Cairo University
Faculty of Computers & Artificial Intelligence
Computer Science Department
Year 2021 – 2022
First Term

Assignment 1

Deadline of assignment submission is 7/12/2021.
The students per group should not exceed 2 students.

Assignment Goal

The goal form this Assignment is to have the knowledge about class and object constraints and how to build ontology with protégé.

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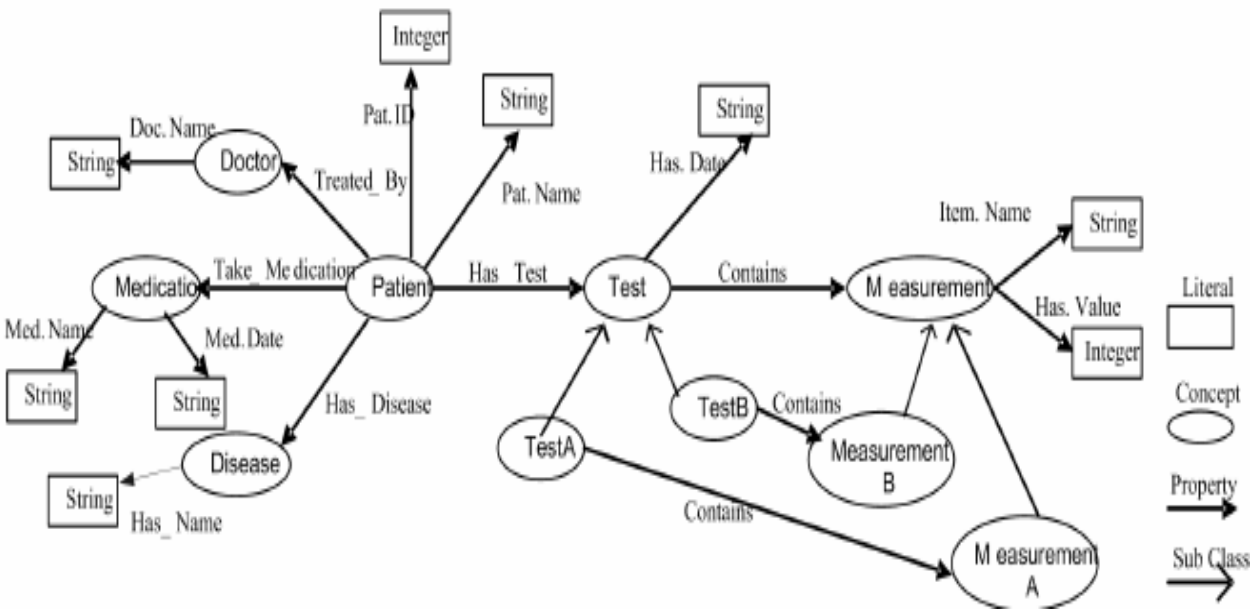
Problem Description

Drug therapy (DT) is growing more complex, thus appropriate drug prescription becomes increasingly challenging. Drug interactions (DI) are one of the important factors that modify the response to a drug. Drug-Drug Interactions (DDI) can result in anything from minor morbidities up to fatal consequences.

The undesirable effects may reduce the drug effectiveness and may produce unwanted, noxious and even life threatening effects in the body. So we will develop program to help the doctors to alert him if any bad drug interaction may happen.

The model.



Task

1. **Create an ontology describing this domain and scenario.**
   - **Every test has at least two Measurements.**
   - **Every Patient has at least one doctor.**
   - **Patient treated by only doctors**
   - **Add end date for the medication and start date.**
   - **Add object property "hasInteractionOn" with domain Medication and range Medication, also create 3 sub properties (Major,Moderate,Minor) of "hasInteractionOn"**

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2. **Fill in the given data to create your knowledgebase and run the reasoner and check for any inconsistencies.**

3. **Using Apache Jena: develop program that read your owl file and:**

   a- List drugs and disease of a patient given the patient name
   b- Alert (print out) if a patient take two or more drugs at the same time duration (if any overlapping between dates) that have interaction and print also the severity number.

Sample drug interactions data – you need to add this data as individuals of medication and don't forget to fill the property of "hasInteractionOn" with the table below.

Severity level	Interacting drugs
Major	Ciprofloxcin / Prednisolone Enalapril / Spironolactone Ciprofloxacin / Tramadol Rabeprazole / Clopidogrel Ciprofloxacin / Theophylline
Moderate	Metformin / Ranitidine Enalpril / Asprin Aspirin / Insulin Enalapril / Metformin Enalapril / Insulin
Minor	Ranitidine / Acetaminophen Enalapril / Amlodipine Aspirin / Rabeprazole Ranitidine / Diclofenac

- Add those individuals to the ontology.

Patient ID	Patient Name	Doctor Name	Desease	Patient drugs

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1	Nada	Salah	Ischemic Heart Disease,	- Ciprofloxcin(from 1/4/2021 to 20/4/2021) - Prednisolone(from 5/3/2021 to 15/4/2021) - Insulin(from 23/3/2021 to 5/4/2021)
2	Ibrahim	Salah	Diabetes Mellitus (DM)	- Enalapril (from 1/4/2021 to 20/4/2021) - Theophylline (from 6/3/2021 to 1/4/2021) - Tramadol (from 20/3/2021 to 15/4/2021)
3	Saber	Salah	Diabetes Mellitus (DM)	- Metformin (from 1/4/2021 to 20/4/2021) - Ranitidine (from 15/3/2021 to 15/4/2021) - Acetaminophen (from 2/3/2021 to 5/4/2021)
4	Gamal	Salah	Hypertension (HTN)	- Enalapril (from 1/4/2021 to 20/4/2021) - Metformin (from 1/2/2021 to 10/2/2021)
5	Ahmed	Salah	Pyrexia	- Aspirin (from 1/4/2021 to 5/4/2021) - Clopidogrel (from 1/3/2021 to 15/4/2021) - Insulin(from 3/3/2021 to 5/3/2021)