

Exercise sheet 4

Theory of Computation, IDC204

1. For each language that you proved was regular in the previous exercise sets, find a regular expression to describe the language.
2. For each language that you proved was regular in the previous exercise sets, find a context free grammar to define it. Can any regular language be defined by context free grammar?
3. Find a context-free grammar to generate the following languages over $\Sigma := \{0, 1\}$
 - (a) $\{0^n 1^n \mid n = 0, 1, \dots\}$
 - (b) The complement of the previous language, i.e. $\{0^m 1^n \mid m > n, m, n = 0, 1, \dots\}$
4. What language does the context free grammar $G := (\{X\}, \{(\,,\,)\}, R, X)$, where $R = \{X \rightarrow (X) \mid XX\}$ generate?
5. Find a context free grammar that generates the language consisting of precisely those strings that are polynomials in x with integer coefficients.