DFA Examples III

State Transition Diagram

State Transition Function

State Transition Function

$\delta(A,0)=B$
$\delta(A,1)=A$
$\delta(B,0)=B$
$\delta(B,1)=A$

State Transition Table

State Transition Table

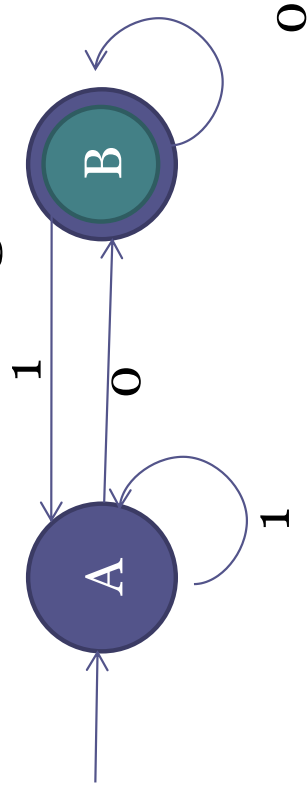| δ	0	1
A	B	A
B	B	A

DFA Examples III

State Transition Diagram

State Transition Function

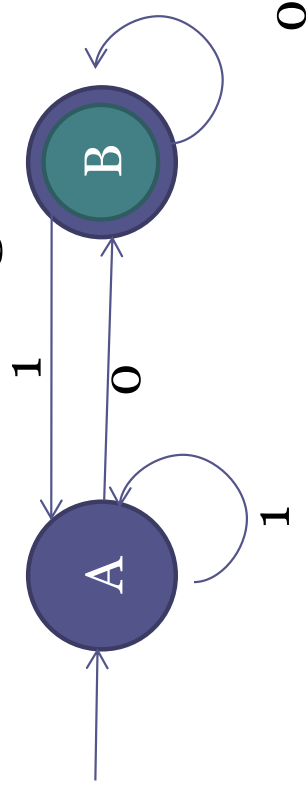$\delta(A,0)=B$
$\delta(A,1)=A$
$\delta(B,0)=B$
$\delta(B,1)=A$

Acceptance of Strings

1 . 1101
$(A,1101)\ |-\ (A,101)\ |-\ (A, 01)\ |-\ (B,1)\ |-\ (A,\ \varepsilon)$ reject

2. 111
$(A,111)\ |-\ (A,11)\ |-\ (A, 1)\ |-\ (A,\ \varepsilon)$ reject

3. 010
$(A,010)\ |-\ (B,10)\ |-\ (A, 0)\ |-\ (B,\ \varepsilon)$ accept

$L(M)=\{w\ \varepsilon\ \{0,1\}^*\ |\ w\ \text{ends with symbol '0'}\}$

DFA Examples IV

State Transition Diagram
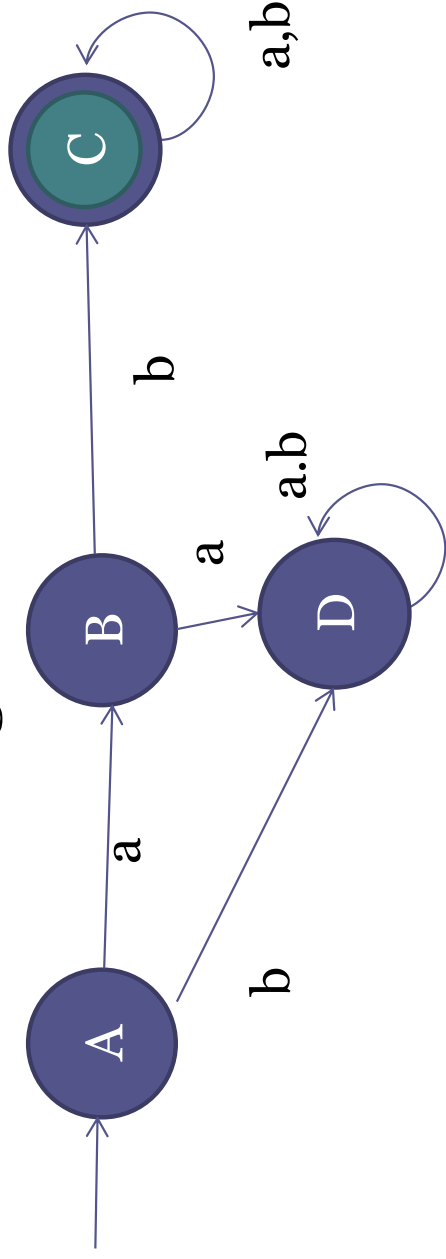
Acceptance of Strings   L(M)={w ε {a.b}*| w begins with 'ab'}

