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Introduction to the Semantic Web

Worksheet 1: What is the Semantic Web?

Deadline: 16. October 2018, 13:00 h

Submit the solutions for the questions in a single pdf-file. Please write your name on top of this page.

Task 1: Questionnaire on e-learning platform "LernraumPlus"

Go to the LernraumPlus `https://lernraumplus.uni-bielefeld.de/course/view.php?id=2881` and login with your eKVV/BITS login. Fill out the short questionnaire on top of the page. The questionnaire is fully anonymous. The final page of the questionnaire shows the "magic word" that is the solution to this task.

Task 2: Read & Answer

Before answering the following questions, please read the *Scientific American* article *The Semantic Web* by Tim Berners-Lee. You find this article in the LernraumPlus.

1. What is the idea behind the Semantic Web?
2. *'Traditional knowledge representation systems [...] require everyone to share the same definition of common concepts'* (p. 2).
   In what way is the Semantic Web different?
3. On the Semantic Web, how would a system be able to differentiate useful information from false or misleading information?
4. What are URIs and what role do they play on the Semantic Web?
5. What role do ontologies play on the Semantic Web?
6. What is the purpose of agents? Think about technical challenges.
7. Do you think that the Semantic Web is feasible? Can you think of problems that may compromise this idea?

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TASK 1: ASCENDIO

TASK 2:

1. What is the idea behind the Semantic Web?

   The idea is to make informations "understandable" for the machines, at the moment most informations are created to be understood only by humans but if these informations are given in a well-defined meaning we can use them to permit cooperation between humans and computer.

2. "Traditional Knowledge representation systems […] require everyone to share same definition of common concepts"
   In what way is the Semantic Web different?

   Semantic Web would to be as decentralized as possible, because central control can rapidly become unmanageable.

3. On the Semantic Web, how would a system be able to differentiate useful information from false or misleading information?

   Using different URIs for each specific concept, in addition adding logic to use its rules to make inferences, choose courses of action and answer questions can help to describe complex properties of objects.

4. What are URIs and what role do they play on the Semantic Web?

   Subject and object are each identified by URIs.
   RDFs triples (subject, verb and object of an elementary sentence) uses URIs to form webs of information about related things.

5. What role do ontologies play on the Semantic Web?

   Ontologies are collection of information that define relations among terms. Classes, Subclasses and relations among entries are very powerful tool for Web usage.
   In Semantic Web an ontology can be a file containing these relations; there are so many different ways to refer the same concept, so the ontologies help us to define the relation between same concepts identified in different ways.

6. What is the purpose of agents? Think about techical challenges.

   The purpose of agents is to undarstand the meaning of information and to manipulate it by collecting contents automatically.
   Agents can verify the validity of information through exchange of "proofs" written in the Semantic Web's unifying language.

An additional feature is digital signatures (encrypted block of data). Computer and agents can verify, through them, if attached information has been provided by a trusted source.
People have to write code to let agents understand the information but this implies a tremendous effort. Moreover, there is no error tolerance or it require additional efforts to implement it.

7. Do you think that the Semantic Web is feasible? Can you think of problems that may compromise this idea?

   Talking about the Semantic Web we can think about it as a conjuction between humans and agents. With the Semantic Web both of them will be able to cooperate to organise people lives, according to appointments and information collected on the web by agents. The principal problem is the sharing of information, in fact some companies prefer to keep their data hidden instead of sharing it (for privacy, commercial strategy or internal decisions).