Let $K$ be a number field, let $a \in K$, and let $f(x) = x^2 - 1$. The roots of $f^n(x) - a$ are the $n$-th preimages of $a$ under $f$, and they have the natural structure of a binary rooted tree $T$. Because $f$ is postcritically finite, the “arboreal” Galois group $G$ of the resulting extension has infinite index in the automorphism group of $T$. In this talk, we describe an “arithmetic basilica group” that $G$ must be a subgroup of, and we present sufficient conditions for $G$ to be the full arithmetic basilica. (Received January 14, 2019)