ?abs
   FILTER(LANG(?abs) = 'en')  }  }
}
```

Project Management Aspects

Risk_management

Risk management is the identification, evaluation, and prioritization of risks (defined in ISO 31000 as the effect of uncertainty on objectives) followed by coordinated and economical application of resources to minimize, monitor, and control the probability or impact of unfortunate events or to maximize the realization of opportunities. Certain risk management standards have been criticized for having no measurable improvement on risk, whereas the confidence in estimates and decisions seems to increase.

Software_project_management

Software project management is an art and science of planning and leading software projects. It is a sub-discipline of project management in which software projects are planned, implemented, monitored and controlled.

Stakeholder_management

Stakeholder management is a critical component to the successful delivery of any project, programme or activity. A stakeholder is any individual, group or organization that can affect, be affected by, or perceive itself to be affected by a programme. Stakeholder management is a four-step process of identifying stakeholders, determining their influence, developing a communication management plan and influencing stakeholders through engagement.

Project

C04-EasyAid

Description

EasyAid

EasyAid was created with the aim of facilitating the provision of services relating to tutoring and support for exams, to students with disabilities and SLD, provided by the right to study office of the University of Salerno.

Artifacts

- RP_EasyAid
- RR_EasyAid
- Doc_EasyAid

Development's Model

Verification_and_validation

Stakeholder

Project Manager

Giusy_Annunziata

A project manager is a professional in the field of project management. Project managers have the responsibility of the planning, procurement and execution of a project, in any undertaking that has a defined scope, defined start and a defined finish; regardless of industry. Project managers are first point of contact for any issues or discrepancies arising from within the heads of various departments in an organization before the problem escalates to higher authorities, as project representative.

Team Member :

- Serena_Liguori
- Martina_Giugliano
- Mariagiovanna_Bianco

With the term team member we intend the member of a team or group. An individual who collaborates with other people thus forming a "team", whose members share the same goal

```
SELECT DISTINCT ?tm ?abs
WHERE {
 {
   ?tm ?association ?individual .
   ?individual rdfs:label "C04-EasyAid" .
   ?association rdfs:label "Project_management" .
   ?class rdfs:label "Project_manager" .
 SERVICE <http://dbpedia.org/sparql> {
    ?class rdfs:comment ?abs
   FILTER(LANG(?abs) = 'en')
 }
 } UNION {
   ?tm ?association ?individual .
   ?individual rdfs:label "Team_04" .
   ?association rdfs:label "PlayerInTeam" .
   ?class rdfs:label "TeamMember" .
   ?class rdfs:comment ?abs
 }
}
```

```
SELECT DISTINCT ?soft ?softdesc ?tm ?dep
WHERE {
   ?individual ?association ?soft .
   ?associated rdf:type owl:NamedIndividual .
   ?individual rdfs:label "C04-EasyAid" .
   ?association rdfs:label "produce_software" .
   ?soft rdfs:comment ?softdesc .
   ?tm ?ass ?individual .
   ?ass rdfs:label "Work" .
   ?individual ?use ?dep .
   ?use rdfs:label "use_to_be_deployed"
}
```

```
SELECT DISTINCT ?soft
WHERE {
   ?individual ?association ?soft .
   ?associated rdf:type owl:NamedIndividual .
   ?individual rdfs:label "C04-EasyAid" .
   ?association rdfs:label "produce_documentation" .
}
```

Project

```
SELECT DISTINCT ?individual ?cause
 ?des ?prevention ?con
WHERE {
    ?associated ?association ?individual .
    ?associated rdfs:label "RR_EasyAid" .
    ?association rdfs:label "Risk_Container" .
    ?individual ?asscause ?cause .
    ?asscause rdfs:label "cause" .
    ?individual ?assdes ?des .
    ?assdes rdfs:label "discovered" .
    ?individual ?assprev ?prev .
    ?assprev rdfs:label "prevention" .
    ?prev dc:description ?prevention .
