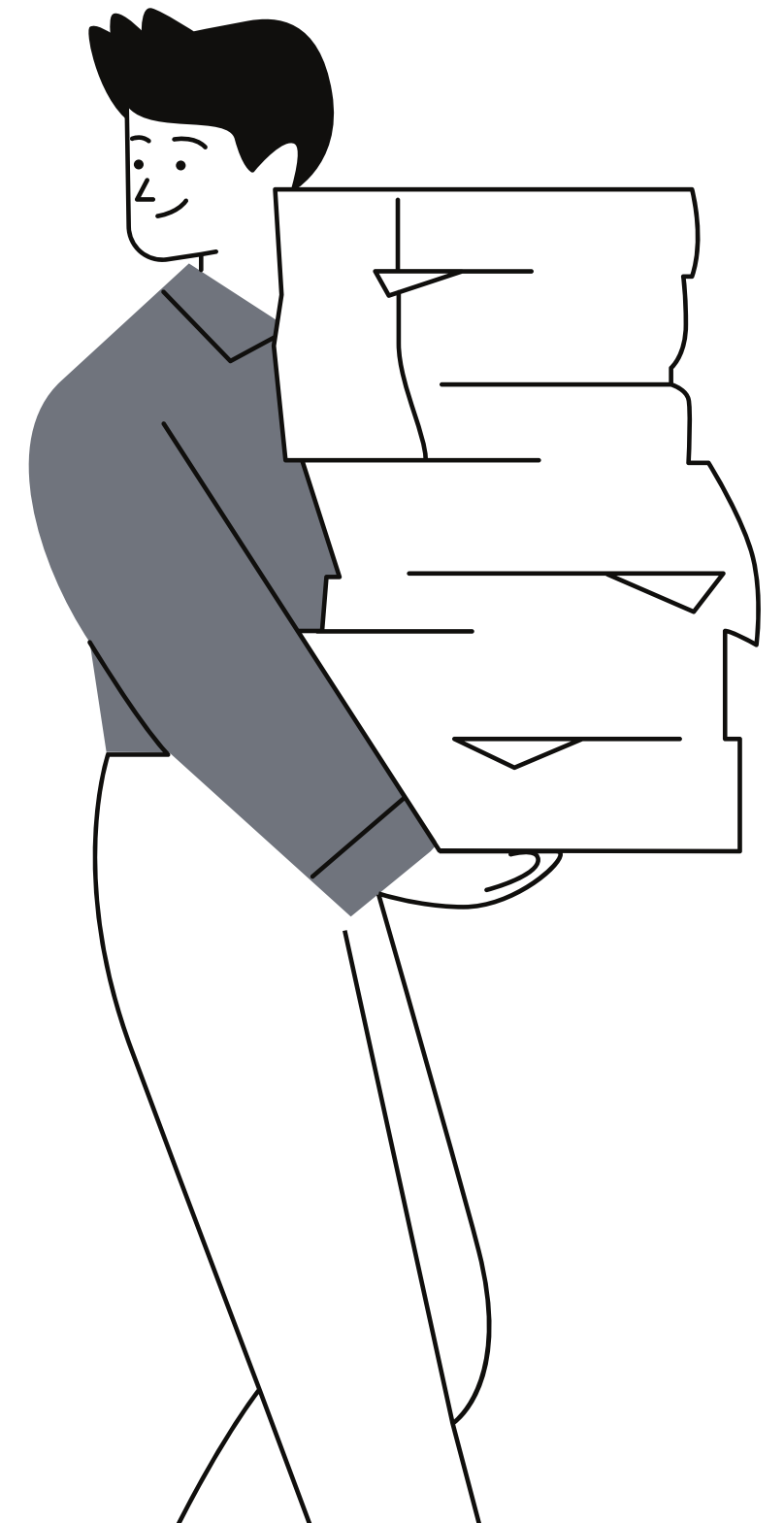
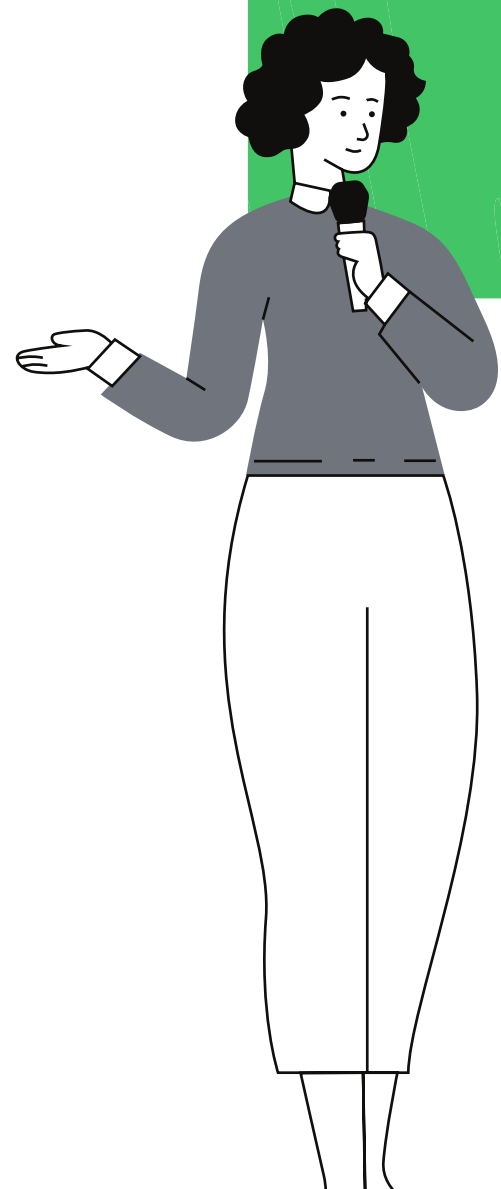


