Lesson 3, September, 22, 2009 BMC Elementary

Overview.

1. Logic problem. After kids solved the first part themselves, we wrote on the board a table and I briefly explained the solution of this problem by elimination of choices. The second problem was not discussed in class. We plan to discuss similar examples during the semester.

2. Fractals and powers of numbers. We discussed the following questions.
   Question 1. What is so special about the tree on the picture?
   Assume that the tree grows so that it gets new branches in the end of the year.
   For example, in the end of the 1st year 2 new branches appeared on the trunk.,
   in the end of the 2nd year 4 new branches appeared, and so on.
   Question 2. How old is the tree?

   We draw a similar tree on the Handout 2. We observed that new branches appear by the following pattern:
   1, 2, 4, 8, 16, 32, …
   We noticed that every year the number of new branches doubled, so we can write:
   2=2
   4=2X2
   8=2X2X2, …
   The short way to write those repeated multipliers is in powers. For example,
   $2X2X2X2X2=2^5$
   Question 3. Compute 2^3, 3^2 , 5^2, 10^2 , 10^3, 10^{17} .

   Additional questions (were not discussed in class):
   Question 4. How many branches in total does the tree have in the middle of each year? (Answer: 2^n-1 in the nth year)
   Question 5. Will the tree ever reach the bird on the picture? Why do you think so?
   Question 6. What is bigger: 5^2 or 4^2 ? 5^{100} or 4^{100} ?
   Question 7. Compute: 9^2, 3^4.

We discussed common features between the fractal tree the pictures of the fractal stars and the fractal triangle. We made the iterations of fractals:
- We cut out a fractal-like star (see the handout)
- We made a Sierpinski triangle out of small triangles glued on the colored paper.

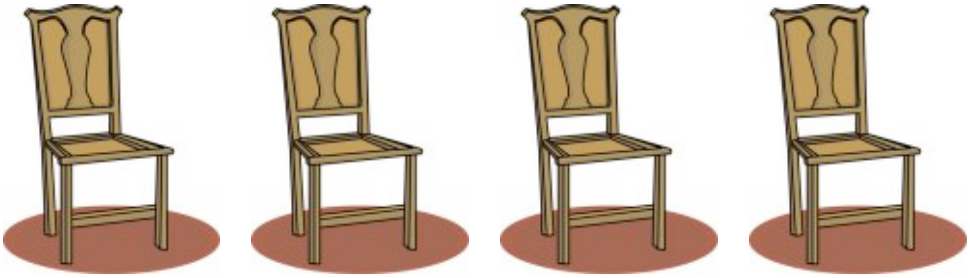
Observations: It is not expected that kids immediately learn powers of numbers. The only goal is to introduce them to this sequence, so that when they see it the second time, it is easier to comprehend it. Typical mistake: kids think that, for example, 5^2 is 10. Probably, we will see powers of two several times during the semester.

IN THE THEATER

A cat, a dog, a horse and a cow went to see a show. They all got places in the same row.

1. The cow and the cat were at the aisles.
2. The horse could see the cow and the dog on his left side.

Put the animals on their places.



Clip art from: http://classroomclipart.com

Little Squirrel has a birthday today! His friends: an Owl, a Fox, a Bob Cat, a Rabbit, a Mouse, and a Deer came to celebrate the day. Seven animals took places around the table.

-The Owl is sitting between the Fox and the Bob Cat.

