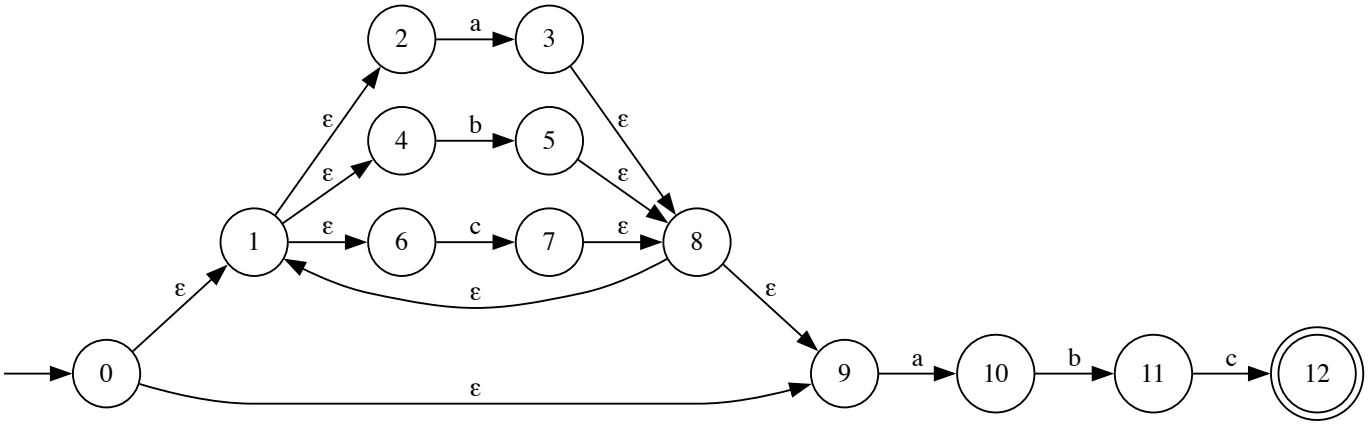
CS323 Written Assignment 2 Sample Answer

Exercise 1

NFA:



The NFA can accept the string $abcabc$, the sequence is $0, 1, 2, 3, 8, 1, 4, 5, 8, 1, 6, 7, 8, 9, 10, 11, 12$.

