
CS 374 LAB 6: NON-REGULAR LANGUAGES

Date: February 1, 2018.

Problem 1. [Category: Proof] Prove that each of the following languages is not regular.

1. $\{0^{2^n}1^n \mid n \geq 0\}$
2. Binary palindromes: Strings over $\{0, 1\}$ that are equal to their reversals. For example: 00111100 and 0100010, but not 01100.
3. $\{0^m1^n \mid m \neq 2n\}$
4. Strings over $\{0, 1\}$ where the number of 0s is exactly twice the number of 1s.
5. Strings of properly nested parentheses $()$, brackets $[]$, and braces $\{\}$. For example, the string $([])\{\}$ is in this language, but the string $([])$ is not, because the left and right delimiters don't match.
6. $\{0^{2^n} \mid n \geq 0\}$ Strings of 0s whose length is a power of 2.
7. Strings of the form $w_1\#w_2\#\dots\#w_n$ for some $n \geq 2$, where each substring w_i is a string in $\{0, 1\}^*$, and some pair of substrings w_i and w_j are equal.