Theorem: $A_n = (-\infty + n, \infty - n)$ or $\{x \in \mathbb{R} | -\infty + n < x < \infty - n\}$ has the properties $A_{n+1} \subset A_n$ for all n and their intersection = ∅.

Proof:
Start with $A_0 = (-\infty, \infty)$ which include all points on the real line.

Pick an arbitrary n. A_n will include $(-\infty + n + 1)$ since:
$(-\infty + n) < (-\infty + n + 1) < (\infty - (n+1)) < (\infty - n)$

Now the next interval in the family is is $(-\infty + (n + 1), \infty - (n + 1))$. Since $\neg((-\infty + n + 1) < (-\infty + n + 1) < (\infty - (n+1)) < (\infty - (n+1)))$ is true, then A_{n+1} will not contain the point $(-\infty + n + 1)$.

Therefore a A_{n+1} is a subset of A_n.

Since the interval $A\infty = (-\infty + \infty, \infty - \infty)$, which is the same as (0, 0), there are no points within the set since for $(0<x<0)$, x cannot exist). Since there are no points within the set, it cannot intercept any other interval. This means the intersection for all intervals will be ∅.

This proves the theorem.