Session 05:Graphs

5A.1 What is a Graph?

5A.2 Paths Cycles and Connectivity

5A.3 Isomorphisms of a graph

5A.4 Adjacency Matrices and Adjacency Lists

Isomorphism

- They have a different number of connected components
- They have a different number of vertices
- They have different degrees sequences
- They have a different number of paths of any given length
- They have a different number of cycles of any length.

Adjacency Lists

u : $\{v\}$

v : $\{w, x\}$

w : $\{v, x\}$

z : $\{v, w\}$

- Spanning Subgraphs of G.
- a vertex is said to be an **emph isolated vertex** if it has a degree of zero.
- a vertex is said to be an **emph end-vertex** if it has a degree of one.
- a vertex is said to be an **emph even vertex** if it has a degree of an even number.
- a vertex is said to be an **emph odd vertex** if it has a degree of an odd number.
- A graph is said to be **emphk-regular** if the degree of each vertex is k.
- Every Graph has an even number of odd vertices.
- A cubic graph is a graph where every vertex has degree three.

Session 05 Graph Theory

- Eulerian Path
- Isomorphism
- Adjacency matrices

Adjacency Matrices

$$\begin{pmatrix} o & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 0 \end{pmatrix}$$