**Assignment 5: Social Network Friend Count with MapReduce**

**Topic:** Algorithms in MapReduce (Lecture 10)  
**Time:** 30-40 minutes  
**Objective:** Count unique friends in a social network dataset using a MapReduce simulation.

**Problem Statement:**  
You are given a list of friendship pairs (symmetric edges, e.g., Jim-Sue and Sue-Jim). Simulate a MapReduce process to count the number of unique friends for each person and visualize the results.

**Dataset:**  
A list of tuples in the notebook:

friends = [("Jim", "Sue"), ("Sue", "Jim"), ("Lin", "Joe"), ("Joe", "Lin"),

("Jim", "Kai"), ("Kai", "Jim"), ("Jim", "Lin"), ("Lin", "Jim")]

**Requirements:**

* Implement map\_function to emit (person, 1) for each friend.
* Implement reduce\_function to count unique friends per person.
* Output a dictionary of friend counts.
* Plot a bar chart of friend counts with matplotlib.

**Solution Outline:**

1. map\_function: For each pair (A, B), emit (A, B) and (B, A) to handle symmetry, but count each friend only once per person.
2. Group by person (simulate shuffle).
3. reduce\_function: Count unique friends for each person.
4. Visualize results.

**Sample Code Starter:**

import matplotlib.pyplot as plt

friends = [("Jim", "Sue"), ("Sue", "Jim"), ("Lin", "Joe"), ("Joe", "Lin"),

("Jim", "Kai"), ("Kai", "Jim"), ("Jim", "Lin"), ("Lin", "Jim")]

def map\_function(pair):

*# Students implement*

pass

def reduce\_function(key, values):

*# Students implement*

pass

*# Students complete the rest*