

INDIAN SCHOOL OF BUSINESS
AMPBA Batch-19
Network and Graph Analytics
Group Assignment

Honor Code Scheme: **2N-b**

Weightage: **35%**

Deadline: **14th January 2024, 11:55 PM**

NGA Group Assignment: Instructions

1. This deliverable has 35% weightage in the Consolidated Total Score.
2. Every team has been given a use case/assignment based on a particular domain. Refer to the file on LMS "[B19 NGA Allocated Use Cases Group Wise Details](#)" to know your **group and assignment/use case details**.
3. **Maximum Marks: 35 Points**
4. **Make sure the combined deliverables file's limit size is less than or equal to 180 MB. (Try to limit the video size to around 5 minutes)**

General Instructions:

1. **Submit the Assignment Submission Form along with the deliverables.** Submissions without this form will not be considered.
2. This is a group assignment with **3-5 member teams**.
3. **The file should be named "Group-nn" where nn is your group number.**
4. Please **include your team member names and PGIDs in the submission**. Type your group member's name on the first page of the Assignment. Marks will not be awarded if the name(s) are missing.
5. **Make sure that only one person from the group submits the assignment.**
6. **Do NOT submit .zip files otherwise the submission will not be considered.**
7. Any late submission will attract a penalty as mentioned in the course outline.
8. The **honor code** for this submission is **2N-b**.
9. **Please look through the honor code restrictions carefully before attempting the assignment as there will be strong consequences for breaking them.**
10. Upload your submissions to the '**NGA Group Assignment**' folder on LMS.
11. **Peer evaluation scores** will be applied to the Group Assignment scores.
12. **Email submissions are not allowed. All the submissions must be made on the LMS.**
13. **Please adhere to the given instructions, otherwise your submission will not be accepted, or a severe penalty will be applied.**

Deliverables:

The Assignment comprises four parts.

1. Part 1 – 10 Points

- a. **Format:** Word Document / PDF
- b. A 2-3 pager that details the team's understanding of the business problem on hand. The document should contain the below sections. Note: The assignment scope is deliberately left open ended so the groups can define the boundaries of the use case.
 - i. Context / Background of the Problem Statement
 - ii. In-Scope & Out-Scope of the Use case
 - iii. Assumptions
 - iv. References (If Any)

2. Part 2 – 12 Points

- a. **Format:** A Grafo model with concepts, attributes, relationships, and instances
 - i. Take a video of the screen navigating the attributes relationships and instances for each concept in the design.
 - ii. Share the link to the grafo model.

OR

- b. **Format:** A Neo4j database created with the complete model (entities, attributes, relationships, and data populated (at least 20 data points for each entity). Take a video of the screen navigating the model and data on neo4j browser and bloom. Run multiple queries (at least 3) and zoom into the graph model to show the results.

3. Part 3 – 8 points

- a. **Format:** Word Document / PDF
- b. A 1-2 pager detailing the thinking behind the design approach used in the assignment. The document can be a free flow with no prescribed structure. The students can provide as many details as deemed required. They can draw the design or architecture model if required.

4. Part 4 – 5 Points

- a. Knowledge Graph Construction using GraphGPT open source from Text (300-500 from Wikipedia of your choice)
- b. Show the output screengrab and the interim list of entities and relationships.
- c. Reference: <https://medium.com/everythingisconnected/building-knowledge-graph-using-graphgpt-40b00d8873bc>

Assignment Questions/Use Cases

Domain: Human Resources

Assignment 1

Help Employees Upgrade their Skills.

Design a graph model for a Human Resource department to facilitate building an application that considers the current skill of an employee and helps find what is the next best skill he/she should target to acquire and the courses or trainings they need to take.

Ex: A TensorFlow & Python to be recommended skill for an employee with skill in Python and from the Data Science Business Unit.

Design Ontology with Skill, Employee, Courses/ Training, Skill Group, Business Unit and related.

Assignment 2

Help Employees find the next best job / role.