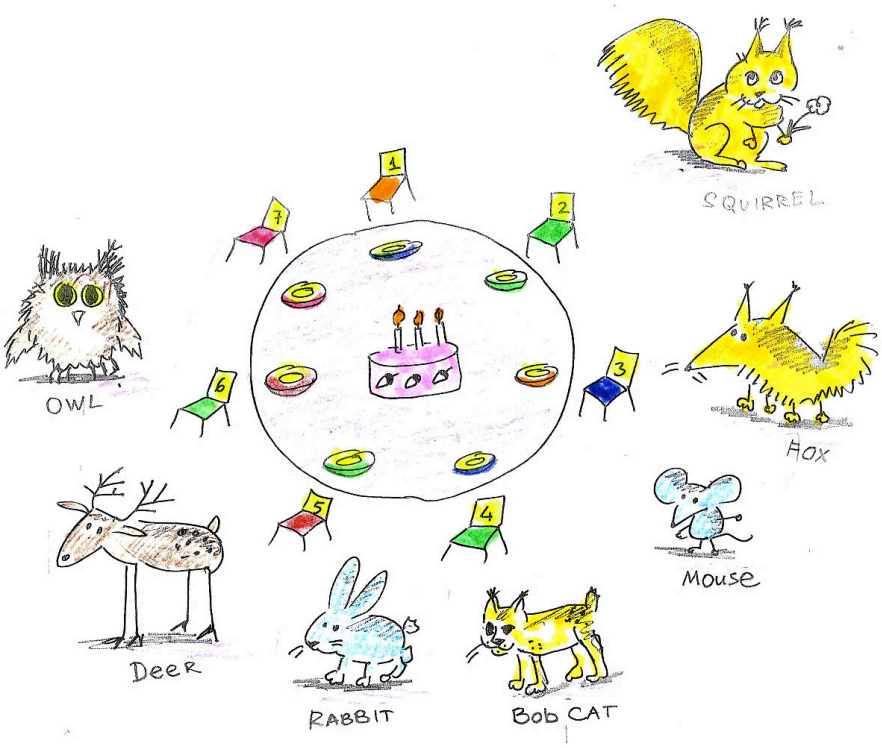
-The Squirrel is sitting at the place number 4, near the Rabbit

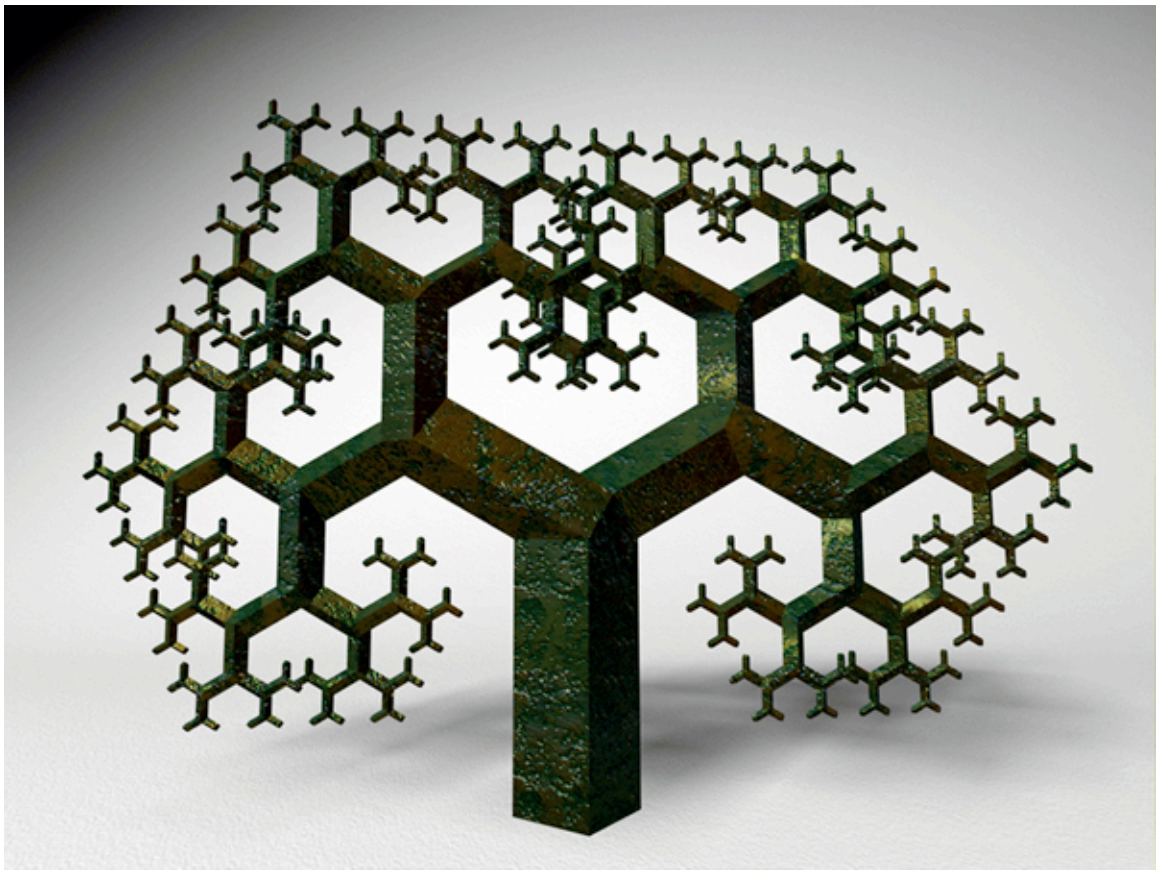
-The Mouse did not want to sit near any of the predators.

