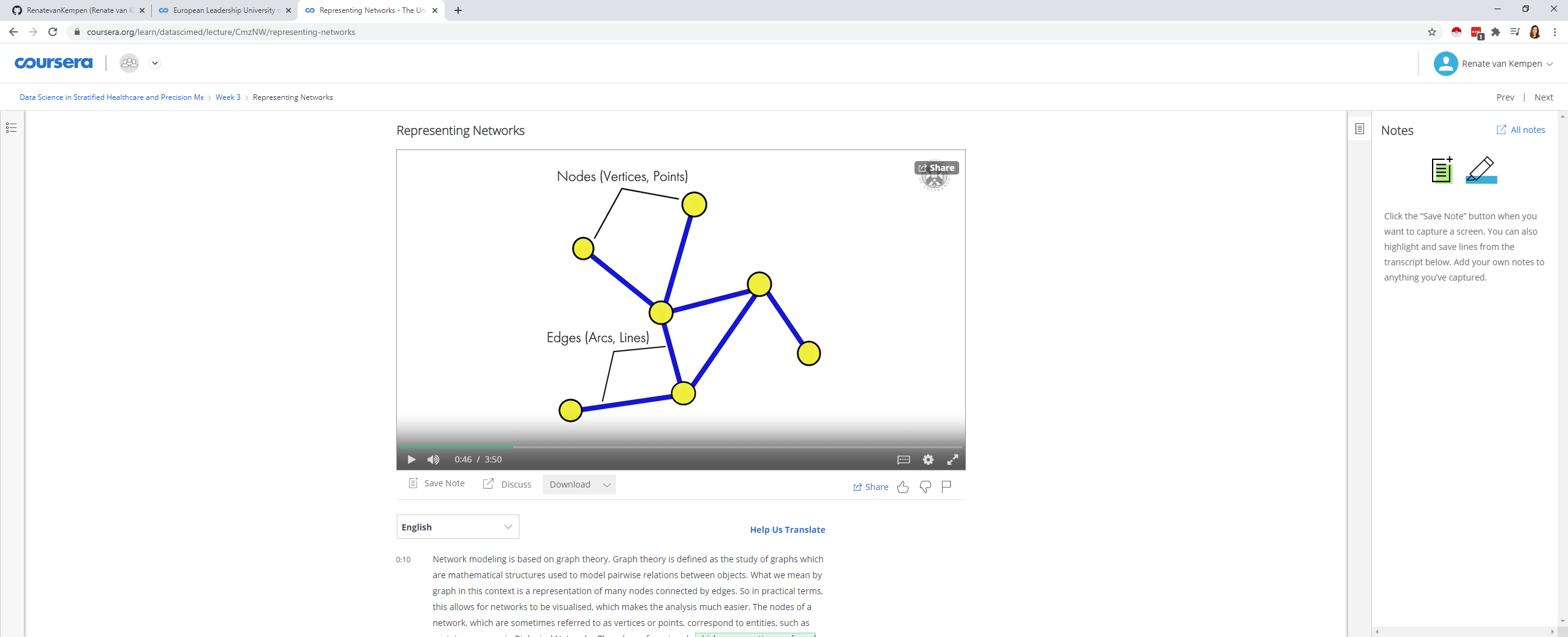
Network analysis



The nodes of a network,

which are sometimes referred to as vertices or points,

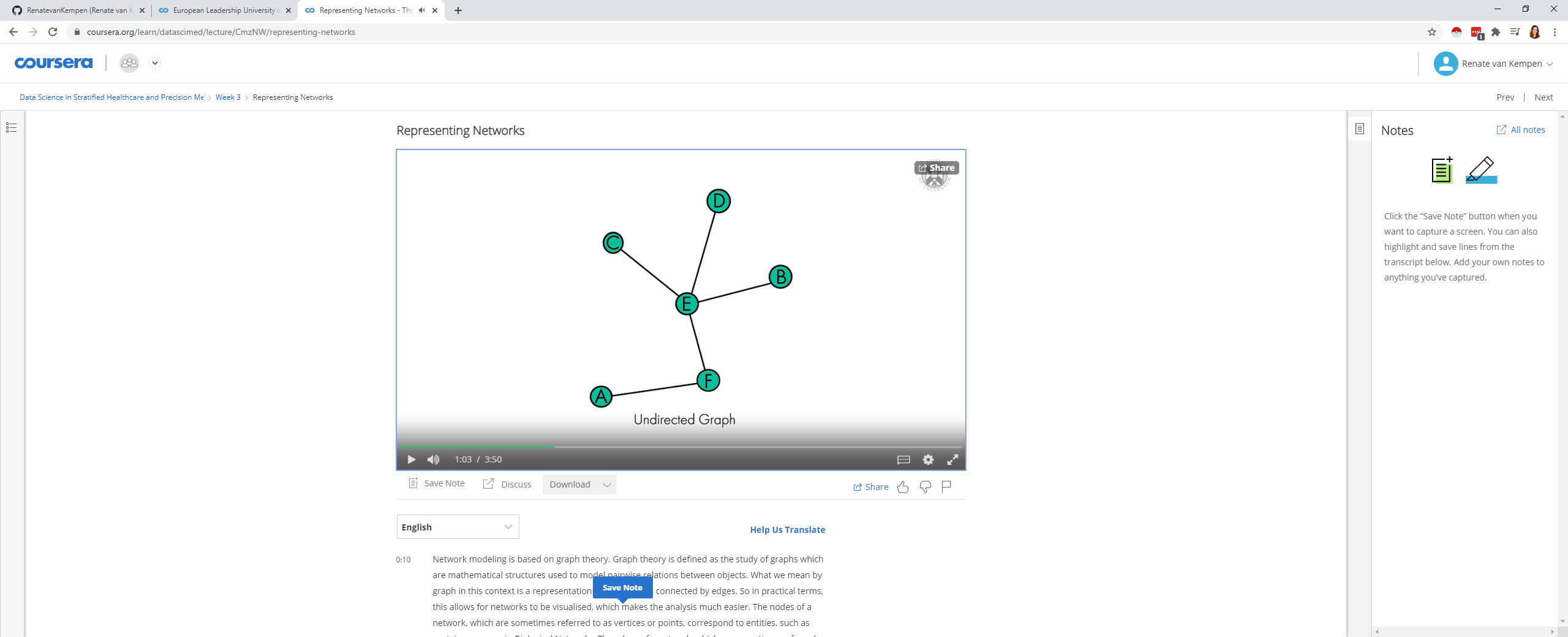
correspond to entities, such as proteins or genes in Biological Networks.