    ?individual ?assmit ?mit .
    ?assmit rdfs:label "mitigazione" .
    ?prev dc:description ?con .
}
```

Risk Register C04-EasyAid

#	Name	Root Cause	Trigger	Prevention Plan	Contingency Plan
1	Quality_management	Soft_skills	Soft_skills	- Carry out training on the tasks to be carried out - Provide guidelines, templates, checklists and references to follow - Motivate the team in carrying out the project successfully - Provide precise and explanatory feedback and corrections of errors made - Show how corrections will be made and according to what criteria	- Carry out training on the tasks to be carried out - Provide guidelines, templates, checklists and references to follow - Motivate the team in carrying out the project successfully - Provide precise and explanatory feedback and corrections of errors made - Show how corrections will be made and according to what criteria
2	Communication	Social_skills	Personality	- Motivate the team, especially remembering the importance of the experience they are experiencing and how soft skills such as communication and team working will be indispensable in the work - Explain how to best use the communication tools - Minimize communications between people in conflict, if this cause cannot be resolved in any other way (e.g. personal reasons)	- Motivate the team, especially remembering the importance of the experience they are experiencing and how soft skills such as communication and team working will be indispensable in the work - Explain how to best use the communication tools - Minimize communications between people in conflict, if this cause cannot be resolved in any other way (e.g. personal reasons)

Risks

Risks

Description

In simple terms, risk is the possibility of something bad happening. Risk involves uncertainty about the effects/implications of an activity with respect to something that humans value (such as health, well-being, wealth, property or the environment), often focusing on negative, undesirable consequences. Many different definitions have been proposed. The international standard definition of risk for common understanding in different applications is ?effect of uncertainty on objectives?.

Root cause

A root cause is an initiating cause of either a condition or a causal chain that leads to an outcome or effect of interest. The term denotes the earliest, most basic, 'deepest', cause for a given behavior; most often a fault. The idea is that you can only see an error by its manifest signs. Those signs can be widespread, multitudinous, and convoluted, whereas the root cause leading to them often is a lot simpler. A "root cause" is a "cause" (harmful factor) that is "root" (deep, basic, fundamental, underlying, initial or the like). For example, projects may fail due to unrealistic expectations.

Plan

A plan is typically any diagram or list of steps with details of timing and resources, used to achieve an objective to do something. It is commonly understood as a temporal set of intended actions through which one expects to achieve a goal. For spatial or planar topologic or topographic sets see map. Plans can be formal or informal:

Prevention Plan

The Prevention plans are created by the Project Managers with the aim of preventing the occurrence of risks. Once the Project Manager realizes that a certain risk is about to occur, he implements the related prevention plan, with the aim of avoiding the impending risk.

Contingency Plan

The Contingenaza Plans, are the plans that are implemented by the Project Managers when a certain risk occurs. These plans have the objective of mitigating the effects of the risk, trying to limit the damage and eliminate the risk.

```
SELECT DISTINCT ?abs ?absCause
                ?absPlan ?predes ?condes
WHERE {
  ?sub rdfs:label "Risk" .
  ?cause rdfs:label "Root_cause" .
  ?plan rdfs:label "Plan" .
  ?pre rdfs:label "Prevention_Plan" .
  ?con rdfs:label "Contingency_Plan" .
  ?pre dc:description ?predes .
  ?con dc:description ?condes .
   SERVICE <http://dbpedia.org/sparql> {
    ?sub rdfs:comment ?abs .
    ?cause rdfs:comment ?absCause .
