**CS6852 Assignment 1: Ontology Design**

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**Design Choice and Details:**

**Domain-Name​ :** University

**Motivation:**

We are students since the past 22+ years, basically it's our whole life. We can relate the ideas of this system, it’s working and now being part of such an Institute and learning ontologis drives us to choose this topic. We chose those Concept names, Roles for our domain, which we were seeing in our regular life there at IITM. Further, exploring the university domain enriches our knowledge about various roles and functionalities of University.

And in the end we come up with the following University Ontology.

**CONCEPTS​:**

|  |  |  |
| --- | --- | --- |
| S.no | Concept name | Description |
| 1 | Program | University offers bachelor's (Btech , Dual-Degree), master's, and doctoral Degrees. This is atomic concept |
| 2 | Person | All the people related to University. This is atomic concept |
| 3 | Website | Contains All information about university. This is an atomic concept |
| 4 | Department | A division of a university where a professor/faculty is devoted to a particular academic discipline. This is atomic concept |
| 5 | TA | A teaching assistant is a student who assist a Faculty with at least one course |
| 6 | Course | All the courses in the University. This is atomic concept |
| 7 | UGCourse | All the courses related to the undergraduate program. |
| 8 | PGCourse | All the courses related to the postgraduate program. |
| 9 | MSCourse | All courses related to the Master of Science program. (is this not a subset of PGCourse) |
| 10 | Student | All persons in the University who attends at least one course |
| 11 | UGStudent | UGStudent is a Student who attends only UGCourses. |
| 12 | PGStudent | PGStudent is a Student who attends at least one PGCourse. |
| 13 | MSStudent | A student who attends at least one MSCourse |
| 14 | SponsoredStudent | A PGStudent who is not a TA. |
| 15 | GraduateStudent | A person who has degree of a program |
| 16 | Publication | All the Research works published by students or faculty. |
| 17 | Event | All Events helds in the university. This is an atomic concept |
| 18 | DepartmentEvent | All Events which are organized by any department |
| 19 | Club | All clubs in the university. This is an atomic concept |
| 20 | ClubEvent | All Events which are organized by any club |
| 21 | Exam | Department Event which are conducted by Faculty. |
| 22 | ResearchAssistant | PGStudent or UGStudent who helps the Professor in the research work |
| 23 | HOD | A Person who is head of any one Department |
| 24 | Faculty | Person who teaches at least one course. Basically refers to teaching staff. This is atomic concept and belong to one Department |
| 25 | DepartmentWebsite | Website containing information regarding department |
| 26 | Website | A place on the internet where different organizations' information is present. This is an atomic concept |
| 27 | AssistantProfessor | A assistant professor is a faculty |
| 28 | AssociateProfessor | A associate professor is a faculty |
| 29 | Professor | Faculty who is neither Associate Professor nor Assistant Professor |
| 30 | Staff | All persons working for the university. |
| 31 | Non-Teaching staff | Employee who does not teach a course. |
| 32 | ProjectGuide | Faculty who guides at least one PGStudent |
| 33 | SportsCommittee | Organises sports events |
| 34 | CulturalCommitte | Organises Cultural events |
| 35 | CulturalEvent | All events which are organised by CulturalCommitte |
| 36 | Credits | The credits associated with a Course. This is an atomic concept |
| 37 | Hostel | an establishment provides lodging for a specific group of people, such as students. This is an atomic concept |
| 38 | Hostellers | Students who belongs to only one Hostel |
| 39 | Warden | Faculty who is head of exactly one Hostel |
| 40 | Classroom | A part of University campus, where courses are taught. This is an atomic concept |
| 41 | Laboratory | All the labs present in university. This is an atomic concept |
| 42 | LabAssistant | A person who assists >=1 laboratory |
| 43 | LabAdministrator | A person who administers at least one laboratory |
| 44 | Library | All the libraries present in university. This is an atomic concept |
| 45 | LibraryStaff | People who works in a library |
| 46 | LibraryAdministrator | A person who administers a library |
| 47 | Hospital | A place where we all persons can get immediate first aid in the university. This is an atomic concept |
| 48 | HospitalStaff | People who works in a Hospital |
| 49 | Mess | All the places in university where food is provided. This is an atomic concept |
| 50 | MessStaff | All the people who work in Mess. |
| 51 | GymKhana | A part of University campus, where gym activities happen. |
| 52 | GymStaff | People works in GymKhana |
| 53 | HostelSec | All students who are secretary of a Hostel |
| 54 | PeopleRegisterdInMes | All the people who are registered in a mess |
| 55 | Security | It includes all security measures to protect/secure University. We are considering this to be an atomic axiom. |
| 56 | Threat | Any Unouthorised, misconduct happens on/to University and Its belonging. |
| 57 | Stadium | A part of University campus, where sports are played. This is an atomic concept |

