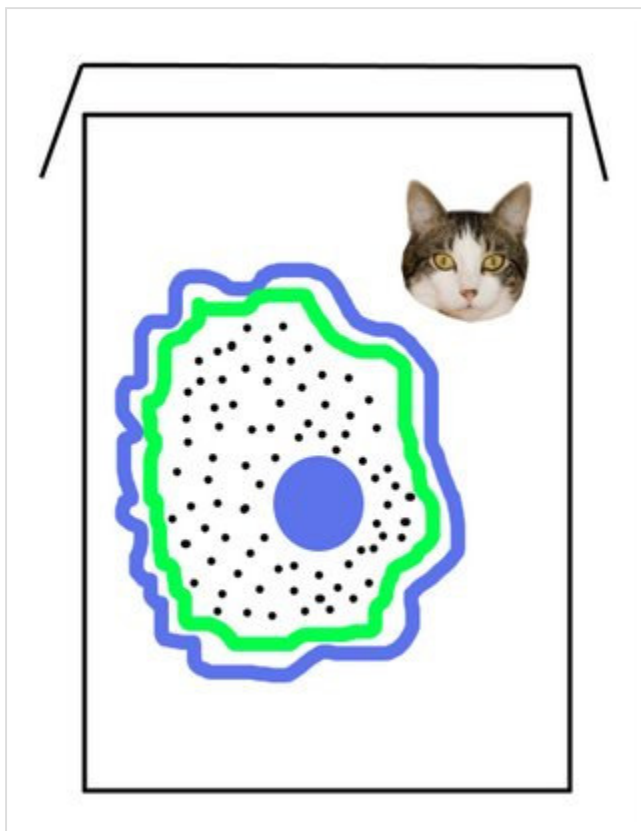


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[Create Blog](#) | [Sign In](#)**Saturday, February 7, 2009****Wun amoeba, 2 amoeba...**

Tobee mayd a nu poozle. He haz a jar wid wun amoeba in id. Eweree minit, eweree amoeba turns into 0, 1, 2, or 3 amoebae wid a probubillitee ov 25% foah each case(dies, duz nuddin, splits into 2, or splits into 3).Wat iz da probubillitee dat da amoeba population eventually dies owd?

Posted by Tobee 'n DeeDee at [2:21 PM](#) 

20 comments:**Amee'z Flowah Ko**

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Amee'z Flowah Ko

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Summah Cowntdo**days till June 21,****Toby's Vokabluary**

[Tobee 'n DeeDee](#) said...

If you are TcT, you have to provide an answer and not another question! You can e-mail your answers to DeeDee if you don't want to give it away.

[February 7, 2009 2:31 PM](#)

[Tinyc Tim](#) said...

Where does DeeDee come up with these puzzles?

I think I have a solution but it took me a good two hours to get it. I feel pretty good about my solution but to feel even better (or worse) I have scribbled out a tiny-c (of course) program which simulates the evolution of 100 separate amoebae and counts the number of times the population dies out. This won't prove I'm right (or wrong). It'll just make me more (or less) confident about my approach. Just to give you an idea of what I think I'll get, I think roughly 48 of those 100 amoebae will leave no offspring.

I have to debug my program and make my diagrams and equations legible. Even after I do all this, I'll keep what I come up with under the covers for a while.

I liked this problem. I do think having some familiarity with probability is a must.

[February 7, 2009 7:08 PM](#)

[Tinyc Tim](#) said...

My "solution" to this problem was incorrect. I think I understand the solution which I managed to locate but I'd like to share the [output](#) of a run of [amoeba.tc](#). It would appear that the predicted probability is correct.

[February 8, 2009 6:43 AM](#)

[BuBe](#) said...

Hi - I spent about 10 minutes and did an amoeba family tree out to 4th generation and came up with my answer which I emailed to Tobee 'n DeeDee. If my answer happens to be the correct one, and anyone is interested, I will forward my rudimentary calculations. Reminds me of a highschool biology science project I once did. Not so sure about my memory, though - ;)

[February 8, 2009 4:45 PM](#)

[Tobee 'n DeeDee](#) said...

Sorry Bube, but I am afraid you are incorrect. TcT came very close, I think. The answer is so complicated I don't fully understand it! I must admit that I was trying to stump the

math teecha, but it didn't really work. I think he is working on an explanation of the answer for all of us.

[February 8, 2009 5:36 PM](#)

[Tinyc Tim](#) said...

Nobody complimented DeeDee 'n Tobee on the very cool graphic in this poast. I immediately liked it (and the problem).

As I said in a previous comment, my solution was ng so I did a little surfing ...

I've taken what I learned and put it all together in a 7-page scanned "[treatise](#)." It's a bit mathy so maybe Max will find it worth a mention on his Math4Chip blog.

I am impressed BuBe gave it a shot. Pretty soon DeeDee'll be asking us to prove The Riemann Hypothesis.

[February 8, 2009 6:42 PM](#)

[Tobee 'n DeeDee](#) said...

Tanx for the treatise. I think I understand it better now.

You amoeba.tc program reminds me of the guy who was doing all of the statistical models for the election, with all of the model "runs". Purdy cul program TcT.

[February 9, 2009 7:57 AM](#)

[BuBe](#) said...

I am curious to see the answer. I only included the cells that continue to divide in my calculations as I assumed the cells that did "nothing" were about the same as the dead cells as far as propagation of the species. And since there were always more amoebas being created with each generation by splitting in 2's and 3's , I don't understand how they could become extinct unless the percentage of dieing and "did nothing" cells increased along the way.

[February 9, 2009 10:28 AM](#)

[Max](#) said...

