

# CSE 390z: Mathematics for Computation Workshop

## QuickCheck: DFAs, RegExs, and CFGs Solutions

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. DFAs, RegExs, and CFGs

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

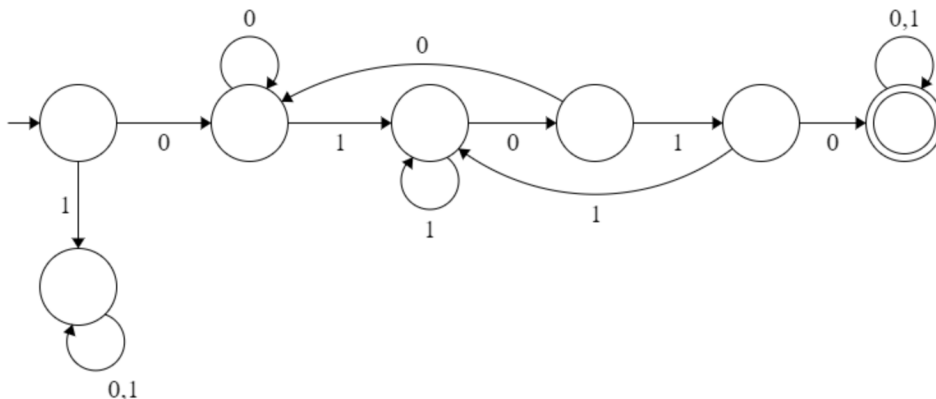
- (a) Construct a regular expression that matches  $L$ .

**Solution:**

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

- (b) Construct a DFA that accepts  $L$ .

**Solution:**



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

**Solution:**

$$S \rightarrow 0B1010B$$

$$B \rightarrow B0|B1|\epsilon$$

## 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?