The edges of a network,

which are sometimes referred to as arcs or lines,

reveal information about the connections between the nodes.

# Undirected Graph



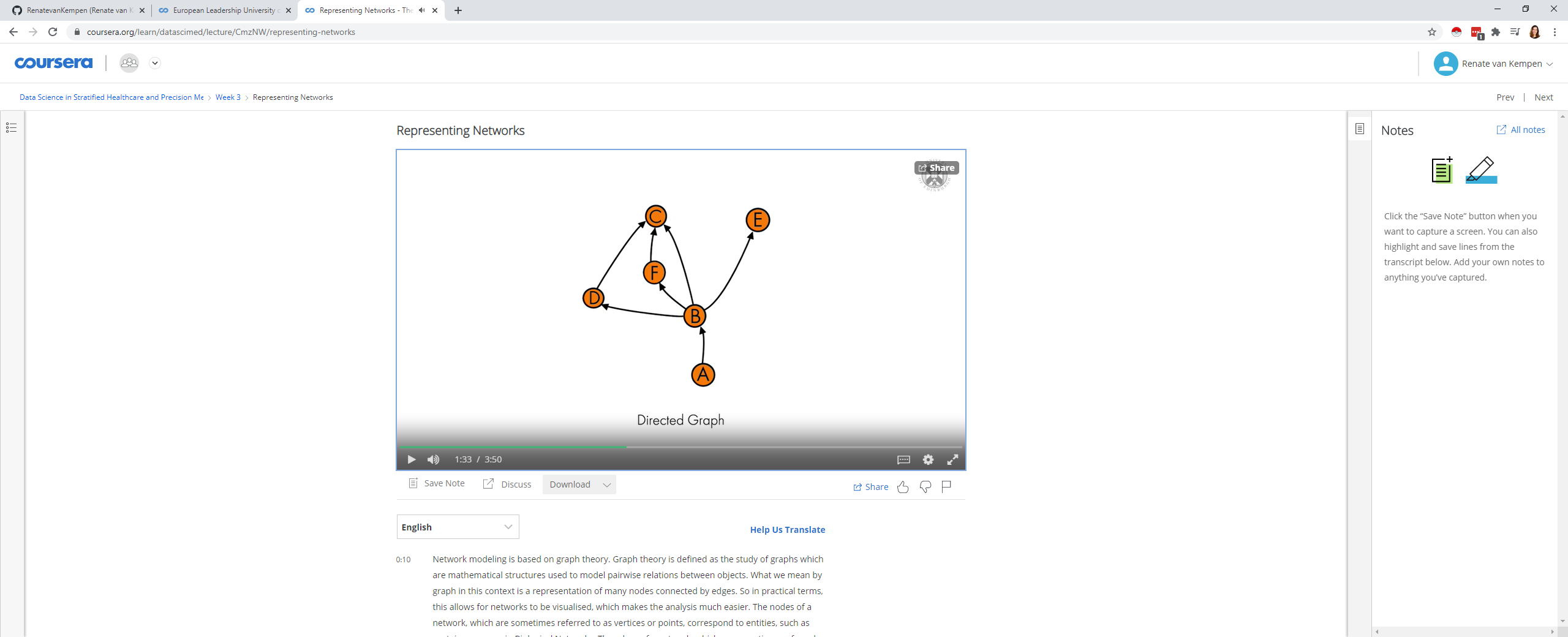
An undirected graph is a graph in which edges have no orientation or direction.

