

University of Waterloo
CS 462 — Formal Languages and Parsing
Winter 2011
Problem Set 9

Distributed Wednesday, March 9 2011.

Due Wednesday, March 16 2011, in class.

All answers should be accompanied by proofs.

1. [10 marks] Let ψ be the Parikh map. Let

$$L = \{w \in \{0, 1, 2\}^* : |w|_0 = |w|_1 = |w|_2\}.$$

Express $\psi(\overline{L})$ as a finite union of linear sets. Here \overline{L} is the complement of L .

2. [10 marks] Is

$$L = \{0^i 1^j 2^k \mid i \neq j \text{ and } j \neq k\}$$

context-free? (*Hint:* Use Ogden's lemma.)

3. [10 marks] Prove or disprove: if L is a CFL, then so is $\{x : x^* \subseteq L\}$.