COMP 455
Models of Languages and Computation
Spring 2012
The State Minimization Algorithm

Let's apply the state minimization algorithm to the automaton having the following transition function:

q	x	delta(q,x)
s	a	q1
s	b	r1
q1	a,b	q2
r1	a,b	r2
q2	a,b	q2
r2	a,b	r2

Suppose q2 and r2 are the final states and s is the start state. We display the transition function as a chart as follows:

	a	b	e
s	q1	r1	s
q1	q2	q2	q1
q2	q2	q2	q2
r1	r2	r2	r1
r2	r2	r2	r2

We now color the accept states R (red) and the others G (green), making the chart as follows:

	a	b	e
s	G	G	G
q1	R	R	G
q2	R	R	R
r1	R	R	G
r2	R	R	R

We now have three rows, GGG for s, RRG for q1 and r1, and RRR for q2 and r2. We thus color s one color (say Y) and q1 and r1 another (say B) and q2 and r2 another (say R). The chart then becomes

	a	b	e
s	B	B	Y
q1	R	R	B
q2	R	R	R
r1	R	R	B
r2	R	R	R

Now there are three rows, BBY for s, RRB for q1 and r1, and RRR for q2 and r2. So the number of colors the next time will still be three, and we are done. We obtain the reduced automaton by identifying q1 and r1 and by identifying q2 and r2.