**Graph Theory 2017**

# Design

The basis of my initial design is a prototype using the Software Development course including the 4 years using 10 lecturers as a sample along with their subjects. Then constructing the database. The initial node will be software the course under which I will map the 4 years for this course. I will then relate the nodes of subjects onto their related years under the relationship contains. The nodes for lecturers will will relate to the subject they teach. Group nodes will relate to the subject under which they fall. The room node will relate to the group/subject depending on whether it is a lab ­­for a group or lecture for year. Days of the week will be their own individual nodes and relate under time slots.

For the groups breakdown I will relate the group to its subject then relate that group to its location (room node) and separately relate that same group node to the day it is on with the relationship displaying the time.

In the database I do the complete group breakdown for each subject in year 3 but in the interest of time and not to make this database prototype unreadable I will not be doing this for every year instead I will use a few subjects across the other years to show that queries can present data for rooms being shared , days , lecturers and times through out the 4 years and that the same 5 days and rooms apply to all years and subjects. This will however not stop the overlap of lecturers , due to some lecturers sharing modules in the same year. And the possibility of two of the same module overlapping for two separate groups and having two or more lecturers linked to the subject. It will not define which lecturer is directly responsible for that subject.

For the Lectures I will use Year three as the example the way I set this up differently to the groups is that in this case lectures can take place over multiple days so I will relate the subject to a lecture node and that node will relate to the rooms used for the lectures . From there the rooms I will relate to the days of the week with the relationship labelled with the timeslot similar to the lab groups way.

# Sources

http://timetable.gmit.ie

<https://learnonline.gmit.ie>

Data used in the database is sourced from checking the elements in the developer console and taking info that I could use as data. Through learnonline I was able to source some lecturers and there subjects and on timetable things such as room no. were obtained aswell as times days etc.

I would paste theses into separate notepads , under sections such as lecturers, subjects , rooms etc then I would clean the html tags off them so that I could use them when creating the nodes and relationships.

# Examples and queries

***Deleting***

match (s:Subject {Name:'Software Testing'}) optional match (s)-[r]-() delete s,r

***Creating Lecture***

match (s:Subject {Name:'Server Side Rad'}) create (l:Lecture {Name:'Lecture'}) create(l)-[r:Lecture]->(s)

MATCH (c)

WHERE ID(c) = 142 Match (d:Day {Name:'Wednesday'}), (r:Room {Name:'997'}) CREATE(c)-[z:Location]->(r) Create(r)-[t:Time {Hours:["13:00 - 14:00"]}]->(d)

***Creating Lab***

match (s:Subject {Name:'Graph Theory'}),(r:Room {Name:'941'}),(d:Day {Name:'Monday'}) create(a:Group {Name:'A'}) create(a)-[:Lab]->(s) create(a)-[:Location]->(r) create(a)-[:Time {:Hours:["9:00 - 10:00"]}]->(d)

Query to list all subjects a lecturer teaches in the database

match (l:Lecturer)-[r:Teaches]->(s:Subject) where l.Name='Ian McLoughlin' return s.Name

