Are All Behaviors of the One-Bit Clock Infinite?

It is not really true that this is the only possible behavior of the one-bit clock starting in the state $b = 1$. You don't need to know this now, and I am mentioning it only for advanced readers who might know that it's not true and be confused by reading that it is. If you're not one of them, you can ignore this pop-up.

You will see later that our initial predicate and next-state action do not imply that the one-bit clock must continue forever. They allow finite behaviors, in which the clock stops. You will then learn how we can specify that the clock must keep ticking.

You will also learn later that our specification actually allows "stuttering steps" in which the value of b doesn't change. For example, it allows a behavior that begins

$$b = 1 \quad \rightarrow \quad b = 1 \quad \rightarrow \quad b = 0 \quad \rightarrow \quad b = 0 \quad \rightarrow \quad b = 0$$

An execution in which the clock stops is represented by an infinite behavior that ends with an infinite sequence of stuttering steps.