Directed Graphs

"DANAD"
full explanation of the
code and of the topic



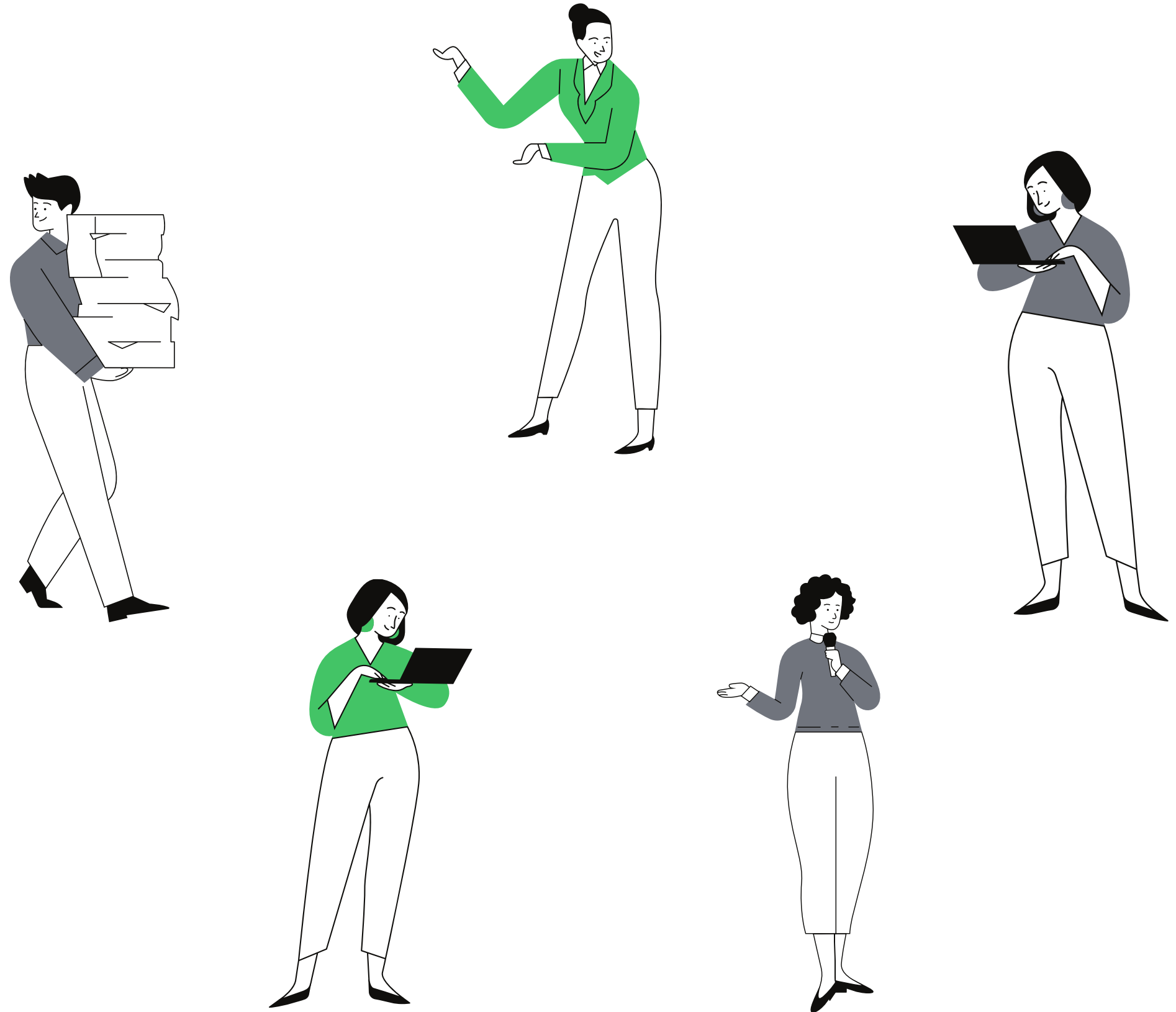
Today's Agenda



- 1 Our team
- 2 Introduction to the diagraph
- 3 Types of directed graphs
- 4 The applications for directed graphs
- 5 Coding part

