Let G be a (V, E) graph of order $p \geq 2$. The double vertex graph $V_2(G)$ of G is the graph whose vertex set consists of all 2-subsets of V such that two distinct vertices $\{x, y\}$ and $\{u, v\}$ are adjacent if and only if $|\{x, y\} \cap \{u, v\}| = 1$ and if $x = u$, then y and v are adjacent in G. For this class of graphs we develop basic properties and study regular, eulerian, bipartite graphs, as well as general structural properties of these graphs.

Classification:
05C75 Structural characterization of types of graphs
05C45 Eulerian and Hamiltonian graphs
05C40 Connectivity

Keywords:
regular graph; Eulerian graph; double vertex graph; bipartite graphs