**ROLES:**

|  |  |  |
| --- | --- | --- |
| S.no | Role-Name | Domain - Range |
| 1 | teaches | Person - Course |
| 2 | attends | Person - Course |
| 3 | publishedBy  publishes | ResearchWork - Faculty ⊔ Student  Faculty ⊔ Student - ResearchWork |
| 4 |  |  |
| 5 | guides | Faculty - PGStudent |
| 6 | assists | Person - Course  Person - Laboratory |
| 7 | worksIn | Person - Library  Person - Hospital  Person - Mess  Person - GymKhana |
| 8 | administratre | Person - Laboratory  Person - Library |
| 9 | belongsTo | Student - Department  Student - Hostel  Faculty - Department  HOD - Department |
| 10 | offeredBy  offers | Course - Department  Department - Course |
| 11 | headOf | Faculty - Department  Student - Club  Staff - Hostel |
| 12 | organisedBy | Event - Department  Event - Club  Event - SportsCommitte  Event - CulturalCommitte |
| 13 | conductedBy | Exam - Faculty |
| 14 | informationAbout | Website - University  Website - Department |
| 15 | creditsFor | Course - Credits |
| 16 | hasDegree | Person - Program |
| 17 | registeredIn | Person - Mess |
| 18 | breaches | Event - Security |
| 19 | protects | Person - University |