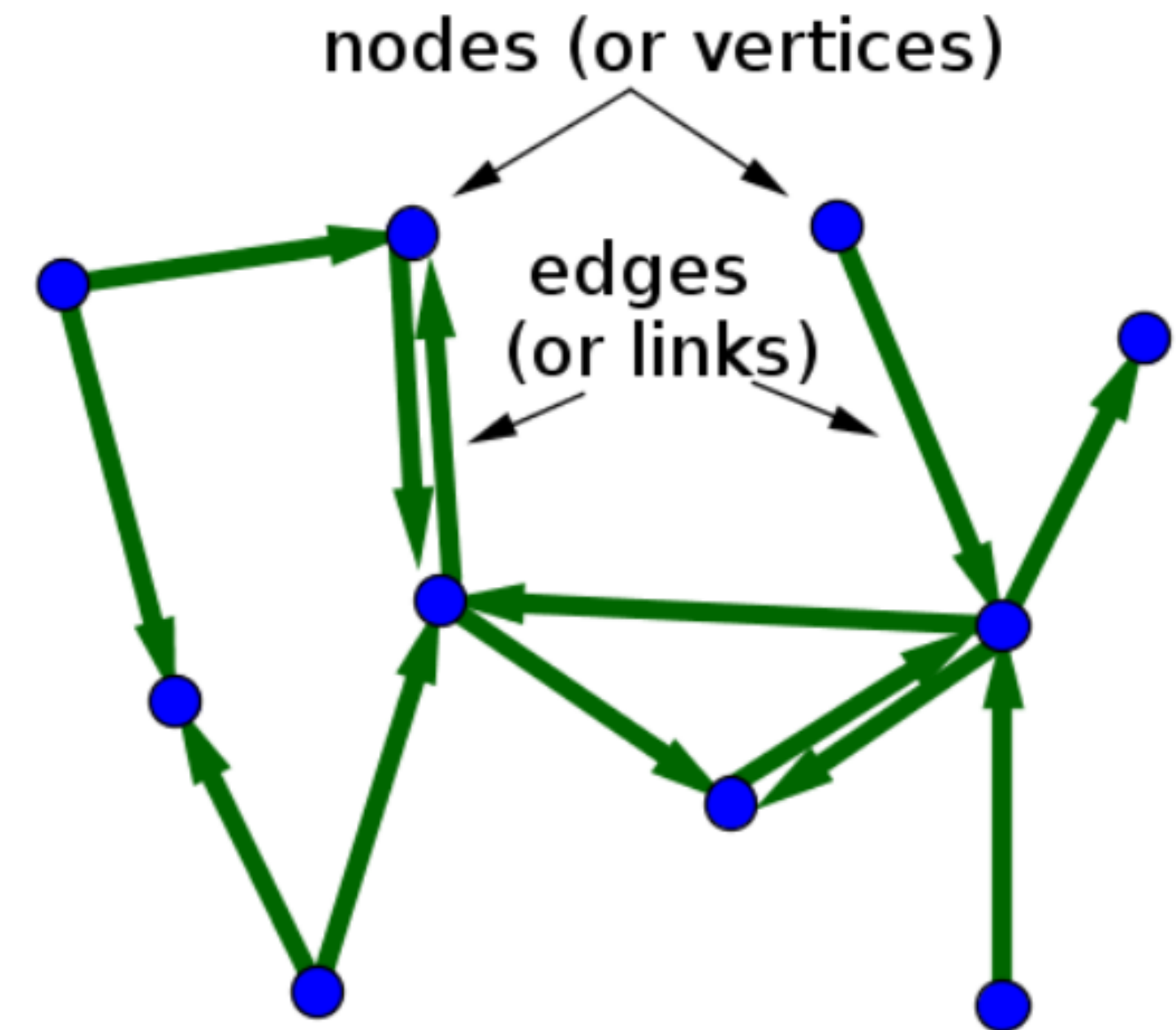
DANAD

- Ospankhan Arailym
- Daudekenkyzy Darish
- Nurgul Mazhit
- Dilnaz Anarkul
- Alisher Mukanov



Digraphs

A directed graph is graph, i.e., a set of objects (called vertices or nodes) that are connected together, where all the edges are directed from one vertex to another. A directed graph is sometimes called a digraph or a directed network.



