

# Informatik für Mathematiker und Physiker HS14

## Exercise Sheet 8

Submission deadline: 15:15 - Tuesday 11th November, 2014

Course URL: <http://lec.inf.ethz.ch/ifmp/2014/>

### Assignment 1 (4 points)

On 8<sup>th</sup> June 2012, Neue Zürcher Zeitung went completely digital, and what they did to visualize this was to encode the whole cover page in binary (see image to the right) in the way that each 8-bit binary number represented a single ASCII character (e.g. 01001110 01011010 01011010 encodes NZZ, since for example 01001110 is 78 which is the ASCII code for N). The nzz.in is a plain text input file that contains the transcript of the NZZ binary cover page. Your task is to write a program `nzz_decoder.cpp` that decodes this file and outputs the decoded text.



**Hint:** You can input the file `nzz.in` to your program `nzz_decoder` by calling it as follows:

```
./nzz_decoder < nzz.in
```

(`nzz.in` has to be in the same folder as `nzz_decoder`.)

### Assignment 2 – Skript-Aufgabe 107 (4 points)

For larger floors, `shortest_path.cpp` from the lecture can become quite inefficient, since every step  $i$  examines *all* cells of the floor in order to find the (possibly very few) ones that have to be labeled with  $i$  in that step. A better solution would be to examine only the neighbors of the cells that are already labeled with  $i - 1$ , since only these are candidates for getting label  $i$ .

Write a program `shortest_path_fast.cpp` that realizes this idea, and measure the performance gain on some larger floors. (You find a few example-floors on the course webpage).

### Have a look at the programming project!

### Challenge – Skript-Aufgabe 106 (Lindenmayer Systems) (8 points)

Don't forget to write some recommended parameter settings (for instance the number of iterations) as a comment in your code and also include your name. We will collect your submissions and show a collection of the most beautiful pictures in the lecture and on the website. You can also hand in multiple submissions!