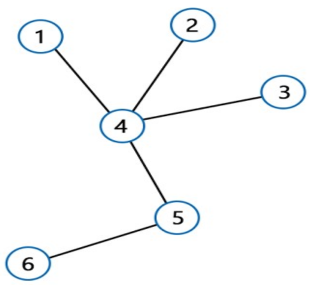
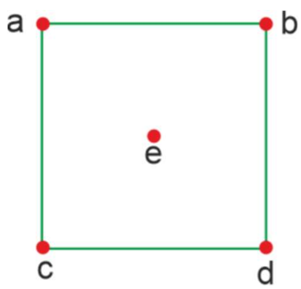
Definitions in graph theory:

Trees: A tree is a type of graph which has undirected networks. The tree can have only one path to connect any two vertices. British mathematician Arthur Cayley was introduced the concept of a tree in 1857. The tree cannot have loops and cycles. The diagram of a tree is described as follows:



The above graph is an undirected graph which has only a path to connect the two vertices. So this graph is a tree.

Degree:



In any graph, the degree can be calculated by the number of edges which are connected to a vertex. The symbol deg(v) is used to indicate the degree where v is used to show the vertex of a graph. So basically, the degree can be described as the measure of a vertex.

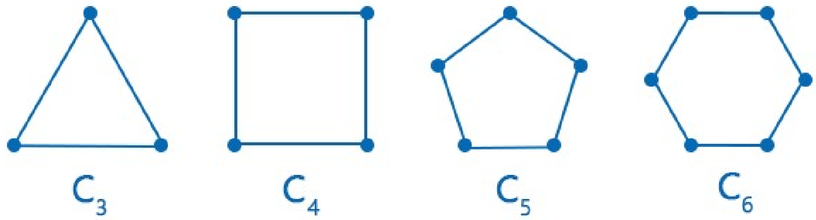
In the above graph, there are total of 5 vertices. The degree of vertex a is 2, the degree of vertex b is 2, the degree of vertex c is 2, the degree of vertex d is 2, and the degree of vertex e is zero.

Cycle:

In any graph, a cycle can be described as a closed path that forms a loop. A cycle will be formed in a graph if there is the same starting and end vertex of the graph, which contains a set of vertices. A cycle will be known as a simple cycle if it does not have any repetition of a vertex in a closed circuit. With the help of symbol Cn, we can indicate the cycle graph. The cycle graph can be of two types, i.e., Even cycle and Odd cycle.

- **Even cycle:** If a graph contains the even number of nodes and edges in a cycle, then that type of cycle will be known as an even cycle.
- **Odd cycle:** If a graph contains the odd number of nodes and edges in a cycle, then that type of cycle will be known as an odd cycle.

The diagram of a cycle is described as follows:



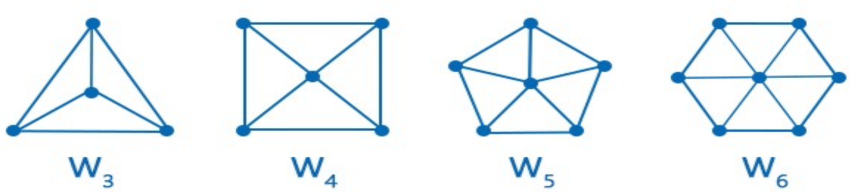
In the above graph, all the graphs have formed a loop, and if we start from any vertex, then we will be able to end the loop of the same vertex. That means in all the above graphs, the starting and end vertex is the same. So this graph is a cycle.

Graph C3 and C5 contain the odd number of vertices and edges, i.e., C3 contains 3 vertices and edges, and graph C5 contain 5 vertices and edges. So graphs C3 and C5 contain the odd cycle. Similarly, graph C4 and C6 contain the even number of vertices and edges, i.e., C4 contain the 4 vertices and edges, and graph C6 contains the 6 vertices and edges. So graphs C4 and C6 contain the even cycle.

Wheels:

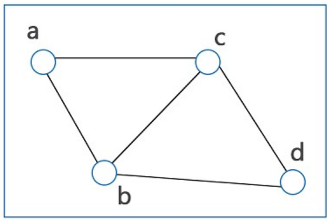
A wheel and a circle are both similar, but the wheel has one additional vertex, which is used to connect with every other vertex. With the help of symbol Wn, we can indicate the wheels of n vertices with 1 additional vertex. In a wheel graph, the total number of edges with n vertices is described as follows: 2*(n-1)

The diagram of wheels is described as follows:



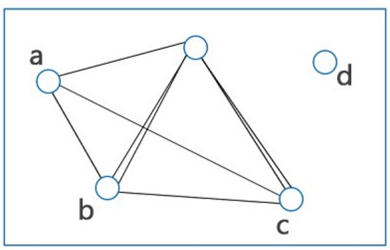
In the above diagram, we have four graphs W3, W4, W5, and W6. All the graphs have an additional vertex which is used to connect to all the other vertices. So these graphs are the wheels.

Planer Graph: A graph will be known as the planer graph if it is drawn in a single plane and the two edges of this graph do not cross each other. In this graph, all the nodes and edges can be drawn in a plane. The diagram of a planer graph is described as follows:



In the above graph, there is no edge which is crossed to each other, and this graph forms in a single plane. So this graph is a planer graph.

Non-planer graph: A given graph will be known as the non-planer graph if it is not drawn in a single plane, and two edges of this graph must be crossed each other. The diagram of a non-planer graph is described as follows:



In the above graph, there are many edges that cross each other, and this graph does not form in a single plane. So this graph is a non-planer graph.