Programming Assignment **#1**
Discrete Structures (CSC160)

“Learning programming and research skills is like exploring a fuzzy set of possibilities, where every challenge you conquer expands your knowledge and understanding.”

Before proceeding with the given scenario enhance your understanding about classical sets, fuzzy sets and ceiling and floor functions..

1. Scenario:
   Imagine you are developing a course registration system for computer science undergraduate students. The system needs to handle set operations such as union, intersection, difference, and Cartesian product to help students efficiently manage their course selections. Write a programs that demonstrate these set operations within the context of a course registration system for computer science undergraduate students?

   Suppose we have following two sets:

   ```
   # Set 1: Current course selection for a student
   current_courses = {'CSC160', 'CSC161', 'CSC162', 'MTH163'}

   # Set 2: Desired course selection for the upcoming semester
   desired_courses = {'CSc202', 'CSC161', 'CSc505', 'CSC162'}
   ```

2. Scenario:
   Let's say you are working on a program that calculates the average execution time of a series of algorithms. The execution times are stored as floating-point values. To analyze the data, you need to round the average execution time up and down to the nearest whole number. Implement the notions explained in the scenario using appropriate concepts covered during lab and lecture sessions.

3. Scenario:
   Imagine you have a system that classifies movies based on their genre and popularity. Each movie can have multiple genres assigned to it, and the popularity of each genre is represented by a fuzzy set. Write programs to implement fuzzy set operations for this movie classification system given the two set namely, Set1 and Set2 using any high level language.

   You may consider following fuzzy set:
   Set1:

   ```
   movie_genres = {
      'Action': 0.8,
      'Comedy': 0.6,
      'Drama': 0.9,
      'Thriller': 0.4,
      'Sci-Fi': 0.7
   }
   ```

   For better understanding let us assume in this fuzzy set, the movie "Mission Impossible 10" is predominantly categorized under genres like 'Action' , 'Thriller', 'Adventure' and so on. It also has a lower association with the genre 'Drama'.

Set2:

```
movie_popularity = {
        'Blockbuster': 0.9,
        'Moderate': 0.6,
        'Cult': 0.3,
        'Underrated': 0.5
}
```

The fuzzy set for movie popularity captures the popularity level of "Mission Impossible 10" using linguistic terms such as Blockbuster, Moderate and so on.

Submission:

Deadline: **10/03/2080**

Students must submit the lab/assignment within the deadline one soft copy via course page and hard copy if needed during External VIVA examination.

Please find the lab report formate in the course page.