Compiler
Assignment 2 – Finite automata

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1 Question 1

1.1 aa

$S_0 = \{1\}$
$S_1 = \epsilon - closure(\{1\}) = \{1, 2, 8, 9, 11\}$
$S_2 = move(\{1, 2, 8, 9, 11\}, a) = \{3, 10\}$
$S_3 = \epsilon - closure(\{3, 10\}) = \{3, 4, 6, 9, 10, 11\}$
$S_4 = move(\{3, 4, 6, 9, 10, 11\}, a) = \{7, 10\}$
$S_5 = \epsilon - closure(\{7, 10\}) = \{7, 9, 10, 11, 13\}$

1.2 abba

$S_0 = \{1\}$
$S_1 = \epsilon - closure(\{1\}) = \{1, 2, 8, 9, 11\}$
$S_2 = move(\{1, 2, 8, 9, 11\}, a) = \{3, 10\}$
$S_3 = \epsilon - closure(\{3, 10\}) = \{3, 4, 6, 9, 10, 11\}$
$S_4 = move(\{3, 4, 6, 9, 10, 11\}, b) = \{5, 12\}$
$S_5 = \epsilon - closure(\{5, 12\}) = \{4, 5, 6, 9, 10, 11, 12, 13\}$
$S_6 = move(\{4, 5, 6, 9, 10, 11, 12, 13\}, b) = \{5, 12\}$
$S_7 = \epsilon - closure(\{5, 12\}) = \{4, 5, 6, 9, 10, 11, 12, 13\}$
$S_8 = move(\{4, 5, 6, 9, 10, 11, 12, 13\}, a) = \{7, 10\}$
$S_9 = \epsilon - closure(\{7, 10\}) = \{7, 9, 10, 11, 13\}$

1.3 b

$S_0 = \{1\}$
$S_1 = \epsilon - closure(\{1\}) = \{1, 2, 8, 9, 11\}$
$S_2 = move(\{1, 2, 8, 9, 11\}, b) = \{12\}$
$S_3 = \epsilon - closure(\{12\}) = \{12, 13\}$

1.4 aaab

$S_0 = \{1\}$
$S_1 = \epsilon - closure(\{1\}) = \{1, 2, 8, 9, 11\}$
$S_2 = move(\{1, 2, 8, 9, 11\}, a) = \{3, 10\}$
$S_3 = \epsilon - closure(\{3, 10\}) = \{3, 4, 6, 9, 10, 11\}$
$S_4 = move(\{3, 4, 6, 9, 10, 11\}, a) = \{7, 10\}$
$S_5 = \epsilon - closure(\{7, 10\}) = \{7, 9, 10, 11, 13\}$
$S_6 = move(\{7, 9, 10, 11, 13\}, a) = \{10\}$
$S_7 = \epsilon - closure(\{10\}) = \{9, 10, 11\}$
$S_8 = move(\{9, 10, 11\}, b) = \{12\}$
$S_9 = \epsilon - closure(\{12\}) = \{12, 13\}$

2 Question 2

2.1 aa

$S_0 = \{1\}$
$S_1 = move(\{1\}, a) = \{2\}$
$S_2 = move(\{2\}, a) = \{4\}$

2.2 abba

$S_0 = \{1\}$
$S_1 = move(\{1\}, a) = \{2\}$
$S_2 = move(\{2\}, b) = \{5\}$
$S_3 = move(\{5\}, b) = \{8\}$
$S_4 = move(\{8\}, a) = \{7\}$

2.3 b

$S_0 = \{1\}$
$S_1 = move(\{1\}, b) = \{3\}$

2.4 aaab

$S_0 = \{1\}$
$S_1 = move(\{1\}, a) = \{2\}$
$S_2 = move(\{2\}, a) = \{4\}$
$S_3 = move(\{4\}, a) = \{6\}$
$S_4 = move(\{6\}, b) = \{3\}$