PA Introduction

Brandeis University
Ryan Marcus

February 23, 2015

Introduction

Introduction

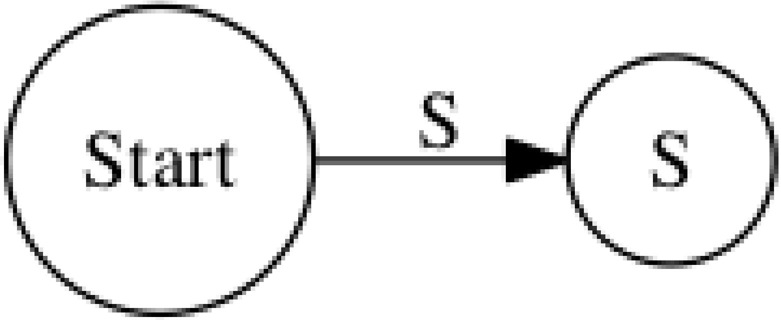
Warning! Some text may be kind of small.
Get the slides here: `http://rmarcus.info/dfa.pdf`

Whitelist

Serena Lily Vanessa Jenny Blaire

Whitelist

<u>S</u>erena Lily Vanessa Jenny Blaire



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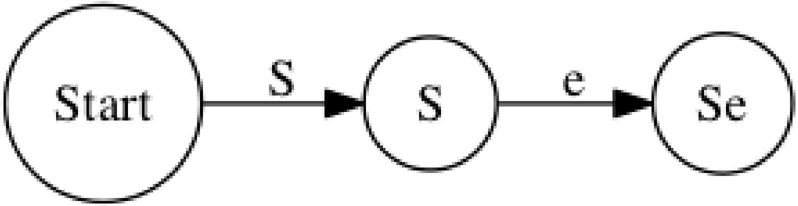

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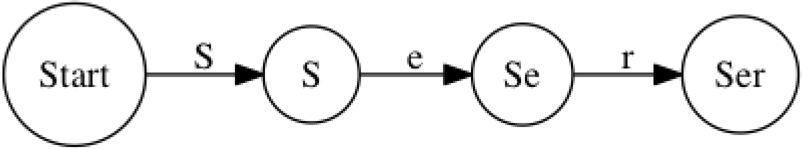

$$\begin{tikzcd}
\text{Start} \arrow[r, "S"] & \text{S} \arrow[r, "e"] & \text{Se} \arrow[r, "r"] & \text{Ser}
\end{tikzcd}$$

Whitelist

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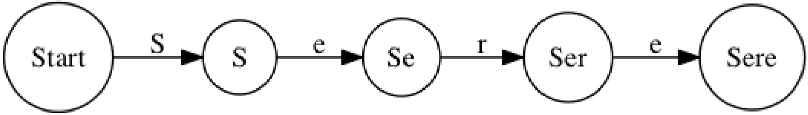

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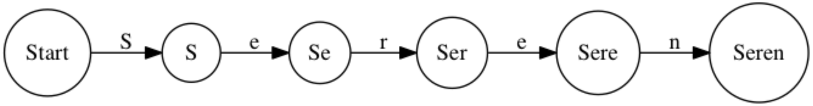

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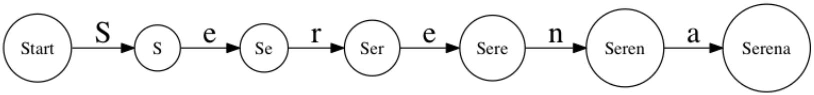

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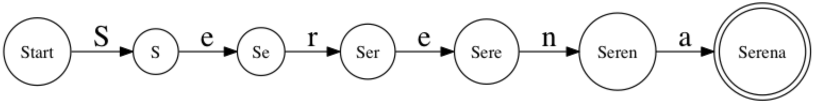

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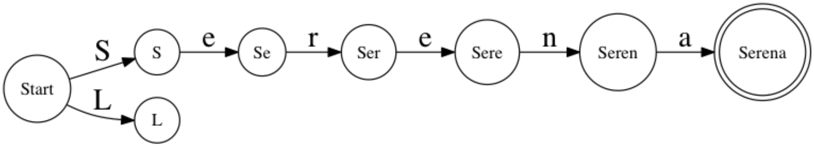

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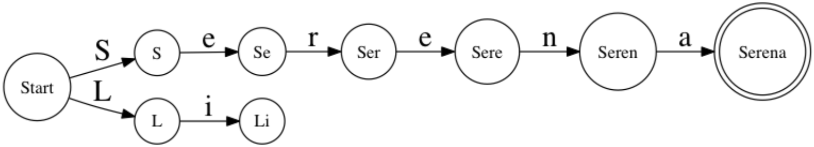

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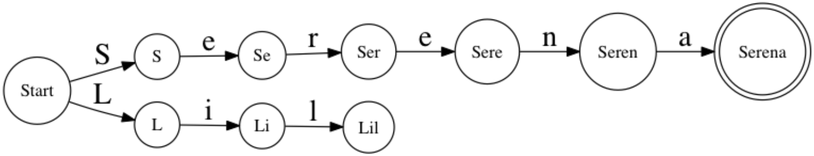