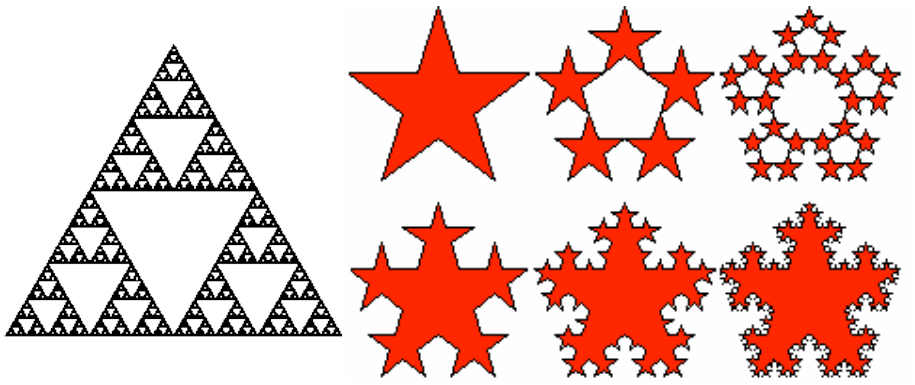
-There were two guests sitting between the Owl and the Squirrel

-The Bob Cat was sitting at the place number 2.

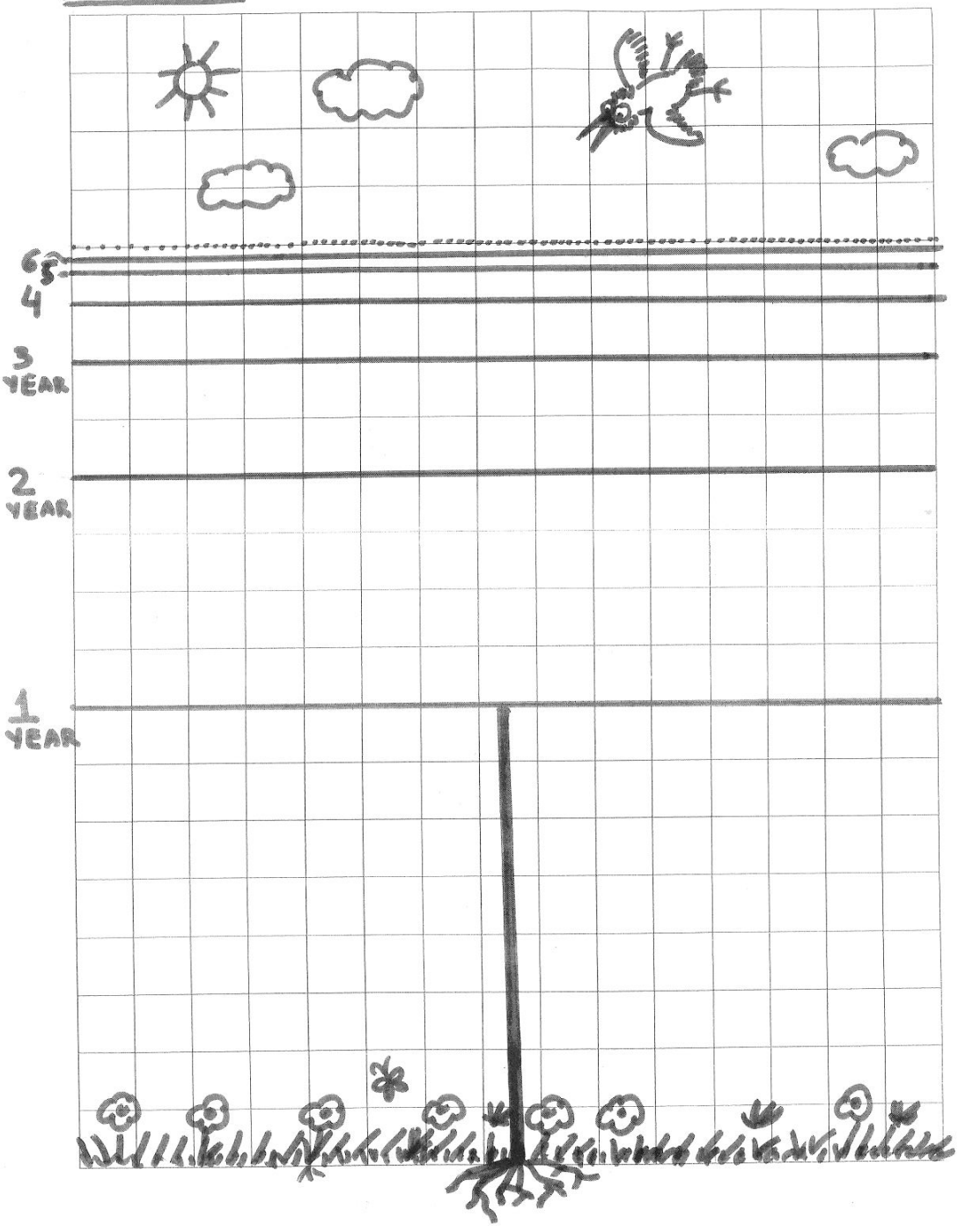
Where did the Deer sit?