    ?plan rdfs:comment ?absPlan
    FILTER(LANG(?abs) = 'en')
    FILTER(LANG(?absCause) = 'en')
    FILTER(LANG(?absPlan) = 'en') }
}
```

Risks Table

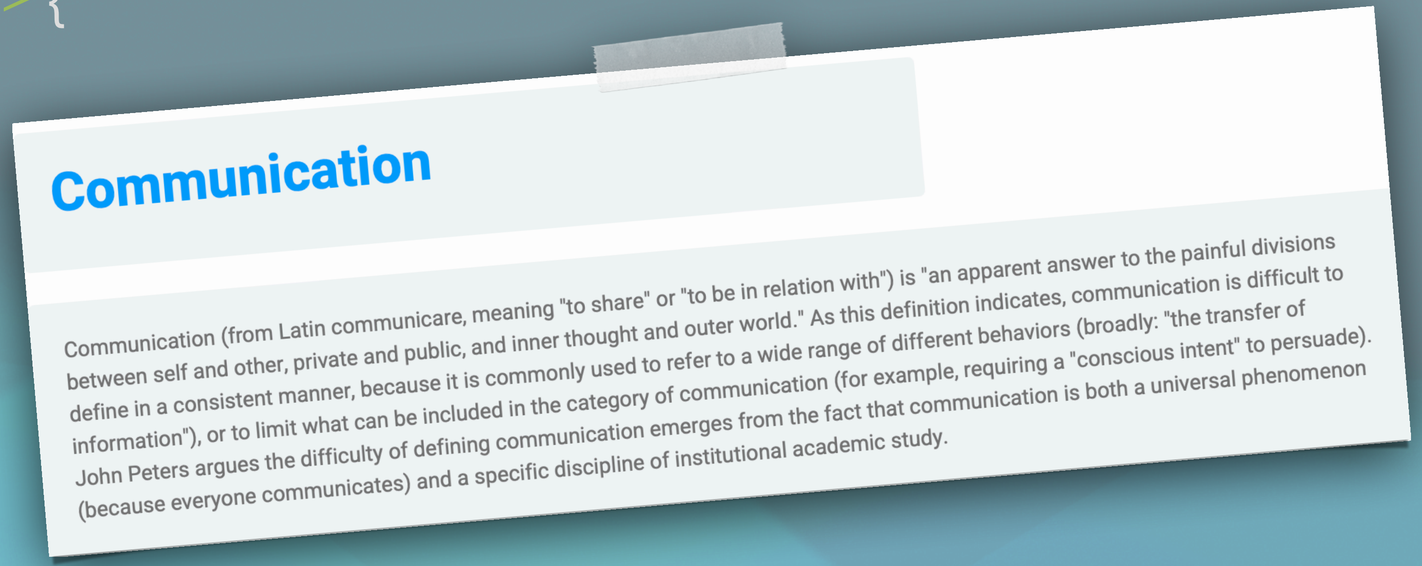
```
SELECT DISTINCT ?individual ?cause
 ?des ?prevention ?con
WHERE {
    ?individual rdf:type owl:NamedIndividual .
    ?individual rdf:type ?sub .
    ?sub rdfs:label "Risk" .
    ?individual ?asscause ?cause .
    ?asscause rdfs:label "cause" .
    ?individual ?assdes ?des .
    ?assdes rdfs:label "discovered" .
    ?individual ?assprev ?prev .
    ?assprev rdfs:label "prevention" .
    ?prev dc:description ?prevention .
    ?individual ?assmit ?mit .
    ?assmit rdfs:label "mitigazione" .
    ?prev dc:description ?con .
}
```

Risk Table

#	Name	Root Cause	Trigger	Prevention Plan	Contingency Plan
1	Quality_management	Soft_skills	Soft_skills	- Carry out training on the tasks to be carried out - Provide guidelines, templates, checklists and references to follow - Motivate the team in carrying out the project successfully - Provide precise and explanatory feedback and corrections of errors made - Show how corrections will be made and according to what criteria	- Carry out training on the tasks to be carried out - Provide guidelines, templates, checklists and references to follow - Motivate the team in carrying out the project successfully - Provide precise and explanatory feedback and corrections of errors made - Show how corrections will be made and according to what criteria
2	Partecipation	interest	interest	- Involve everyone in the project activities - Create a friendly, pleasant work environment. - Emphasize the benefits of coordinated teamwork - Continuously stimulate and motivate TMs - Valuing everyone's knowledge, skills, ideas and points of view	- Involve everyone in the project activities - Create a friendly, pleasant work environment. - Emphasize the benefits of coordinated teamwork - Continuously stimulate and motivate TMs - Valuing everyone's knowledge, skills, ideas and points of view

Describe

```
SELECT DISTINCT  ?sub ?abs ?des
WHERE{
   ?sub rdfs:label "Communication" .
