

CSC 363, Winter 2010 — Short Assignment #2 Solution

- 1) *Scan the input tape, checking the syntax of the DFA encoding, and setting tape 2 to the largest state number that appears in the transition table.*
 - a) Reject if the first symbol on tape 1 is not \$, otherwise move right on tape 1.
 - b) Reject if tape 1 does not see R or A, otherwise move right on tape 1.
 - c) Move the head on tape 2 to the beginning.
 - d) As long as tape 1 sees a 1 symbol, write a 1 on tape 2, and move right on tapes 1 and 2.
 - e) Reject if tape 1 does not see 0, otherwise move right on tape 1.
 - f) Move the head on tape 2 to the beginning.
 - g) As long as tape 1 sees a 1 symbol, write a 1 on tape 2, and move right on tapes 1 and 2.
 - h) If tape 1 sees a \$, go to stage 2; otherwise go to stage 1b.
- 2) *Check that the maximum state number in the transition table is not greater than the number of states.*
 - a) Move the head on tape 2 to the beginning.
 - b) Move the head on tape 1 to just after the initial \$ symbol.
 - c) If tape 1 sees a \$ symbol, reject.
 - d) If tape 2 sees a blank symbol, go to stage 3.
 - e) Move tape 2 to the right. Move tape 1 to the right to the next cell with R, A, or \$.
 - f) Go to stage 2c.
- 3) *Copy the input string for the DFA to tape 2.*
 - a) Move the head on tape 2 to the beginning.
 - b) Move the head on tape 1 rightward to the cell after the next \$ symbol.
 - c) Copy symbols from tape 1 to tape 2 (moving to the right), until a blank symbol has been copied. Reject if any symbol other than 0, 1, or blank is encountered.
- 4) *Simulate the operation of the DFA until the end of the input string is reached, keeping the number of the current state on tape 3 and the head of tape 2 at the symbol currently seen by the DFA.*
 - a) Move the head on tape 2 to the beginning.
 - b) Move the head on tape 3 to the beginning, and the head on tape 1 after the initial \$ symbol.
 - c) If tape 3 sees a blank, go to stage 4f. Otherwise, move right one cell on tape 3.
 - d) If tape 1 doesn't see an R or A, move right on tape 1 until an R or A is encountered.
 - e) Go to stage 4c.
 - f) If tape 2 sees a blank symbol, go to stage 5.
 - g) Move the head on tape 3 to the beginning.
 - h) If tape 2 sees a 1, go to stage 4l.
 - i) Move right one cell on tape 1.
 - j) As long as tape 1 sees a 1 symbol, write a 1 on tape 3, and move right on tapes 1 and 3.
 - k) Write a blank on tape 3 and then go to stage 4b.
 - l) Move right on tape 1 until the cell after the next 0.
 - m) As long as tape 1 sees a 1 symbol, write a 1 on tape 3, and move right on tapes 1 and 3.
 - n) Write a blank on tape 3 and then go to stage 4b.
- 5) *Decide whether to accept or reject according to the type of state we ended in.*
 - a) If tape 1 sees an R, reject; if it sees an A, accept.