A = ϵ-closure({0}) = {0, 1, 2, 4, 6, 9}

B = ϵ-closure(move[A, a]) = ϵ-closure({3, 10}) = {1, 2, 3, 4, 6, 8, 9, 10}

C = ϵ-closure(move[A, b]) = ϵ-closure({5}) = {1, 2, 4, 5, 6, 8, 9}

D = ϵ-closure(move[A, c]) = ϵ-closure({7}) = {1, 2, 4, 6, 7, 8, 9}

E = ϵ-closure(move[B, b]) = ϵ-closure({5, 11}) = {1, 2, 4, 5, 6, 8, 9, 11}

F = ϵ-closure(move[E, c]) = ϵ-closure({7, 12}) = {1, 2, 4, 6, 7, 8, 9, 12}

DTran[A, a] = B

DTran[A, b] = C

DTran[A, c] = D

DTran[B, a] = B

DTran[B, b] = E

DTran[B, c] = D

DTran[C, a] = B

DTran[C, b] = C

DTran[C, c] = D

DTran[D, a] = B

DTran[D, b] = C

DTran[D, c] = D

DTran[E, a] = B

DTran[E, b] = C

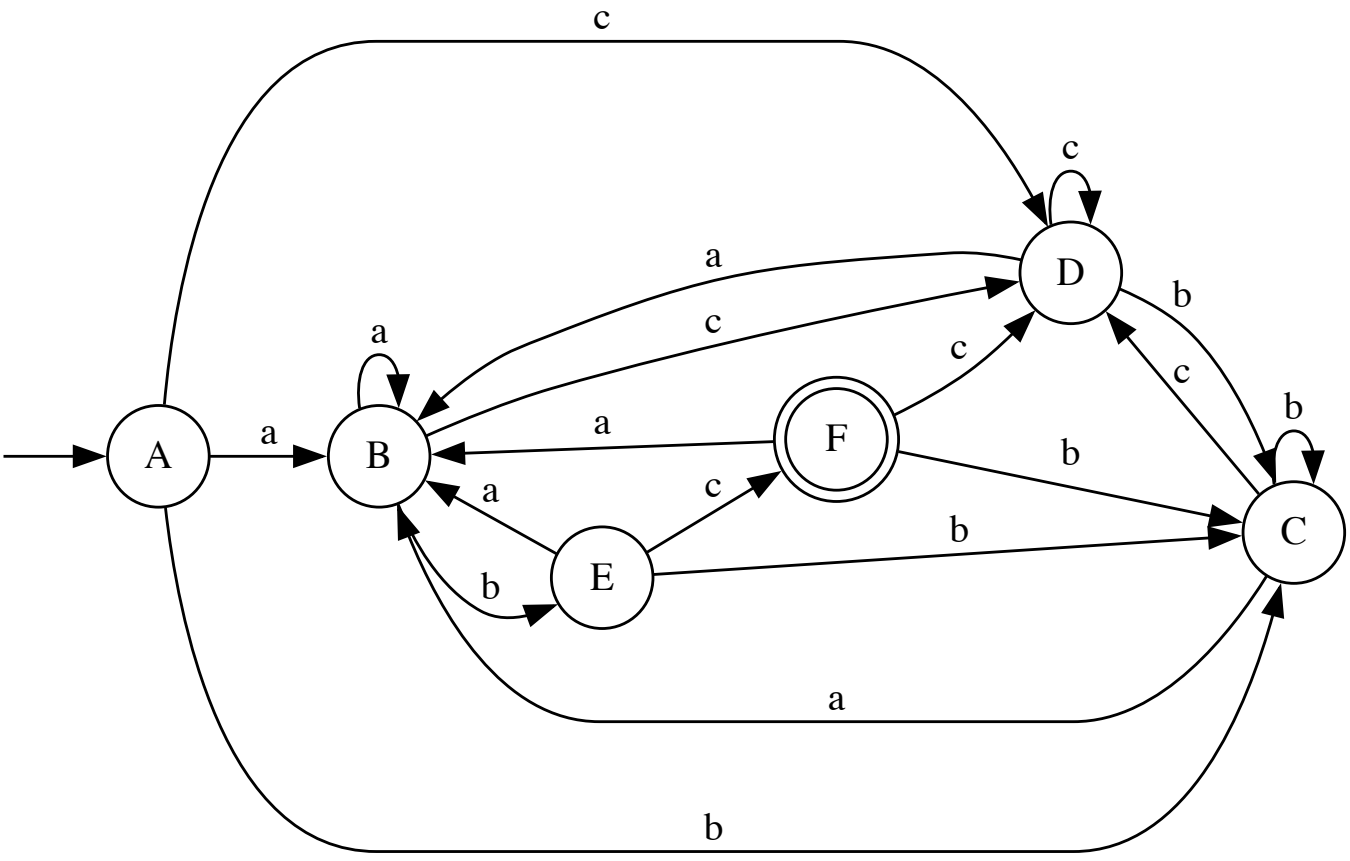
DTran[E, c] = F

DTran[F, a] = B

DTran[F, b] = C

DTran[F, c] = D

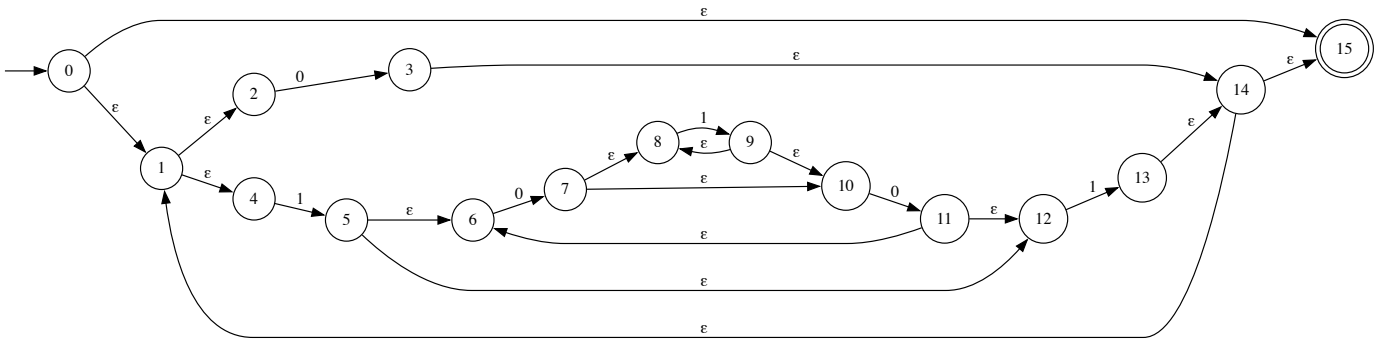
DFA:



The DFA can accept the string $abcabc$, the sequence is A, B, E, F, B, E, F.

Exercise 2

NFA:



The NFA can accept the string 10101.

