Reading

Sipser, sections 1.3 and 1.4.

Practice

Sipser, 1.13, 1.14, 1.15, 1.17, 1.18, 1.23, 1.28, 1.36, 1.38, 1.40 1.41, 1.42, 1.43, 1.44.

To Be Handed In

1. For each of the following regular expressions, give an equivalent NFA:

   (a) \((01 \cup 011 \cup 0111)^*\)
   (b) \((000)^*1 \cup (00)^*1\)

2. Sipser, 1.16.

3. Read the definition of minimum pumping length from Sipser problem 1.38 on page 90. For each of the following languages give the minimum pumping length and justify your answer:

   (a) \((111)^*\)
   (b) 111
   (c) 111*
   (d) 01*0
   (e) \(\epsilon\)
4. For each of the following languages, decide if they are regular or not regular. Give proofs.

   (a) $L = \{0^p1^q \mid p \geq q, \ q \geq 37\}$
   (b) $L = \{0^p1^q \mid p \geq q, \ q \leq 37\}$
   (c) $L = \{0^p1^q \mid p + q = 37\}$
   (d) $L = \{0^p1^q \mid p = q + 37\}$

5. Sipser, 1.37.