Trent University

Computing and Information Systems 3050H

Fall 2020

Quiz 1

Date: October 2, 2020 Instructor: Dr. R. T. Hurley

Time: 35 minutes Open Course Notes and Textbook

1) [5 marks] Give a recursive definition for the language QUES1 which is defined over the alphabet $\Sigma = \{a, b\}$ and contains words that contains at least one *b* and an odd number of *a's*.

2) [3 marks] Consider the following recursive definition of a language called QUES2

Rule 1: 132 is in QUES2

Rule 2: If w = abc is in QUES2, then so are cab and bca.

Rule 3: no other words in QUES2.

What are all the words in the language QUES2.

3) [8 marks] Construct a regular expression for each of the following languages over the alphabet $\Sigma=\{a ,b\}$.

(a) The language of all words that begin the substring *ba* and end with the letter *a*.

(b) The language of all words that begin with the letter *b* but do not contain the substring *ab.*

(c) The language of all words that end with the letter *b* and have an odd number of letters.

4) [9 marks] Build an FA for each of the following languages over the alphabet Σ={a ,b}.

(a) The language of all words that begin with the letter *a* and contain substring *bb*.

(b)The language of all words that contain a least one *b* but do not contain the substring *ab*.

(c) The language of all words that end with the letter *b* and have an odd number of letters.