1 . abbb

(A,abbb) |- (B,bbb) |- (C, bb) |- (C,b) |- (C, ε) accept
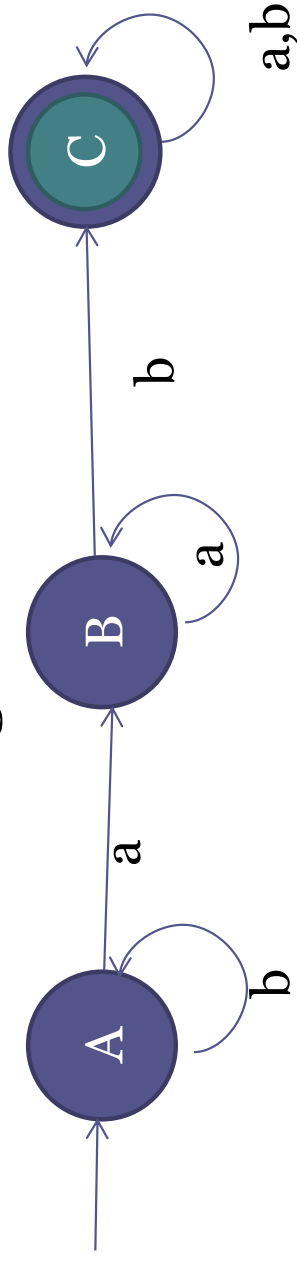
2. bab

(A,bab) |- (D,ab) |- (D, b) |- (D, ε) reject

3. aab

(A,aab) |- (B,ab) |- (D, b) |- (D, ε) reject

DFA Examples V

State Transition Diagram

Acceptance of Strings   **L(M)={w ε {a.b}*| w contains 'ab'}**

1 . abbb

(A,abbb) |- (B,bbb) |- (C, bb) |- (C,b) |- (C, ε) accept
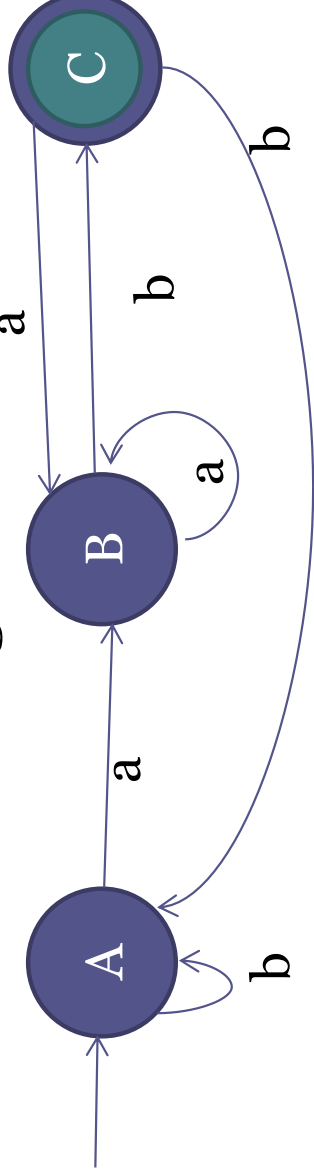
2. bab