**TBox:**

1. Student ≡ Person П >=1attends.Course (Person and attends min 1 (Course))
2. UGCourse ⊑ Course (Course some UGCourse)
3. PGCourse ⊑ Course (Course some PGCourse)
4. MSCourse ⊑ Course (Course some MSCourse)
5. Faculty ≡ Person ⊓ >=1teaches.Course. (Person and teaches min 1(Course))
6. Graduate Student ≡ Person ⊓ ∃hasDegree.Program (Person and (hasDegree some Program))
7. Staff ≡ Person ⊓ ￢Student ⊓ ￢Graduate Student Person and not(Student) and not(Graduate Student)
8. Non-TeachingStaff ≡ Person ⊓ ￢∃teaches.Course ⊓ ￢Student. (Person and not(teaches some Course) and not(Student))
9. AssistantProfessor ⊑ Faculty
10. AssociateProfessor ⊑ Faculty
11. Professor ≡ Faculty ⊓ ￢AssociateProfessor ⊓ ￢AssistantProfessor (Faculty and not(AssociateProfessor) and not(AssistantProfessor))
12. UGStudent ≡ Student ⊓ ∀attends.UGCourse (Student and (attends only UGCourse))
13. PGStudent ≡ Student ⊓ ∃attends.PGCourse (Student and (attends some PGCourse))
14. MSStudent ≡ Student ⊓ ∃attends.MSCourse (Student and (attends some MSCourse))
15. TA ≡ PGStudent ⊓ ∃assists.Course (PGStudent and (assists some Course))
16. SponsoredStudent ≡ PGStudent ⊓ ￢ TA (PGStudent and not(TA))
17. Hostellers ≡ Students П ∃belongsTo.Hostel (Students and (belongsTo some Hostel))
18. DayScholars ≡ Students П ￢Hostellers (Students and not(Hostellers))
19. ProjectGuide ≡ Faculty ⊓ ∃guides.PGStudent (Faculty and (guides some PGStudent))
20. HOD ≡ Faculty ⊓ =1headOf​ .Department (Faculty and (headOf exactly 1 (Department)))
21. Warden ≡ Staff П =1headOf.Hostel (Staff and (headOf exactly 1 (Hostel)))
22. Publication ≡ >=1publishedBy.(Faculty ⊔ Student) (publishedBy min 1 (Faculty or Student))
23. Department Event ≡ Event ⊓ ∃orgainsedBy.Department (Event and (organisedBy some Department))
24. ClubEvent ≡ Event ⊓ ∃orgainsedBy.Club (Event and (organisedBy some Club))
25. CulturalCommitte ⊑ Student (Student some CulturalCommitte)
26. CulturalEvent ≡ Event ⊓ ∃orgainsedBy.CulturalCommitte (Event and (organisedBy some CulturalCommitte))
27. Department Website = Website П ∀informationAbout.Department (Website and (informationAbout Only Department))
28. SportsCommittee ⊑ Student (Student some SportsCommittee)
29. SportsEvents ≡ Event ⊓ ∃orgainsedBy.SportsCommittee (Event and (organisedBy some SportsCommittee))
30. Exam ≡ DepartmentEvent ⊓ ∀conductedBy.Faculty (DepartmentEvent and (conductedBy only Faculty))
31. LabAssistant ≡ Person ⊓ >=1assists.Laboratory (Person and (assists min 1 (Laboratory)))
32. LabAdministrator ≡ Person ⊓ >=1administrate.Laboratory (Person and (administrate min 1 (Laboratory)))
33. LibraryAdministrator ≡ Person ⊓ ∃administrate.Library (Person and (adminstrate some Library))
34. LibraryStaff ≡ Non-TeachingStaff ⊓ ∃worksIn.Library (Non-TeachingStaff and (worksIn some Library))
35. HostelSec ⊑ Student (Student some HostelSec)
36. Hospital Staff ≡ Non-TeachingStaff ⊓ ∃worksIn.Hospital (Non-TeachingStaff and (worksIn some Hospital))
37. MessStaff ≡ Non-TeachingStaff ⊓ ∃worksIn.Mess (Non-TeachingStaff and (worksIn some Mess))
38. GymStaff ≡ Non-TeachingStaff ⊓ ∃worksIn.GymKhana (Non-TeachingStaff and (worksIn some GymKhana))
39. PeopleRegisteredInMess ≡ Person ⊓ ∃registeredIn.Mess (Person and (registeredIn some Mess))
40. Chief Security Officer ≡ Staff П =1headOf.SecurityTeam (Staff and (headOf exactly 1 (SecurityTeam)))
41. Threat ≡ Event П ∃breaches.Security (Event and (breaches some Securtiy))
42. SecurityTeam ⊑ ∃protects.University (Protects some University) check this

**Motivating Examples (i.e to answer some possible scenarios like listed below):**

* List of TA’s for a course
* How many students, faculty,etc. are there in the department ?
* No. of publications, research papers by the professors or students.
* All the events organized by a club
* Which Hostel a student belongs to ?

AN:(cant we define our new concept names? Like Parent-Wo-Son or Parent-Wo-Daughter)

SN:I think we can, let these comment be here Don’t delete it

Correct?

∃hasChild.Women how does this will ensure that parent has no son(male)?

Yeah it should be like if the parent have a child it has to be female or none.

Is None satisfies ? if parent is not having any child then ,

According to the definition there has to be atleast one child of parent...so none will no appear.

Okay

￢∃hasChild.Man how these is different from above, just for knowledge

First one was wrong...now i have corrected..

Is “Person ⊓”is unnecessary? I think cause man itselfdefined as Person Man ≡ Preson ⊓￢Female

⊓ =1hasChild.person

Thinking

Looks good

AN:yeah lets what others correct…

Person .>1hasChild.person ---”can anyone type in language what does this says?”

What i mean , we are referring to same parent.. Its seems incorrect syn

Can we create hasParent role?

Given inverse of haschild as hasparent

how to write inverse of the roles in description logic? Haschild−