Directed graphs that do not have bidirectional edges (i.e., at most one of (x, y) and (y, x) can be arrows of the graph). It follows that a directed graph is directed if and only if it does not have two cycles.

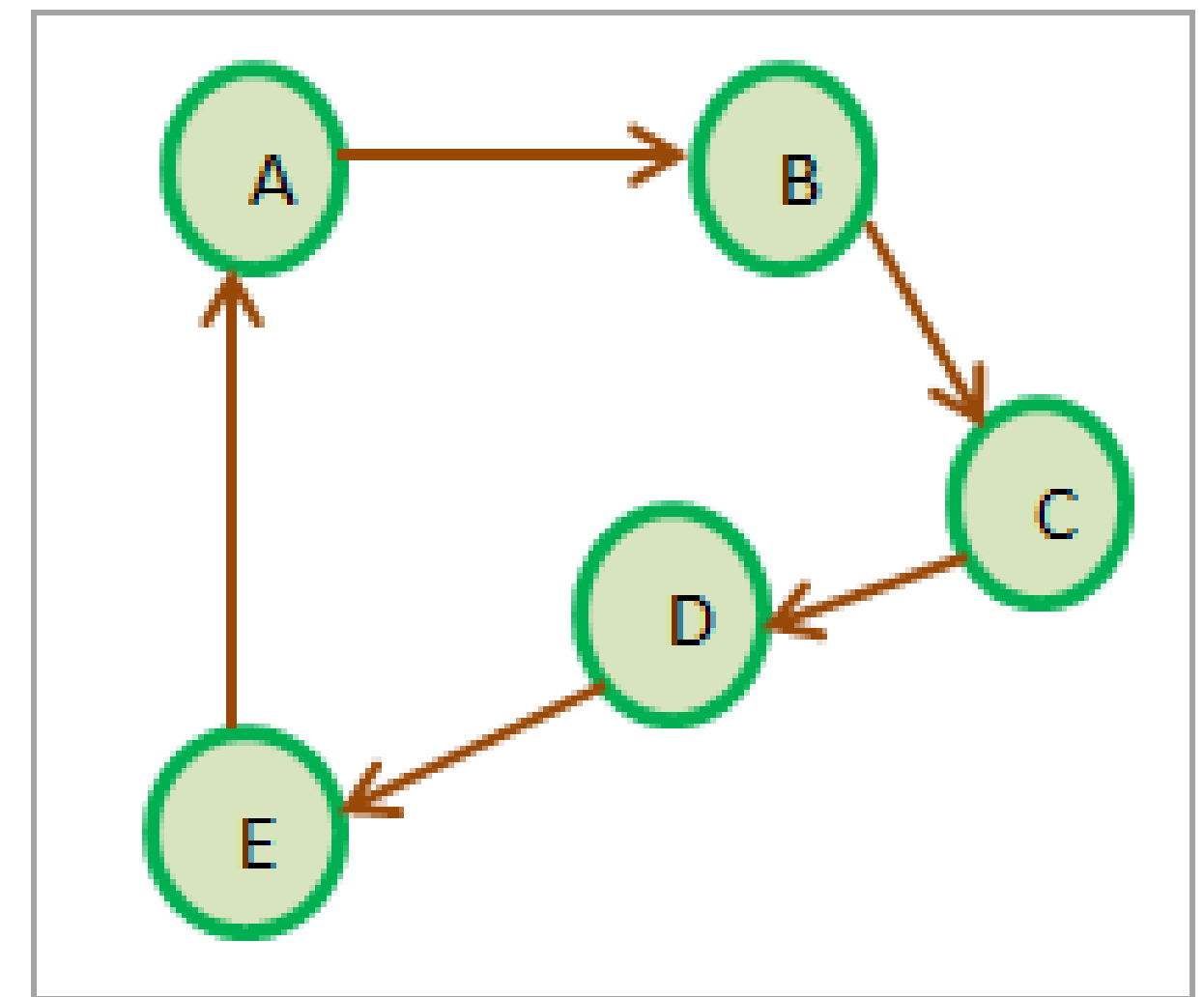
So directed graph or digraph is a graph data structure in which the edges have a specific direction. They originate from one vertex and culminate into another vertex.



