CS 461, Lecture 16

Jared Saia
University of New Mexico

Graph Definition

- Recall that a graph is a pair of sets (V, E).
- We call V the vertices of the graph
- E is a set of vertex pairs which we call the edges of the graph.
- In an *undirected* graph, the edges are unordered pairs of vertices and in a *directed* graph, the edges are ordered pairs.
- We assume that there is never an edge from a vertex to itself (no self-loops) and that there is at most one edge from any vertex to any other (no multi-edges)
- $|V|$ is the number of vertices in the graph and $|E|$ is the number of edges

Today's Outline

- Minimum Spanning Trees

Graph Defns

- A graph $G' = (V', E')$ is a *subgraph* of $G = (V, E)$ if $V' \subseteq V$ and $E' \subseteq E$
- If (u, v) is an edge in a graph, then u is a *neighbor* of v
- For a vertex v, the *degree* of v, $deg(v)$, is equal to the number of neighbors of v
- A *path* is a sequence of edges, where each successive pair of edges shares a vertex and all edges are disjoint
- A graph is *connected* if there is a path from any vertex to any other vertex
- A disconnected graph consists of several *connected components* which are maximal connected subgraphs
- Two vertices are in the same component if and only if there is a path between them