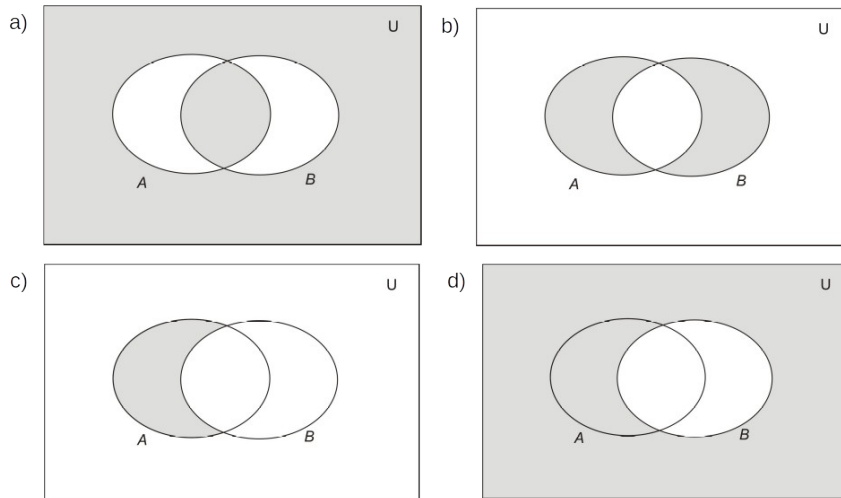# CS 104 - Homework 05

ÖZYEĞİN ÜNİVERSİTESİ

The deadline for this homework is Tuesday, 23rd of November, 23:59:00. Please name your solution files as solution1.py, solution2.py, solution3.py, solution4.py. Once you're finished with the homework, upload the files to LMS in order to complete the assignment. The assignment can and must be solved with the content we have covered during the first eight weeks.

1. (25 pts) Please implement four methods (one method for each case a, b, c, d) that take a value and returns whether that value is in the gray zone or not (True or False). Verify your implementation by using the following sets:

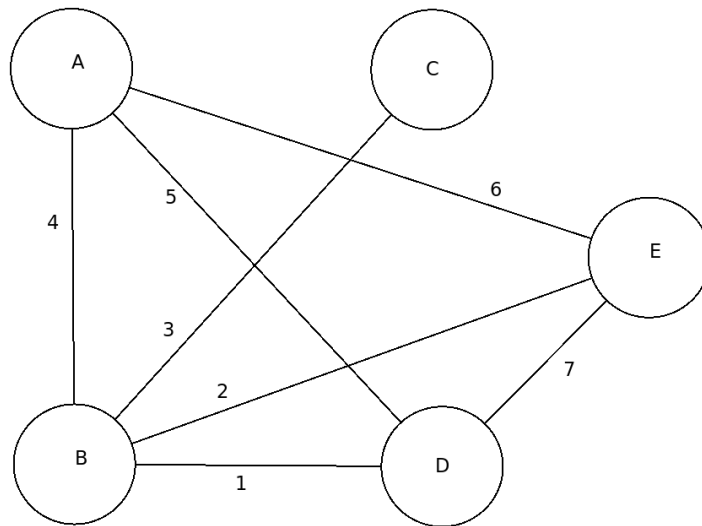   A = { 2, 3, 4, 5, 6, 7, 8}
   B = { 7, 8, 9, 10 }

2. (25 pts) Implement a method that takes a matrix and a vector, calculates their product using list comprehension and returns the resulting list. We expect your method to be a single line method that uses list comprehension. The formula for matrix-vector is as follows:

Matrix-Vector Multiplication

$$x_i = \sum_{j1}^{n} m_{ij} v_j$$

$$\begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix}_n = \begin{bmatrix} m_{11} & \cdots & m_{1n} \\ \vdots & \ddots & \vdots \\ m_{n1} & \cdots & m_{nn} \end{bmatrix}_{n \times n} \begin{bmatrix} v_1 \\ \vdots \\ v_n \end{bmatrix}_n$$

3. (25 pts) Please see the graph below. The graph consist of vertices (V = {A, B, C, D, E}) and edges that connect them to each other (E = {1, 2, 3, 4, 5, 6, 7}). Please use an appropriate container (list, tuple, set, dictionary) to model this graph. Implement two methods that uses this container. First method shall return the number of edges connected to a vertex. For example *give_edges("A")* shall return *(4, 5, 6)* as a tuple. Similarly *give_vertices(2)* shall return *("B", "E")* as a tuple.

4. (25 pts) We have the following dictionary given for English to French translation.

English	French
bread	pain
wine	vin
bring	apporter
I	Je
eat	mange
drink	bois
John-Michael	Jean-Michel
friends	amis
and	et
of	du
red	rouge
from	de
town	ville
we	nous
Mary	Marie
for	pour
years	ans

Please translate the following phrase using this dictionary. Please keep in mind that you're expected to keep the layout and and punctuation marks as they are, and just translate the words.

John-Michael and, friends from town drink wine.

I eat bread!

For 5 years, we bring red wine from town, from Mary.