We consider the Cauchy problem for the Camassa-Holm equation
\[ \partial_t u + u \partial_x u + (1 - \partial_x^2)^{-1} \partial_x [u^2 + (\partial_x u)^2] = 0, \quad x \in \mathbb{T}, \quad t \in \mathbb{R}, \quad (0.1) \]
\[ u(x,0) = u_0(x), \quad (0.2) \]
and prove the following result.

**Theorem 1.** If \( u_0(x) \in H^s(\mathbb{T}) \) for some \( s > 3/2 \), then there is a \( T > 0 \) depending only on \( \|u_0\|_{H^s} \), such that there exists a unique function \( u(x,t) \) solving the Cauchy problem (0.1)–(0.2) in the sense of distributions with \( u \in C([0,T];H^s) \). The solution \( u \) depends continuously on the initial data \( u_0 \) in the sense that the mapping of the initial data to the solution is continuous from the Sobolev space \( H^s \) to the space \( C([0,T];H^s) \). Furthermore, the lifespan (the maximal existence time) is greater than
\[ T \geq \frac{1}{2c_s} \frac{1}{\|u_0\|_{H^s(\mathbb{T})}}, \quad (0.3) \]
where \( c_s \) is a constant depending only on \( s \). Also, we have
\[ \|u(t)\|_{H^s(\mathbb{T})} \leq 2\|u_0\|_{H^s(\mathbb{T})}, \quad 0 \leq t \leq T. \quad (0.4) \]