NEW YORK COLLEGE
EUROPEAN & AMERICAN EDUCATION

University of Bolton
Teaching Intensive, Research Informed

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SWE5002

DATA STRUCTURE AND ALGORITHMS

Assessment 002 (50%)
Due date: 17/05/24

Subject: Produce a software artifact that implements the required data structures for a given scenario.

Learning Outcomes Assessed:
LO2: Appraise and implement a software design that incorporates data structures.

For this assessment you will work individually.
You will need to hand in (upload on the e-learning platform and on Turnitin) a report, develop the proposed solution and demonstrate your work in class.
Important Note: Please be aware that any suspicion of copying or plagiarism will be fully investigated and punished. No extension will be given. If you face difficulties that are beyond your control, it is your responsibility to contact the course coordinator promptly.

Description:

A social network, X2, provides the ability for members to follow other members. Following does not require a follow back. A member may put several likes and several comments to any of the members they follow. The social networks calculate engagement rate using this formula:

```
(total likes + total comments) / followers * 100.
```

The influence of a member A to a member B is calculated by:

```
(likes A to B + comments A to B) / total engagement rate of A
```

a. Select and design the appropriate data structure to represent the social network and its connections.

b. Implement the data structure for the social network.

c. Calculate the engagement rate of each member.

d. For any given pair of members, find and display the shortest path (number of steps) between them

e. For any given pair of members, find the path with the highest engagement between them.

Note 1: There is not always a path from a member A to a member B.

Note 2: The formulas used are simplified. A real social network will use more complex calculations.

Deliverables:

1. Report (1500 to 2000 words)
2. Python Code:
    - Provide a **GitHub link** to your project or a **zip file** with your implementation.
    - Include a **README.md** file explaining how to use the program.
    - Include a **requirements.txt** file with any additional libraries to be installed.

The Report should include:

- Student's information, Your full name, program title and student ID, word count.
- Table of contents.
- Introduction - Presentation of the case study / problem addressed.
- Identification of needed data structures for the scenario and rationale.
- Identification of the algorithms selected to solve the shorted path problems.
- Presentation of the solution.
- Identification of the order of growth of the selected algorithms.
- Critical evaluation of the solution.
- References.

Bear in mind that in the report you must discuss your selection of data structures within a short report outlining alternative approaches and providing justification for the path taken

References and citation

Written work should be referenced using the standard University of Bolton referencing style– see:
https://www.bolton.ac.uk/library/Study-Skills/Referencing/Home.aspx

Level HE5 - It is expected that the Reference List will contain between **ten and fifteen sources**. As a MINIMUM the Reference List should include **two refereed academic journals and four academic books**

Assessment Criteria for the Implementation

Code works (no errors): 30%
Implementation of the requirements: 50%
Code is well structured and proper comments are used: 15%
README.md file and requirements.txt file (if necessary) provided: 5%

Assessment Criteria for the Report

Relevance 15%
Knowledge 20%
Argument/Analysis 20%
Structure 10 %
Presentation 15%
Written English 10%
Research/Referencing 10%

Successful submission:

You have to submit the report/essay both on Turnitin and on the NYC e-learning platform.
(1) Students submit their report/essay on Turnitin
(2) Software artefacts (code) are only submitted on the NYC e-learning platform.

***Note:** For the "Guidelines for the Preparation and Submission of Written Assessments", additional information concerning Assessments and Assessment criteria please refer to the module handbook.