  OPTIONAL{
   SERVICE <http://dbpedia.org/sparql> {
     ?sub rdfs:comment ?abs
   FILTER(LANG(?abs) = 'en')
}}
  OPTIONAL{
    ?sub rdfs:comment ?abs
  }
}
```

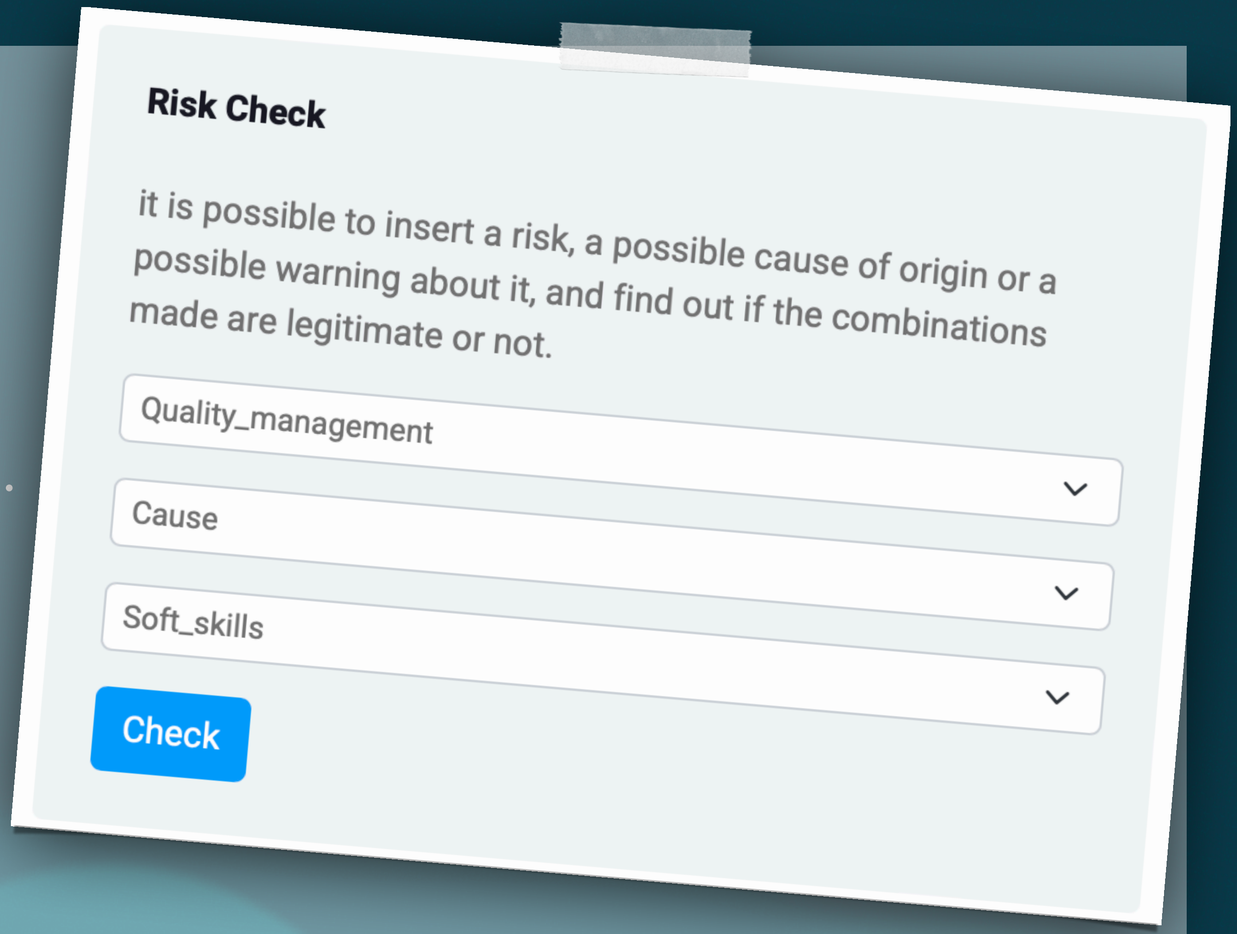


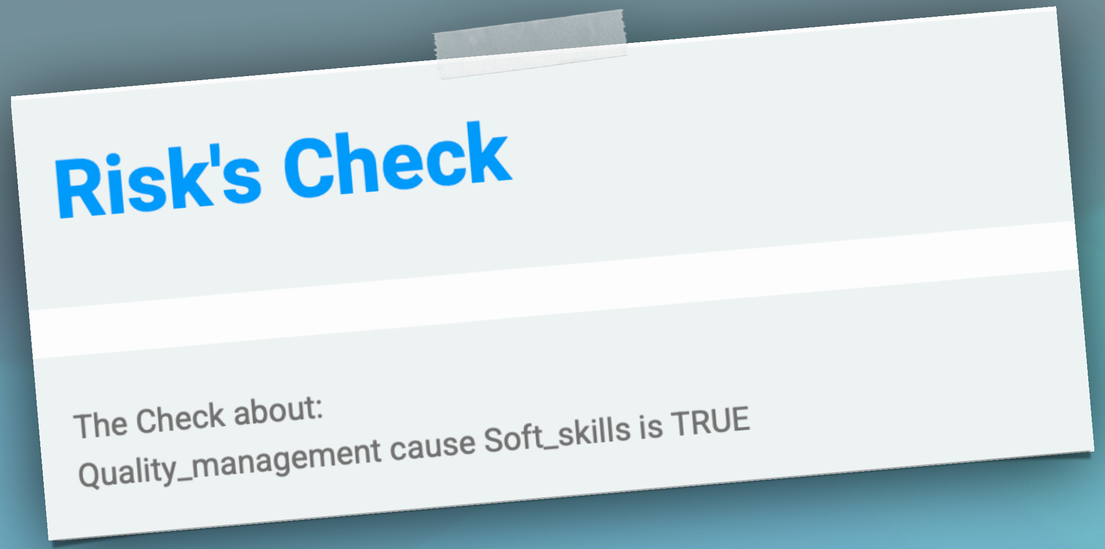
Communication

Communication (from Latin communicare, meaning "to share" or "to be in relation with") is "an apparent answer to the painful divisions between self and other, private and public, and inner thought and outer world." As this definition indicates, communication is difficult to define in a consistent manner, because it is commonly used to refer to a wide range of different behaviors (broadly: "the transfer of information"), or to limit what can be included in the category of communication (for example, requiring a "conscious intent" to persuade). John Peters argues the difficulty of defining communication emerges from the fact that communication is both a universal phenomenon (because everyone communicates) and a specific discipline of institutional academic study.

Ask

```
ASK {
  ?individual ?ass ?object .
  ?individual rdfs:label "Quality_management" .
  ?ass rdfs:label "cause" .
  ?object rdfs:label "Soft_skills"
}
```





Tools

Tools

Apache Tomcat

Conclusioni e Sviluppi Futuri

Conclusioni e Sviluppi Futuri

CONCLUSIONI

RiskOntology fornisce dunque tutte le informazioni necessarie per la realizzazione del Risk Management da un parte di un Project Manager, indipendentemente dalla sua esperienza. Esso potrà basarsi sull'esperienza di altri Project Manager e di altri progetti, al fine di individuare i rischi che potrebbero verificarsi nel suo progetto.

SVILUPPI FUTURI

Ampliare l'ontologia e il dataset con ulteriori informazioni e progetti d'esempio

GRAZIE PER L'ATTENZIONE

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