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Associated with a given graph G on n vertices $1, 2, \dots, n$, is the set $S(G)$ of all $n \times n$ real symmetric matrices $A = [a_{ij}]$ whose off-diagonal entries are placed according to the edges of G , i.e., for $i \neq j$, $a_{ij} \neq 0$ if and only if vertices i and j are adjacent. In this talk we present spectral properties of matrices in $S(G)$ for a class of binary trees G . We first show that a matrix A in $S(G)$ has no eigenvalues of multiplicity 4 or more, at most one eigenvalue of multiplicity 3, and at least three simple eigenvalues. We then completely determine the unordered multiplicity lists of these binary trees. As a consequence, it is shown that the minimum number of distinct eigenvalues of a matrix in $S(G)$ is one more than the diameter of G . (Received September 05, 2011)