(A,bab) |- (A,ab) |- (B, b) |- (C, ε) accept

3. aab

(A,aab) |- (B,ab) |- (B, b) |- (C, ε) accept

DFA Examples VI

State Transition Diagram

Acceptance of Strings   L(M)={w ε {a.b}*| w ends with 'ab'}

1 . abbb
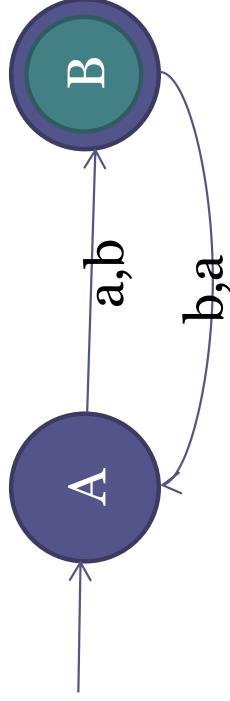(A,abbb) |- (B,bbb) |- (C, bb) |- (A,b) |- (A, ε) reject
2. bab
(A,bab) |- (A,ab) |- (B, b) |- (C, ε) accept
3. aab
(A,aab) |- (B,ab) |- (B, b) |- (C, ε) accept

DFA Examples VII

State Transition Diagram

Acceptance of Strings

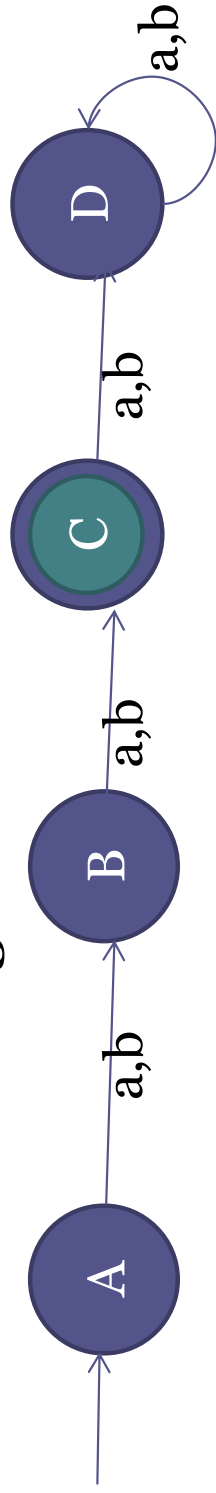1 . aabb

(A,aabb) |- (B,abb) |- (A,bb) |- (B,b) |- (A, ε) reject

2 . aabba

(A,aabba) |- (B,abba) |- (A,bba) |- (B,ba) |- (A,a) |- (B, ε) accept

L(M)={w ε {a.b}*| length of w is odd or |w| mod 2=1}

DFA Examples VIII

State Transition Diagram

```
       a,b         a,b          a,b         a,b
 ──▶( A )─────▶( B )─────▶(( C ))─────▶( D )⟲ a,b
```