In the above diagram, there is an edge from vertex A to vertex B. But note that A to B is not the same as B to A like in undirected graph unless there is an edge specified from B to A.

A directed graph is cyclic if there is at least one path that has its first and last vertex as same. In the above diagram, a path $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow A$ forms a directed cycle or cyclic graph.

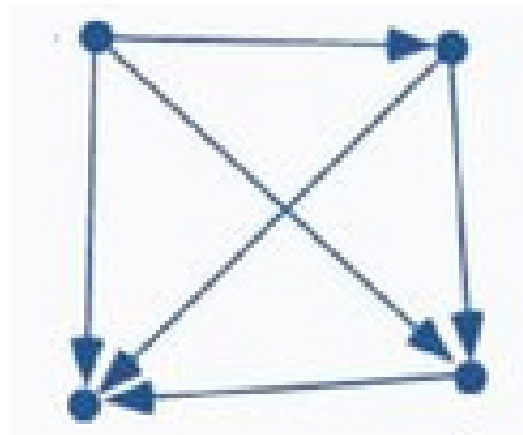
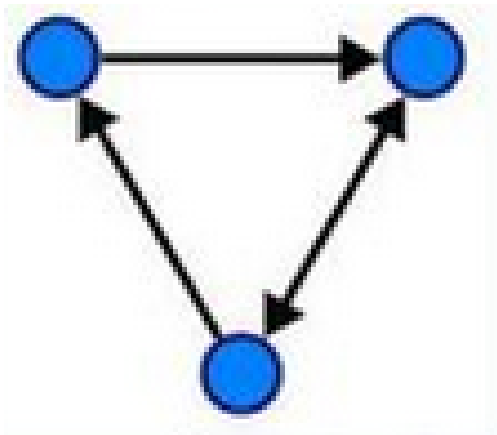
Conversely, a directed acyclic graph is a graph in which there is no directed cycle i.e. there is no path that forms a cycle.