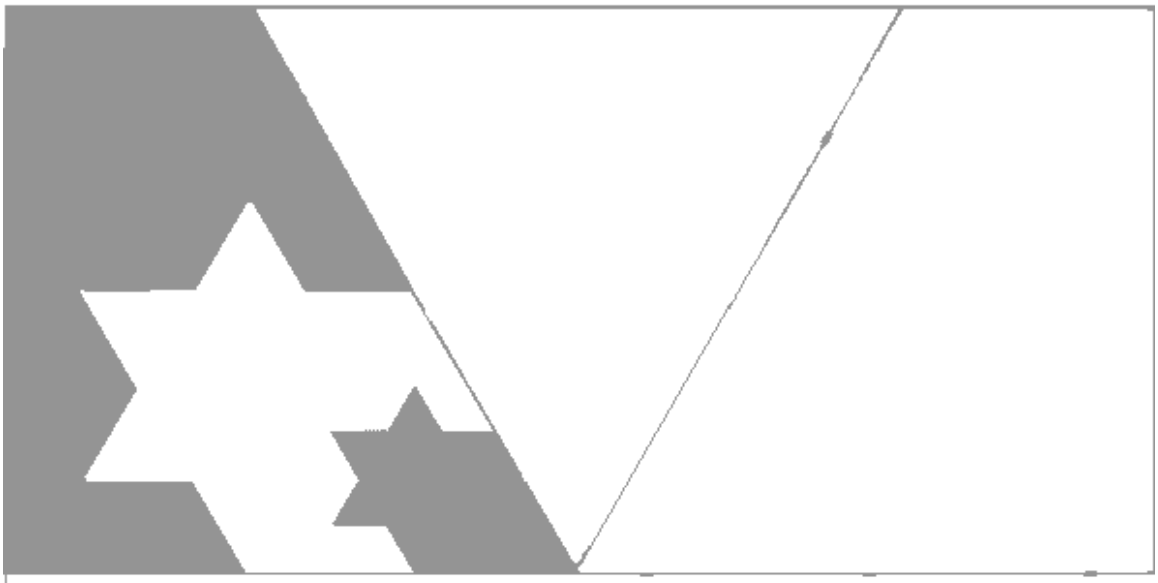


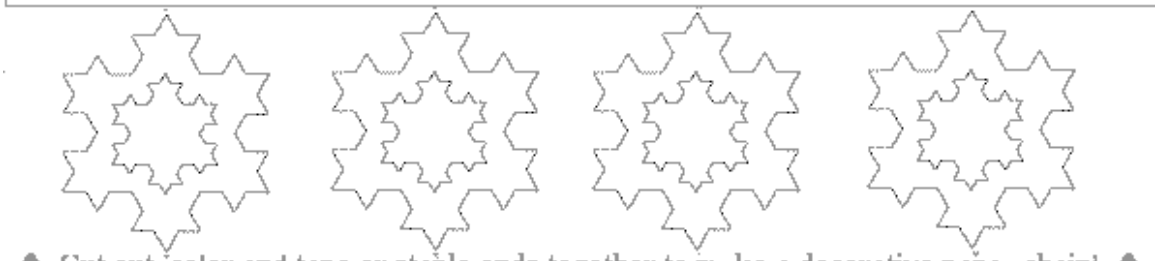
Fractal tree



Pattern # Basic **KOCH Snowflake Fractal**

Use our 3-sided pattern instructions to fold and cut this snowflake design





Cut out, color and tape or staple ends together to make a decorative paper chain!