Acceptance of Strings

1 . ab

(A,ab) |- (B,b) |- (C, ε) accept

2 . aab

(A,aab) |- (B,ab) |- (C,b) |- (D,ε) reject

L(M)={w ε {a.b}*|length of w is 2 or |w| =2}

DFA Examples IX

State Transition Diagram

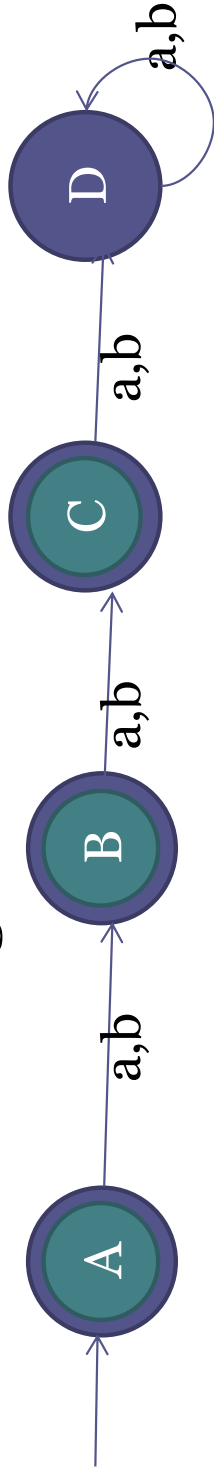## Acceptance of Strings

1 . ab
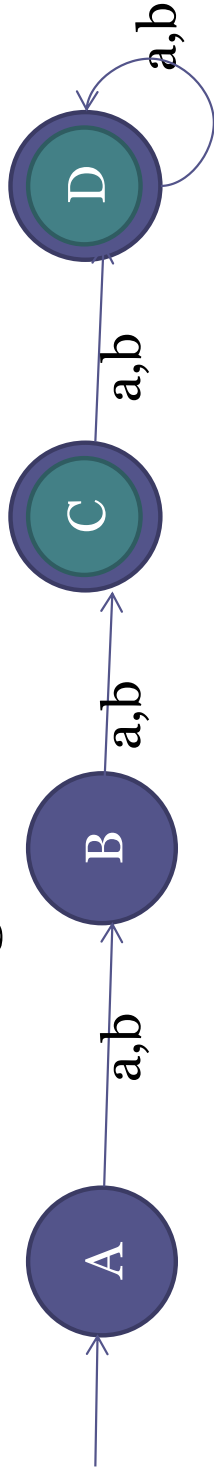
(A,ab) |- (B,b) |- (C, ε) accept

2 . aab

(A,aab) |- (B,ab) |- (C,b) |- (D,ε) accept

L(M)={w ε {a.b}*|length of w is at least 2 or |w| >=2}

DFA Examples X

State Transition Diagram

Acceptance of Strings

1. ab

(A,ab) |- (B,b) |- (C, ε) accept

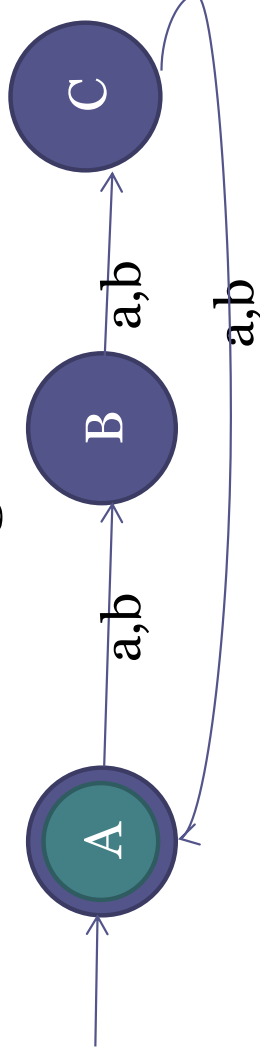2. aab

(A,aab) |- (B,ab) |- (C,b) |- (D,ε) reject

L(M)={w ε {a.b}*|length of w is at most 2 or |w| <=2}

DFA Examples XI

State Transition Diagram

Acceptance of Strings

1 . ab

(A,ab) |- (B,b) |- (C, ε) reject

2 . aab
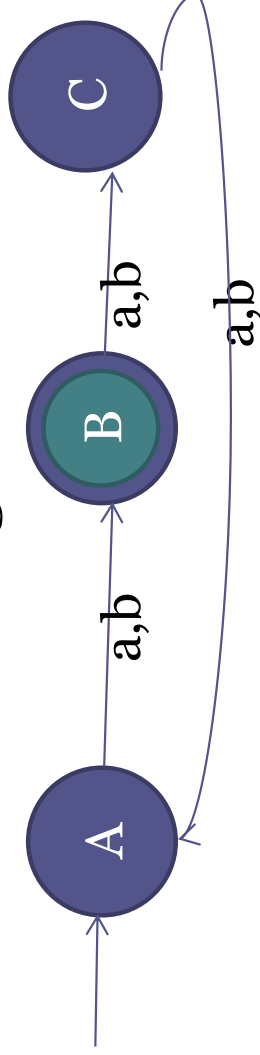
(A,aab) |- (B,ab) |- (C,b) |- (A,ε) accept

L(M)={w ε {a.b}*|length of w is divisible by 3 or |w| mod 3=0}

DFA Examples XII

State Transition Diagram

Acceptance of Strings

1 . ab

(A,ab) |- (B,b) |- (C, ε) reject
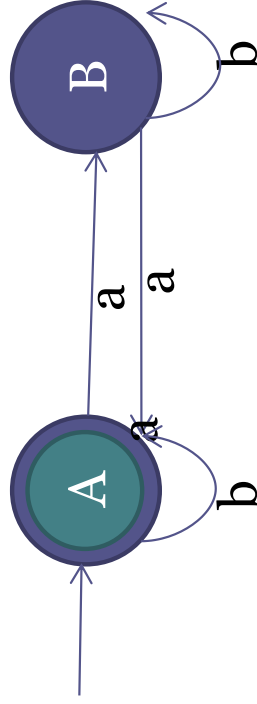
2 . aab

