

Lassonde Faculty of Engineering
EECS

EECS2001Z. Problem Set No1

Posted: Jan. 20, 2019

**Due: Feb. 11, 2019, by 2:30pm; in the course
assignment box.**



It is worth remembering (quoted from the course outline):

The answers must be typed (but you may draw symbols by hand, if it is easier for you).

The homework must be each individual's own work. While consultations with the instructor, tutor, and among students, are part of the learning process and are encouraged, *at the end of all this consultation* each student will have to produce an individual report rather than a copy (full or partial) of somebody else's report.

The concept of "late assignments" does not exist in this course.



1. (5 MARKS) Write a correct URM which simulates the assignment statement $\mathbf{x} \leftarrow \mathbf{z}$ without changing the original value of \mathbf{z} .

You must provide a brief coherent argument of correctness.

2. (5 MARKS) By **induction on the length of derivations** prove that $\mathcal{PR} \subseteq P$.
3. (2 MARKS) Using the preceding problem conclude that $\mathcal{PR} \subseteq R$.
4. (5 MARKS) Prove that the function

$$x \text{ 2s } \left\{ \begin{array}{l} 2 \\ 2^2 \\ \dots \\ 2^{2^{\dots^2}} \end{array} \right.$$

is in \mathcal{PR} .

5. p.234 of the text, Section 2.12: Do

- (a) Problem 3 (5 MARKS)
- (b) Problem 4 (5 MARKS)
- (c) Problem 6 (5 MARKS)
- (d) Problem 7 (5 MARKS)
- (e) Problem 9 (5 MARKS)
- (f) Problem 10 (5 MARKS)