Types of diagraphs

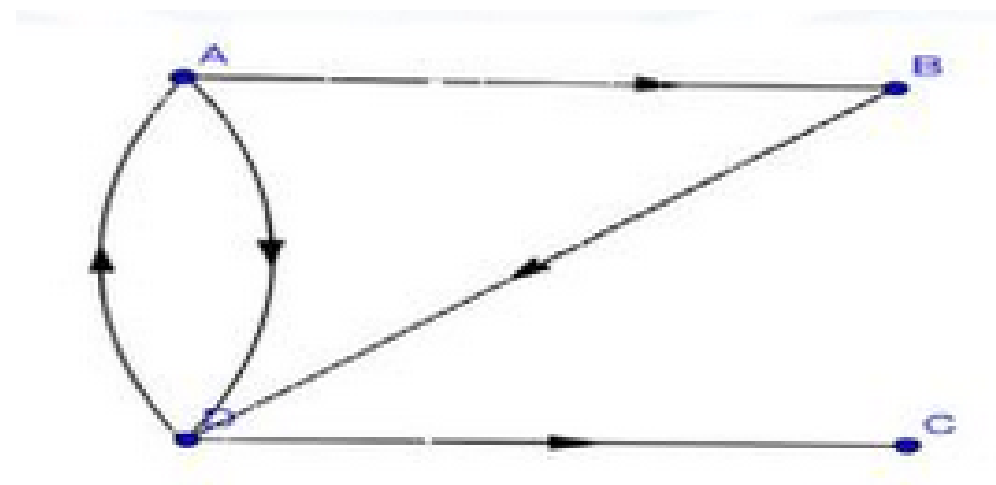
5

Simple directed graph a directed graph that has no loops and has no multiple directed edges.

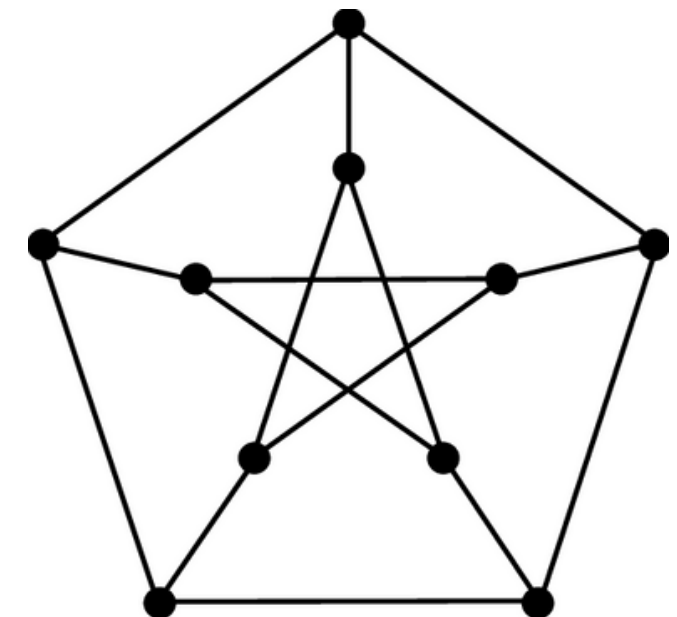


Directed multigraphs:

directed graphs that may have multiple directed edges. Edge of multiplicity m When there are m directed edges, each associated to an ordered pair of vertices (u,v) .



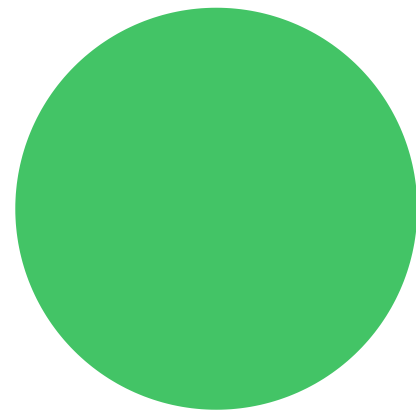
Symmetric directed graphs are directed graphs where all edges are bidirected (that is, for every arrow that belongs to the digraph, the corresponding inversed arrow also belongs to it)