(A,aab) |- (B,ab) |- (C,b) |- (A,ε) reject

3 . aaba

(A,aaba) |- (B,aba) |- (C,ba) |- (A,a) |- (B,ε) reject

L(M)={w ε {a.b}*| |w| mod 3=1}

DFA Examples XIII

State Transition Diagram

Acceptance of Strings

1. ab

(A,ab) |- (B,b) |- (B, ε) reject
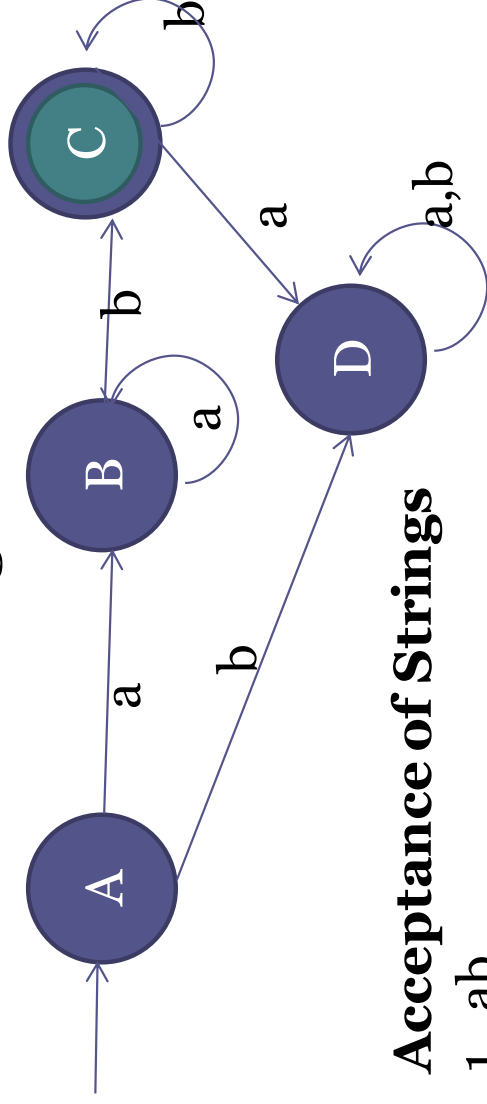
2. aab

(A,aab) |- (B,ab) |- (A,b) |- (A,ε) accept

3. aaba

(A,aaba) |- (B,aba) |- (A,ba) |- (A,a) |- (B,ε) reject

L(M)={w ε {a.b}*| number of a's in w is even}

DFA Examples XIV

State Transition Diagram

Acceptance of Strings

1 . ab
(A,ab) |- (B,b) |- (C, ε) accept
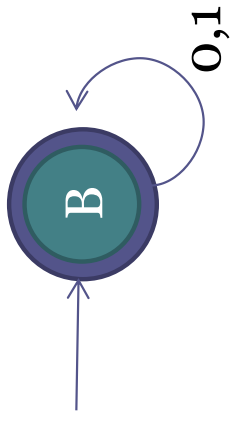2 . aab
(A,aab) |- (B,ab) |- (B,b) |- (C,ε) accept
3. ba
(A,ba) |- (D,a) |- (D, ε) reject

