(V , E) consists of V , a nonempty set of vertices (or nodes) and E, a set of

Edges. Each edge has either one or two vertices associated with it, called its endpoints.

A graph with an infinite vertex set or an infinite number of edges

A graph with a finite vertex set and a finite edge set

A graph in which each edge connects two different vertices and where no two edges connect the same pair of vertices

Graphs that may have multiple edges connecting the same vertices

Graphs that may include loops, and possibly multiple edges connecting the same pair of vertices or a vertex to itself

(or digraph) (V , E) consists of a nonempty set of vertices V and a set of

directed edges (or arcs) E. Each directed edge is associated with an ordered pair of vertices.

The directed edge associated with the ordered pair (u, v) is said to start at u and end at v.

A directed graph with no loops and no multiple directed edges

Directed graphs that may have multiple directed edges from a vertex to a second (possibly the same) vertex are used to model such networks.

A graph with both directed and undirected edges

Graphs that are extensively used to model social structures based on different kinds of relationships between people or groups of people.

A vertex of degree zero

If and only if a vertex has degree one.

A simple graph that contains exactly one edge between each pair of distinct vertices.

A simple graph for which there is at least one pair of distinct vertex not connected by an edge

Vertex set V can be partitioned into two disjoint sets V1 and V2 such that every edge in the graph connects a vertex in V1 and a vertex in V2

The algorithms written to solve problems were designed to perform one step at a time

Uses computers made up of many separate processors, each with its own memory, helps overcome the limitations of computers with a single processor.

Breaks a problem into a number of subproblems that can be solved

Concurrently, can then be devised to rapidly solve problems using a computer with multiple

processors.

A large number of intermediate links for processors to share information.

When edges and vertices are removed from a graph, without removing endpoints of any remaining edges, a smaller graph is obtained.

Removes an edge e with endpoints u and v and merges u and w into a new single vertex w, and for each edge with u or v as an endpoint replaces the edge with one with w as endpoint in place of u or v and with the same second endpoint.

Graph that contains all the vertices and edges of these graphs

Two graphs have exactly the same form, in the sense that there is a one-to-one correspondence between their vertex sets that preserves edges.

Specify the vertices that are adjacent to each vertex of the graph.

Two graphs are not isomorphic if we can find a property only one of the two graphs has, but that is preserved by isomorphism.

A sequence of edges that begins at a vertex of a graph and travels from vertex to vertex along edges of the graph.

An undirected graph’s path between every pair of distinct vertices of the graph.

An undirected graph that is not connected is called. We say that we disconnect a graph when we remove vertices or edges, or both, to produce a disconnected subgraph.

The removal from a graph of a vertex and all incident edges produces a subgraph with more connected components.

Connected graphs without cut vertices and can be thought of as more connected than those with a cut vertex.

The vertex connectivity of a non complete graph G, denoted by κ(G), as the minimum number of vertices in a strongly connected graph

If there is a path from a to b and from b to a whenever a and b are vertices in the graph.

If there is a path between every two vertices in the underlying undirected graph.

A simple circuit containing every edge of G.

A simple path in a graph G that passes through every vertex exactly once

A labeling of the arcs of the circle such that adjacent arcs are labeled with bit strings that differ in exactly one bit.

Graphs that have a number assigned to each edge

A practical approach to the traveling salesperson problem when there are many vertices. These are algorithms that do not necessarily produce the exact solution to the problem but instead are guaranteed to produce a solution that is close to an exact solution.

A graph that is drawn in the plane without any edges crossing (where a crossing of edges is the intersection of the lines or arcs representing them at a point other than their common endpoint).

A planar representation of a graph splits the plane

If a graph is planar, so will be any graph obtained by removing an edge {u, v} and adding a new vertex w together with edges {u,w} and {w, v}.

The graphs G1 = (V1, E1) and G2 = (V2, E2) if they can be obtained from the same graph by a sequence of elementary subdivisions.

Two regions that touch at only one point are not considered adjacent.

The least number of colors needed for a coloring of this graph.