A = ϵ-closure({0}) = {0, 1, 2, 4, 15}

B = ϵ-closure(move[A, 0]) = ϵ-closure({3}) = {1, 2, 3, 4, 14, 15}

C = ϵ-closure(move[A, 1]) = ϵ-closure({5}) = {5, 6, 12}

D = ϵ-closure(move[C, 0]) = ϵ-closure({7}) = {7, 8, 10}

E = ϵ-closure(move[C, 1]) = ϵ-closure({13}) = {1, 2, 4, 13, 14, 15}

F = ϵ-closure(move[D, 0]) = ϵ-closure({11}) = {6, 11, 12}

G = ϵ-closure(move[D, 1]) = ϵ-closure({9}) = {8, 9, 10}

DTran[A, 0] = B

DTran[A, 1] = C

DTran[B, 0] = B

DTran[B, 1] = C

DTran[C, 0] = D

DTran[C, 1] = E

DTran[D, 0] = F

DTran[D, 1] = G

DTran[E, 0] = B

DTran[E, 1] = C

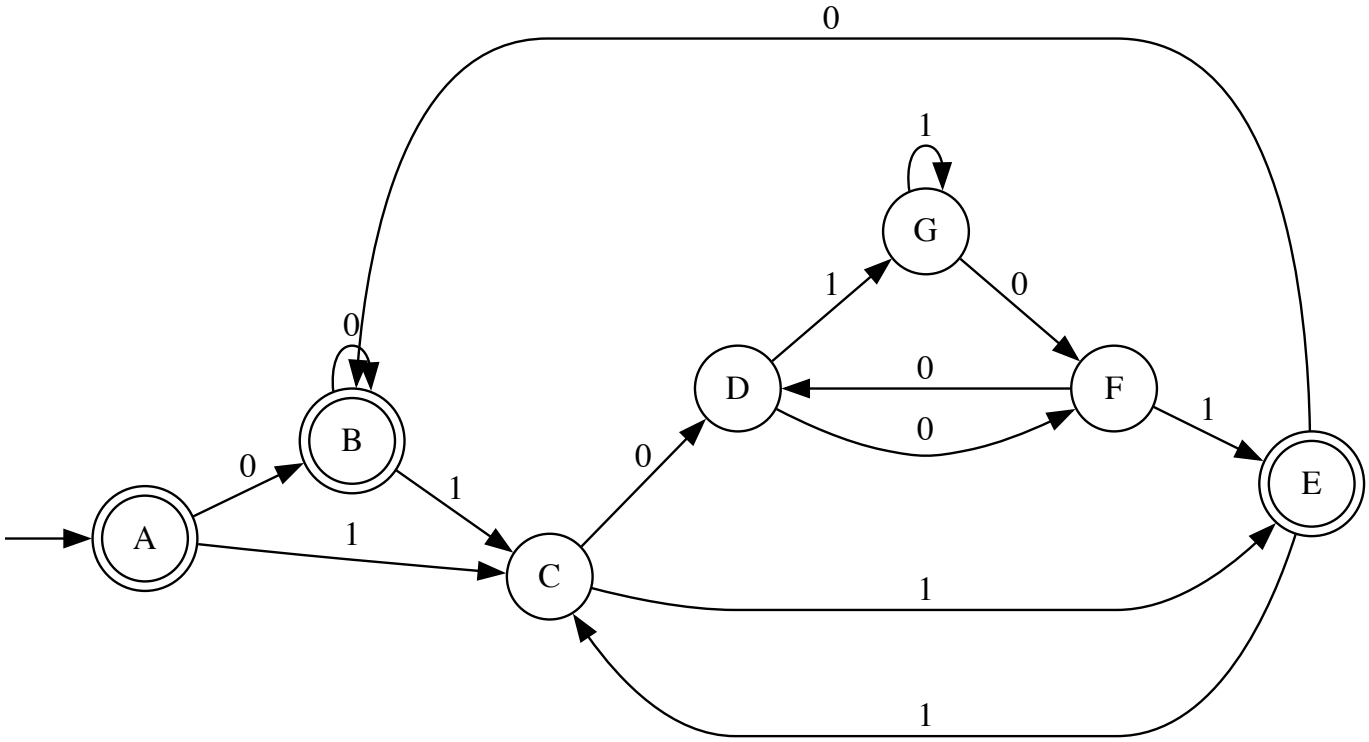
DTran[F, 0] = D

DTran[F, 1] = E

DTran[G, 0] = F

DTran[G, 1] = G

DFA:



The DFA will reject the string 10.