L(M)={w ε {a.b}*| w contains series of 'a' followed by series of 'b'}
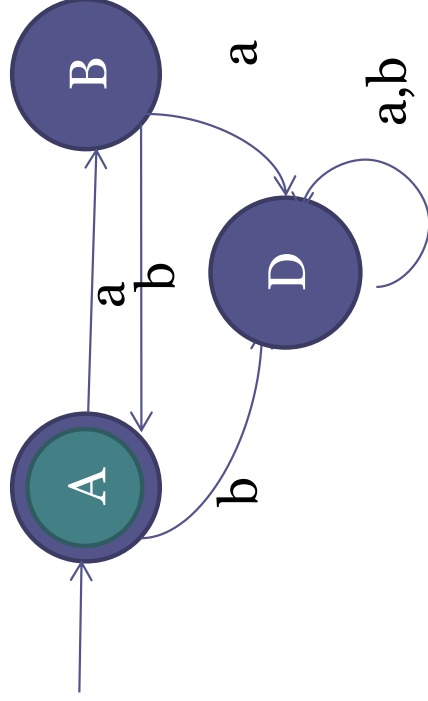
DFA Examples XV

State Transition Diagram

B

0,1

$L(M) = \{w \in \{0,1\}^*\}$

DFA Examples XVI

State Transition Diagram

Acceptance of Strings

1. ab

(A,ab) |- (B,b) |- (A, ε) accept
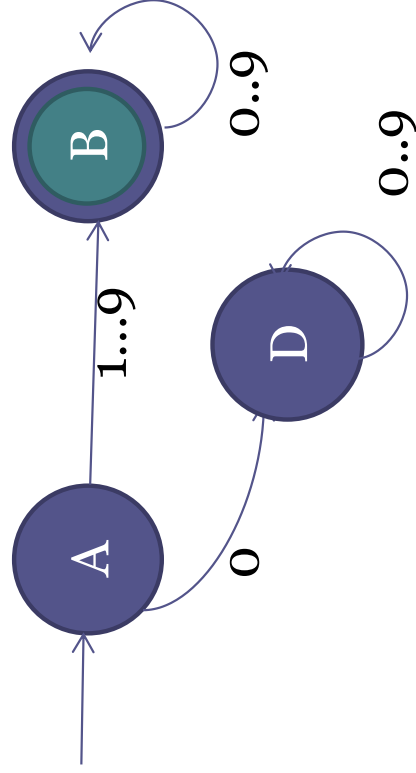
2. aab

(A,aab) |- (B,ab) |- (D,b) |- (D,ε) reject

3. aaba

(A,aaba) |- (D,aba) |- (D,ba) |- (D,a) |- (D,ε) reject

L(M)={w ε {a.b}*| w is of the form (ab)ⁿ, n>=0}

DFA Examples XVII

State Transition Diagram

States: A, B, D

Transitions:
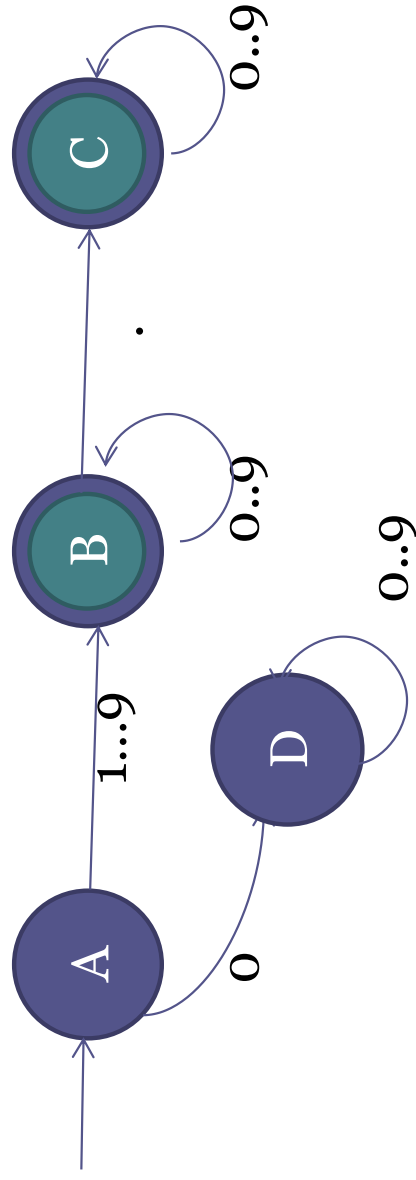- A → B on 1..9
- A → D on 0
- B → B on 0..9
- D → D on 0..9

Representation of integers

DFA Examples XVIII

State Transition Diagram

Representation of decimals