

Case 6

This week we have only one problem, which can give you 2+4=6 points. The task is to produce arts by L-systems, either animation, pictures or music. You can choose any of the following choices. Return a short report about your idea and the **grammar** producing your piece of art next Monday. You have time to implement your system until the Art exhibition.

a) Make a program, which simulates development of some living organism, like in flower field example. You can use any programming language and graphic tool. If you are using Turbo Pascal or Turbo C, you can use the elements of Wilhelmiina's example program for drawing.

b) Music by L-Systems. In simplest form we just modify the notes into another (with same duration), e.g.

$$\begin{aligned}C &\rightarrow E \\E &\rightarrow CGC \\G &\rightarrow \epsilon\end{aligned}$$

produces from the axiom C a string $CECGCEECGCCGCEEEE$, which can be played.

Different octaves can be referred by numbers $C1, C2, C3, \dots$, or the octave may have its own symbol. Also the duration can be coded. A very useful coding system is following: let's denote by comma $.$ that the current note is played, by $+$ that it is incremented by a semitone, and $-$ that it is decreased by a semitone. Simultaneously played notes can be put into parentheses, e.g. (CEG) plays C major chord. $c(. + + + . + + + .)$ plays the same (the beginning c tells where to begin). You can invent your own notation and rules! ja sÄdÄntÄüsi!

You can either produce notes, which are played by some instrument, or directly music. Unfortunately the department computers don't have any suitable tools for playing music...? However, with simple one-tone "beeping music" you can already listen to your own compositions.

Further reading:

<http://www.csse.monash.edu.au/~jonmc/resources/L-systemsMusic.pdf>
"Grammar-based Music Composition" or

<http://www.csu.edu.au/ci/vol103/mccorm/mccorm.html> (principally the same)

Example program (Flower simulation): <http://www.cs.joensuu.fi/pages/whamalai/tepe04/FLOW>