CS6852: Theory and Applications of Ontologies :: 2022
Assignment Descriptions

Phase 1: Ontology Design
Task:
Each team is required to pick a domain of their choice and create an ontology or a semantic model of the domain. They need to develop the semantic model using description logic SROIQ.

Report: 1) the DL ontology (TBox) and 2) a write-up about the design choices made and the details of the design - the explanations for classes, properties, DL axioms, motivating situations/ examples - of the ontology.

Please keep the overall goal of the full set of assignments in mind while designing the ontology. You can plan to have members of the primitive symbols (concepts and relationships) available/ extractable from XML data you would generate later in Phase 2.

Phase 2: XML Design
Task:
Consider the same domain from Phase 1 and each team is required to create a DTD that can be used to structure data in the domain. Also, populate with data on an appropriate platform. Write a brief description about the design of the DTD. Run an interesting set of XPATH and XQuery queries on the data and submit the results along with the plain English description of the queries.

Report: You are required to submit the DTD file with description and XML data and your queries and results obtained.

Phase 3: Ontology Development
Task:
Required to produce an OWL Ontology using Protege for the semantic model designed in Phase 1. The developed ontology needs to be checked for consistency before submission.

Report: You are required to submit the OWL file (check consistency before submission) and a "report" pdf file to communicate any comments regarding the OWL file. If slight modifications/ additions to the semantic model are made, it should be documented in the "report" pdf file.

Phase 4: Inference using OWL
Required to develop a program that extracts XML data and combines it with the ontology. That is, take appropriate portions of the XML data created in Phase 2 and convert them to RDF triples. The triples should be consistent with the OWL ontology of Phase-3. You should check for consistency using an OWL reasoner. You should infer additional triples by running the reasoner on the ontology and the triples extracted from XML data store. Display both the extracted and inferred triples as the final result of the program.

APIs: You can use OWLAPI in Java/ OWLReady in Python.