The relationship between the nodes is simple connection

The edges indicate a two-way relationship, in that each edge can be bi-directional.

Undirected graphs are commonly found in protein to protein interaction networks.

# Directed Graph



A directed graph is a graph in which edges have

orientation or a direction associated with them.

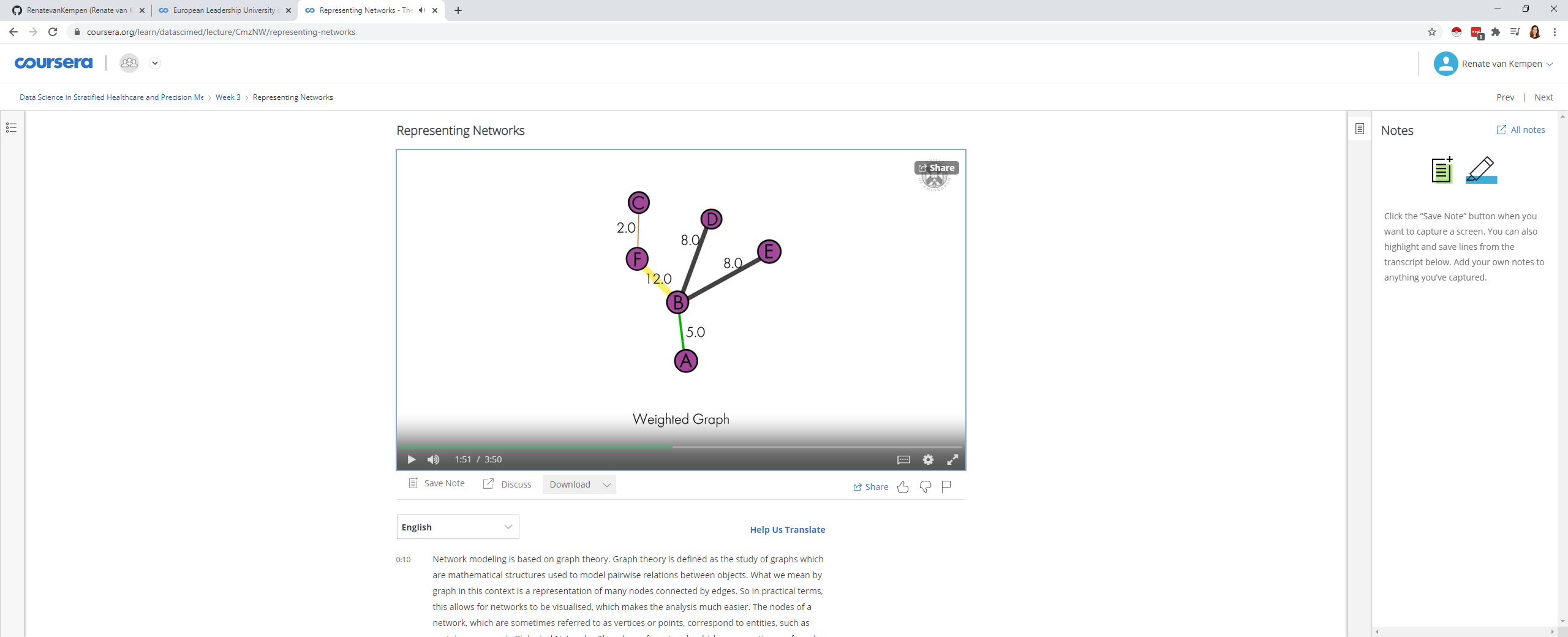
The edges indicate a one-way relationship

in that each edge can only go in a single direction

Directed graphs are mainly found in metabolic,

signal transduction or regulatory networks.

# Weighted GRaph



Weighted graphs are graphs in which each edge is

given a numerical weight or quantity value.

Such weights might represent, for instance,

sequence or structural similarities between proteins or co-expression of genes.

Weighted graphs can have either directed edges,

one-way relationship or undirected edges, two-way relationship.

# Adjacency Matrix

An Adjacency matrix is a data structure used to store network graph representations.

The values of the Matrix indicate whether

pairs of nodes are adjacent or not in the graph.

## Undirected graph - matrix

its adjacency matrix is simply represented

by a symmetric matrix containing only the values one and zero.

These values simply indicate the presence or absence of connections respectively.

## directed and weighted graph – matrix

These can use different numerical values in the matrix to illustrate this.

These values are sometimes used to indicate stimulation or inhibition within a network.

The way in which nodes and edges are arranged within a network is down to its topology.

Topological properties can help to identify relevant sub-structures within a network.