

Re: infinity

>>> Look, you have written your "proof" – I'm interlining my "proof", a
>>> different "proof", of something different. (What do you mean by "path"?
>>> Is it a 'way through the tree'?)
>> Yes a path is a succession of branches from the root, through child nodes, to
>> a
>> leaf, or possibly infinitely long with no discernible leaf.
>>>
>>> <snip>
>>>
>>>>> Proof: In a maximal binary tree with paths of length n , or depth of
>>>>> n , there
>>>>> are $p(n)=2^n$ paths and $b(n) = 2(2^n-1) = 2(p(n)-1)$ branches.
>>>>>
>>>>> What do you mean by "Proof"? Isn't this still part of the same
>>>>> argument? You would get more respect if you took the trouble to
>>>>> understand elementary notational conventions.
>>>>> This was a second proof, using a slightly different statement.
>>>>
>>> Oh, OK. In a tree that terminates at depth n , $p(n)$ is the number of
>>> terminal nodes, and $b(n)$ is the number of 'branches', where a branch is
>>> a link from one node to its child. Yeah, OK, I agree with the
>>> 'numbers'.
>> Yay!!!
>>>
>>>
>>>>> Anyway, never mind: to finish off *my* proof... By induction, the
>>>>> number of ends of an endless tree is infinity. Da-dah!!
>>>>> yes, you are very clever.....
>>>>
>>> Well, I'd like you to address the substantive issue. Seems to me that
>>> if one were to consider an unending tree, each path through it would be
>>> unending, so there would be some infinite number of branches, but there
>>> would also be zero leaf nodes. Do you agree?
>> If one imagines a tree that goes forever and never ends, one might imagine
>> that
>> there are no leaf nodes. If we look at the tree as representing the binary
>> numbers, each path corresponds to a single infinite string of bits, each
>> branch
>> corresponds to a bit, and the nodes are just the spaces between digits. The
>> root node corresponds to the digital point. So, no leaf nodes means that all
>> bit strings are infinite. I suppose I can live with an image with no leaf
>> nodes, but that doesn't affect the relationship between branches and paths,
>> does it?
>
> Yes it does! In trees in which every path has a leaf node, there is an
> obvious bijection between paths and leaf nodes, but in a maximal binary
> tree there are infinitely many paths and zero leaf nodes. If that
> correspondence fails so dramatically in the "lomiting" case, what is
> TO's evidence that any others still hold?
>

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I don't think that the leaf nodes automatically disappear when the tree is infinite. It is more natural to consider that there are an infinite number of leaf nodes, and maintain all relationships between features of the tree to infinity. Now, applying some Virgilogic to the situation, let's say each path is uniquely defined by a leaf node, which is perfectly true for all finite trees of any sort. When we have an infinite tree, and you declare that your leaf nodes are infinitely far away, so they no longer exist, are there really any paths left? Doesn't a path NEED to end in a leaf node? Aren't there zero paths now, since none of them ever ends at a leaf, given this definition of a path?

Why don't you try considering that there are infinitely many leaves infinitely far from the root, and your thinking will be less clouded. For n levels, there are 2^n leaf nodes. Is the limit($x=0 \rightarrow \infty$: 2^n)=0? Not in any math I have ever seen.

—
Smiles,

Tony

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◇ *From: Virgil*

- *References:*

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◇ *From: aeo6*
- ◆ [Re: infinity](#)
◇ *From: imaginatorium*
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