Hi gang,

Just wanted to let you know I will be passing on this interesting dividing amoeba question. I did a 1-3 generation drawing of an "amoeba tree," and then did not investigate further. It looks like some of you are really getting into this one. I will sit this one out this time. Cool problem though.

Good luck!

[February 9, 2009 12:54 PM](#)

The answer is 0.414213562. Tincy has written a very gud explanayshun of the answer, just follow the "treatise" link in his comment.

[February 9, 2009 1:43 PM](#)

[BuBe](#) said...

Now that was absolutely fascinating! My lack of math education prevents me from totalling comprehending the entire probability issue, but thanks TcT for elaborating in mostly understandable terms. Fascinating. Times like this I wish I still had some room in the sponge! :}

[February 9, 2009 4:13 PM](#)

[Tincy Tim](#) said...

Well, I have just read BuBe's reaction to my explanation of the amoeba problem and Max's "two sky" explanation on Orion. The two subjects (amoeba evolution and the sky) share one thing in common; the desire authors have to use just the right words to communicate as clearly as humanly possible their understanding of something.

I would like to tell Max that his words "worked" for me just well enough so that I have an inkling of what he sees and look forward to how he will realize his skies. I think DeeDee's question itself has set Max's "brush" in motion.

I can tell BuBe (and DeeDee) got something from reading my words. When I wrote them I was thinking of my audience and trying not only to understand the stuff myself but also to translate my still incomplete understanding into words that could be understood. It is VERY gratifying to be told by someone that they get it, not totally, but somewhat.

My mind was literally consumed by this amoeba problem from the moment I saw DeeDee's graphic and words to my posting what BuBe just read. Max's mind was consumed by DeeDee's two sky question and has now taught us what he knows. None of us really totally understands amoebae or the sky, but we certainly know more now than we did yesterday.

[February 9, 2009 6:56 PM](#)

[Max](#) said...

Ize ope no wun minds yetz wun mowa [stah](#) foah TcT foah hiz 7 page treatise awn ameebah development. Ize put summ ameebah in a stah dishe and dais iz wat grew frum dem foah him! Itz cawld a Teecee dishe and id grew a nu strayen ov ameebah. Frum da luks ov dem, dey zeem pritty excited aboot hiz accomplishment. Notice da mitokondrial development az wel. Cul!

[February 10, 2009 12:58 AM](#)

[BuBe](#) said...

This has been the most fun I have had in a long time - let's do it again! I will keep my out for challenging poozles (that I will probably need TcT, Max and DeeDee to solve for me)

Max, really neat amoeba star complete with mitacondria - we have come right down to the basics (which are still complicated) (Sort of like all of us, basic and somewhat complicated at the same time) - and belatedly, DeeDee, I honestly do love your original amoeba graphic.

[February 10, 2009 6:25 AM](#)

[BuBe](#) said...

One more questions TcT, how does "probability" overcome "straight" math, ie, the family tree showing a 25% increase in population with each generation?

[February 10, 2009 6:44 AM](#)

[Tobee 'n DeeDee](#) said...

I think this poast wins a prize for the most comments ever! I am glad that you liked the poozle, and my graphic. I looked on Google images for a picture of an amoeba, but couldn't find a good one, so I made one myself.

I have found a good source for puzzles, there are many more where this one came from. They are all math problems. I got the idea of doing math problems from Max's Math4Chip blog. But it would be great if other people found puzzles too, as I would like to do some myself.

[February 10, 2009 8:59 AM](#)

[Tinyc Tim](#) said...

Well, clearly we need to bring the comment count up to a prime number, so this comment should take care of that problem.

I would like to thank Max for giving me a **two** star day! I love my stars and will (I'm serious) actually take him up on the suggestion that I print out a few copies of my "Nice Work!" star and give them to my students when I think they've done something "extra credit."

My other star (the one he "grew" using a "TeeCee" dish (I love it!)) is very very cool.

Thanks Max. You are the best!

[February 11, 2009 4:27 AM](#)

[Tinyc Tim](#) said...

This comment is a bit overdue and I'm not sure it will answer BuBe's question but it's been buggin' me ever since she asked

"One more questions TcT, how does 'probability' overcome 'straight' math, ie, the family tree showing a 25% increase in population with each generation?"

The family tree does **not** have a "25% increase" in population with each generation.

There's a 1 in 4 chance it will either stay the same, lose 1, gain 1 or gain 2.

Just because the 1st possibility sounds like you can sort of disregard it and the 2nd and 3rd sound like they kind of "cancel each other out," you can't conclude that the situation is equivalent to a 25% increase in population. You've got to stick with the exact (albeit probabalistic) 1/4, 1/4, 1/4, 1/4 breakdown.

[February 13, 2009 3:03 PM](#)

[BuBe](#) said...

It becomes more confusing each time I think about it = I need a math tutor! Next time we see each other, we will have to leave our spouses to chat while you show me in Black and White just how this works.

[February 13, 2009 6:53 PM](#)

[Tinyc Tim](#) said...

BuBe (et al) ... the following had (and continues to have) special meaning to me the minute I encountered it. If you thought DeeDee's original amoeba poozle and "my" probability proof were mind boggling, try this on.

[Hugh Everett's take on amoeba](#)

(<http://www.pbs.org/wgbh/nova/manyworlds/orig-01.html>)

by Peter Byrne

The above was written by Hugh Everett in the 1950s ...

It is from an early draft of his doctoral dissertation at Princeton University. Using an amoeba as a metaphor, the excerpt describes the concept of splitting into multiple universes that lies at the heart of Everett's Many Worlds theory, as well as how such multiple universes never come into contact with one another. Though the amoeba metaphor never made it into either the short version of Everett's thesis

one physicist recently told me he considers it one of the classic metaphors of all time.

[June 11, 2009 5:55 AM](#)

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