

## CSE 390z: Mathematics for Computation Workshop

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### QuickCheck: RegExs and CFGs Solutions (due Monday, November 27)

Please submit a response to the following questions on Gradescope. We do not grade on accuracy, so please submit your best attempt. You may either typeset your responses or hand-write them. Note that hand-written solutions must be legible to be graded.

We have created [this template](#) if you choose to typeset with Latex. [This guide](#) has specific information about scanning and uploading pdf files to Gradescope.

#### 0. Constructing Languages

Let  $L$  be the set of all binary strings that start with 0 and contain 1010 as a substring.

Let  $M$  be the set of all binary strings that contain an even number of 0s OR an odd number of 1s.

- (a) Construct a regular expression that matches  $L$ .

**Solution:**

$$0(0 \cup 1)^*1010(0 \cup 1)^*$$

- (b) Construct a CFG that generates  $L$ .

**Solution:**

$$S \rightarrow 0B1010B$$

$$B \rightarrow B0 \mid B1 \mid \epsilon$$

- (c) Construct a regular expression that matches  $M$ .

**Solution:**

$$1^*(1^*01^*01^*)^* \cup 0^*1(0^*10^*10^* \cup 0)^*$$

#### 1. Video Solution

Watch [this](#) solution video **after** making an initial attempt. Then, answer the following questions.

- (a) What is one thing you took away from the video solution?
- (b) What topic from the quick check or lecture would you most like to review in workshop?