National University of Computer & Emerging Sciences, Karachi
Spring 2025 (School of Computing)
Assignment # 1

Course Code:	Course Name: Recommender Systems
Course Instructor: Syed Zain Ul Hassan	
Open Date: April 28th, 2025	**Deadline:** May 3rd, 2025 (9:55 PM)

Instructions:

- The assignment consists of two (2) parts.
- You can find the max points for each task and rubrics for assessment in the supplementary file.
- The submission instructions are also provided in the supplementary file.
- You will be given zero points in case any corrupt files or empty folders are submitted. You are expected to be careful while submitting your assignment.
- You will be given -1 weightage if your work is found to be copied. This will be unarguable.

Part 1

Consider the following ratings given to items by the users and perform the given tasks:

	Item 1	Item 2	Item 3	Item 4
User 1	3	3	?	3
User 2	1	2	1	2
User 3	?	?	3	?
User 4	3	3	4	?
User 5	5	5	5	5

a) Find nearest neighbors of *User 1, User 2* and *User 4* for *k=1* using Pearson Correlation Coefficient.
b) Apply item-based Collaborative Filtering to predict R(U1, I3), R(U3, I1) and R(U4, I4) using mean-centered prediction function.
c) Using only your human judgement, state which one of these users may be the least reliable in terms of their provided ratings. Give a reason for your selection.
d) Find nearest neighbors of *User 2, User 3, and User 5* for *k=1.* Use Spearman's Rank Correlation.

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Part 2

Find and download the file *"ml-latest-small.zip"* containing the movie ratings dataset in the course folder on Google Drive. Use this data and write a Python (or Java) program to implement an item-based Collaborative Filtering Recommender System. It should take a movie name as input and recommends top-5 movies to the current user. Use Adjusted Cosine Similarity for finding neighborhoods and mean-centered prediction function *(refer to Lecture 2 slides for context)*.

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