Design a graph model for a Human Resource department to facilitate building an application that considers the current skill and role of an employee and helps find what is the Job opening they can target to apply for. Consider the current skill set, experience and current role of the employee and list all the openings within their organization that they can target to apply for. You can sort the results based on the most relevant ones to show up first.

Ex: An employee who is a certified cloud architect should see a list of Job postings from the Cloud Transformation Department looks for architects.

Design Ontology with Job, Role, Skill, Certification, Employee, Department, Level, Experience and related.

Assignment 3

Build a Profile Panel for an employee.

Design a graph model for a Human Resource department to facilitate building an application for all employees that links all the information about the employee in one panel. The information about the employee can be sourced from both internal and external sources like workday or equivalent, LinkedIn, slack, medium, GitHub, Twitter etc. This Panel can perceivably be a resume for the employee.

The Graph model should comprise of details like employee name, id, department, role, title, level and related, skills, certifications, experience, projects, clients he/she worked for, awards/ rewards, social media activities that includes speaker presentations, open-source contributions, publications, conferences attended, education etc.

Design Ontology that links all the above and helps navigate with logically valid data for at least 20 employees.

Domain: eCommerce / Retail / Online App

Assignment 4

Profile a visitor to the Online store and facilitate Product recommendations.

Design a graph model for an eCommerce Cosmetic Store (Online) to facilitate recommending potential product that he/she can buy. Model the Cosmetic store and design the Ontology for Product, Product classification, Price, ratings, feedback, inventory/stock, potential buyers, buyer profiles, historic purchases, and recommendations. Allow capturing the buyer requirements to recommend top products.

Design Ontology that links all the above and helps navigate with logically valid data for at least 20 products and 20 buyer profiles.

Assignment 5

Food Recommendations (based on Food Ontology)

Imagine a fictitious restaurant and design a graph model for a restaurant to facilitate building an application that maps food items on the menu with the recipes and ingredients. This model should lead into classifying the dish category at multiple levels, use this information to recommend food for the customers visiting the restaurant. Consider Customer profiles and the ratings for the dish as a part of the recommendations.

Design Ontology that links all the above and helps navigate with logically valid data for at least 20 food products, recipes, ingredients and 20 customer profiles.

Assignment 6

Booking Rides for Customers

Imagine a fictitious Mobile app “Book Your drive” and design a graph model that maps drivers to customers and helps with rides with multiple factors in consideration. Time of the day, distance, locations, types of vehicles, cost for the ride, no. of passengers, driver rating, customer rating etc. This model should help recommending the best vehicle for the best price.

Design Ontology that links all the above and helps navigate with logically valid data for at least 20 locations, drivers, vehicles, and 20 customer profiles.

Domain: Digital Twins

Assignment 7

Building Automation & Predictive Maintenance

Imagine a fictitious Residential Building or Commercial Complex and model the building onto a Knowledge Graph with a dictionary of common terms and concepts along with pre-defined relationships that all use the same standards as RDF graph databases.

Build an Ontology with Site, Building, Storey, rooms/apartments, zones, elevator, reception, electricals like air conditioners etc. and related. The scope is as restricted as the teams thinking and the teams can feel free to define the boundaries.

Assignment 8

Automotives & Twins

Imagine a fictitious Car as shown below and create a knowledge graph-based twin of the car- a virtual prototypes. Create a grafo model (**no** Neo4j) of the car its different properties and relationship. The digital twin of product comprises the entire car, its software, mechanics, electrics, and physical behavior. The scope is as restricted as the teams thinking and the teams can feel free to define the boundaries.



Domain: Heath care & Pharmaceuticals

Assignment 9

Patients & Doctors Networks

Create a Knowledge Graph model that links Patient data, diseases, symptoms, records, medications, doctors, and diets with an intention to build an application that helps recommending best doctors for consolation and potential diet plan recommendation. The scope is as restricted as the teams thinking and the teams can feel free to define the boundaries.

Design Ontology that links all the above and helps navigate with logically valid data for at least 20 patients, 10 diseases, 10 doctors and diet plan options.