1. (a) Draw a complete NDFA for floating point numbers. It should accept 44, 44.0, -1.45, 4.4E01, 440E-1. Also give a regular expression.

(b) Assume that we have a cheap table calculator with usual operators, with usual numbers (signs, decimal fractions, but no 'e'/E'), without operator priorities and without parentheses.

Draw an NDFA for this calculator.

(c) Give a regular expression for C-style comments, starting with /* and ending with */.

(d) Same for C-style comments that start with // and last until the end of the line.

(e) Give regular expressions that accept all words over the usual alphabet \{a, \ldots, z\} that contain (exactly, less than, more than) four occurrences of the letter a.

(f) Give a regular expressions that accepts all words over \(\Sigma = \{a, b, c\}\) that contain each of the letters in \(\Sigma\) at least once. Could you describe a similar regular expression for the complete alphabet \(\Sigma' = \{a, b, c, \ldots, z\}\)?

2. Let us define two regular expressions equivalent if they accept the same set of words. Which of the following pairs of regular expressions are equivalent? (Give proofs or counter examples)

(a) \(RS\) and \(SR\),

(b) \(R|S\) and \(S|R\),

(c) \(R(ST)\) and \((RS)T\),

(d) \((R|S)^*\) and \(R^*S^*\),

(e) \((R|S)^*\) and \((R^*S^*)^*\),

(f) \(R(S|T)\) and \(RS|RT\).