

## Solution to Homework 36

**Problem.** What can you say about the Kolmogorov complexity of the string 10001000... in which the sequence 1000 is repeated 2026 times?

**Solution.** Kolmogorov complexity of a string  $x$  is the length of the shortest program that computes this string. The given string  $x$  can be generated by the following program:

```
for(i = 1; i <= 2026; i++)  
    System.out.print("1000");
```

that has length 59. Thus, the Kolmogorov complexity  $K(x)$  – i.e., the length of the shortest program for computing this string – must be smaller than or equal to 59:  $K(x) \leq 59$ .