

Homework #8  
CS 310 Fall 2014

Due Nov 21, 4:45pm pm

p 159

3.1 a, c

3.2 b, c

For 3.1 and 3.2 be sure to use the yields notation described in class.

3.8 b, c

For this question, write the algorithm! Don't build the full machine.

3.9 a (Hint: Proof by example)

3.15 b, c Read the answer to 3.15/3.16 a

3.16 b, d

Answer the above questions in a GoogleDoc.

Produce a PUNetID\_cs310Hmwk8.tar.gz or .zip file containing the following JFLAP files and **email** me that file. None of the following TMs can use the S (stationary) extension in JFLAP.

**Submit JFLAP files:**

TM1\_PUNetID.jff

Build a single tape, deterministic Turing Machine that accepts the language  
 $\{ww^R \mid w \in \{0, 1\}^*; |w| > 0\}$

TM2\_PUNetID.jff

Build a single tape, deterministic Turing Machine that accepts the language  
 $\{A^n B^n C^n \mid n > 0\}$

TM3\_PUNetID.jff

Build a single tape, deterministic Turing Machine that accepts the language  
 $\{A^{2*n} B^n C^{3*n} \mid n \geq 0\}$

BinAdd\_PUNetID.jff

**8-bit binary addition:** Produce a 3-tape TM in JFLAP that will produce the sum on tape 3 of the 8-bit binary numbers given on tape 1 and tape 2. For example, if tape 1 contains: 00001111 (15) and tape 2 contains 00000011 (3) the sum on tape 3 should be: 00010010 (18). Don't worry about overflows. Each number on tape 1 and tape 2 will be exactly 8 bits long.

Bin2sComp\_PUNetID.jff

**8-bit binary complement:** Produce a 2 tape TM that will produce the **2s complement** on tape 2 of the 8-bit binary number on tape 1. The 2s complement is created by flipping each bit in the number and adding the value 1 to the resulting 8-bit number. For example, the 2s complement of 00001110 is 11110010