The applications for directed graphs

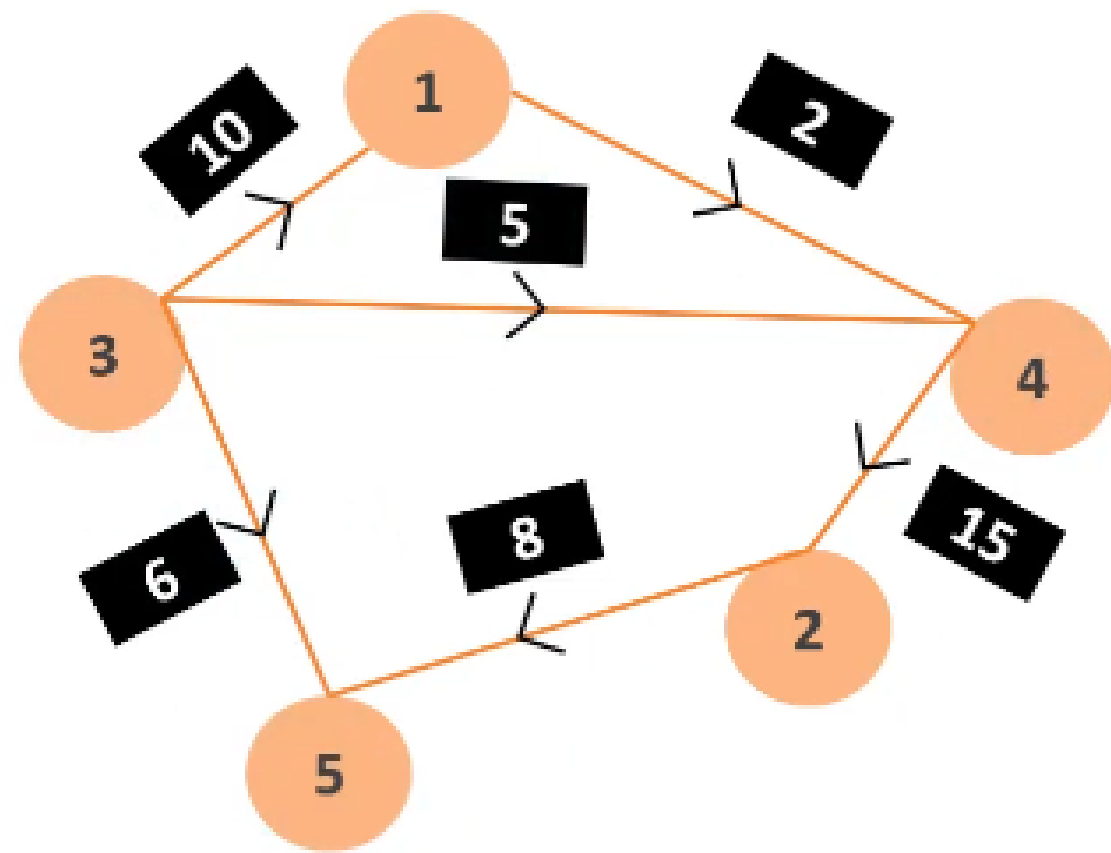
The applications for directed graphs are many and varied. They can be used to analyze electrical circuits, develop project schedules, find shortest routes, analyze social relationships, and construct models for the analysis and solution of many other problems.

Graphs



Also -- just as a graph can have paths and cycles -- a digraph has directed paths and directed cycles, except that in both of these, all of the adjacent edges must "flow" in the same direction.

Still other graphs might require both edges with both weights and direction. Not surprisingly, such graphs are called edge-weighted digraphs. Appealing to economics this time for an example, note that a graph could be used to describe the flow of money between a group of individuals in a given time period. Using vertices to represent the individuals involved, two vertices could be connected if any money flowed from one to the other. The net amount of money that changed hands provides a weight for the edges of such a graph, and the direction of the connection could point towards the vertex that saw a net gain from the associated transactions.



Weighted Directed Graph

	1	2	3	4	5
1	0	0	0	2	0
2	0	0	0	0	8
3	10	0	0	5	6
4	0	15	0	0	0
5	0	0	0	0	0

Adjacency Matrix

- In a directed graph edge points in a direction
- If each edge is having some value then it is called weighted graph
- Weighted directed graph can be represented using adjacency matrix
- 0 value represents that there is no edge in between the vertex
- Value greater than 0 represents that there is edge in between the vertex

We're done!

A green speech bubble with a tail pointing downwards and to the left, containing white text.

Thank you for
participating. Have a
great day ahead.