Indian Institute of Technology, Kharagpur
Department of Computer Science and Engineering
Software Engineering (CS 20202), Spring 2024

Assignment 1 – Modular C Programming

Grading guidelines:

1. *Zero marks for a submission if it does not pass the plagiarism test.*
2. *Break-up of Credits will be as follows:*
    (a) *Percentage of features implemented: 70 marks*
    (b) *Documentation of the program features: 20 marks*
    (c) *Aesthetics: 10 marks*

Total marks: 100

In a social network, there are a set of nodes. Each *node* can be of type: individual, group, business, or organisation. All nodes have a unique id (int), a set of links to other nodes, a name (String), a creation date, and a set of uploaded or posted content. A *content* can be implemented as a string object, which can be reposted multiple times without duplication. *Individuals* can optionally have birthdays in addition to all the node attributes. *Businesses* and *organisations* have location (2D coordinates) in addition to all node attributes. *Groups* and *organisations* can have linked *individuals* as members. *Businesses* can have *individuals* as owners or customers. *Businesses* can also be members of *groups*. No other forms of links are allowed, e.g. a business cannot be owner of another business, or a group cannot be a member of an organisation.

You have to implement the following functionalities:

1. Create and delete nodes of each type. [**10 marks**]
2. Search for nodes using the name or type or birthday. [**10 marks**]
3. Print all 1-hop linked nodes to a given input node. [**10 marks**]
4. Create and post content by a node. [**10 marks**]
5. Search for content posted by any node. [**10 marks**]
6. Display all content posted by individuals linked to a given individual. Here an individual is linked to another individual if they have a common group or organization. [**10 marks]**
7. A master text-based interface to print all nodes in the system and utilize all the above functionalities. [**10 marks**]

Submit a design and implementation of the above program in C. You are allowed to use structures, but not classes.
All structure defintions should be first in a header file named `social.h` followed by prototypes of related functions. The function definitions and global variables if any should be defined in a c file called `social.c`. A comment in the beginning of the header file should clearly explain the role of each structure and function in program. **20 marks** should be given based on this comment.
10 marks will be given based on readability (indentation etc.) of the code and appropriate naming of variables / structures.

Submit the header file and the c-file.