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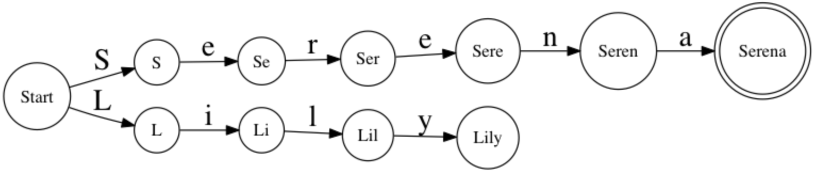

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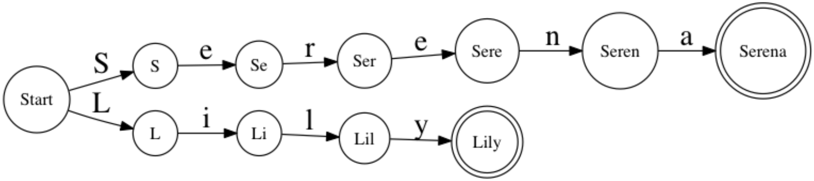
Serena <u>Lily</u> Vanessa Jenny Blaire



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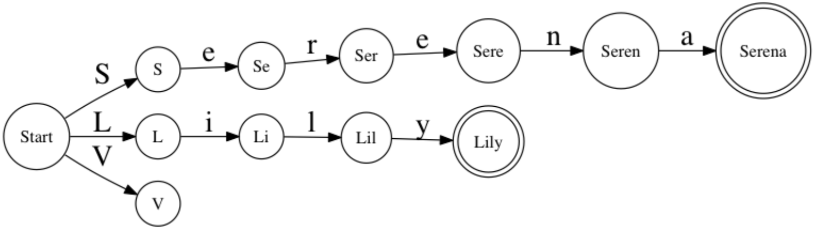

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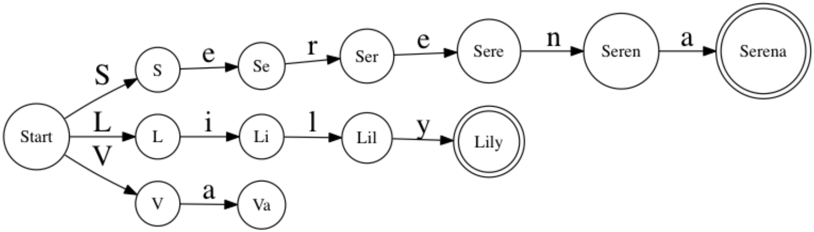

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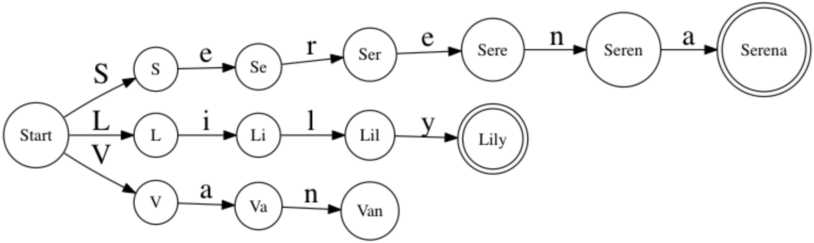

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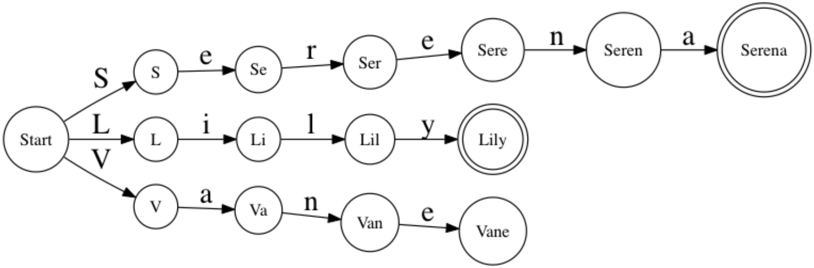

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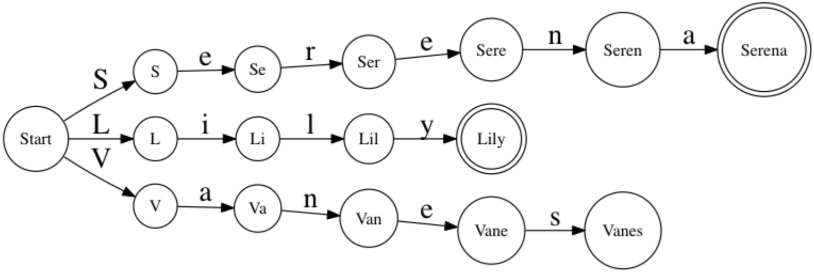

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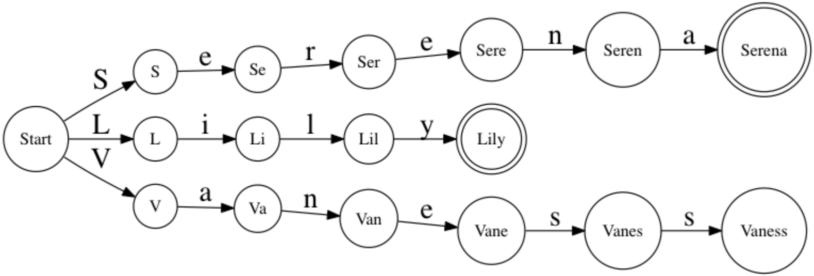

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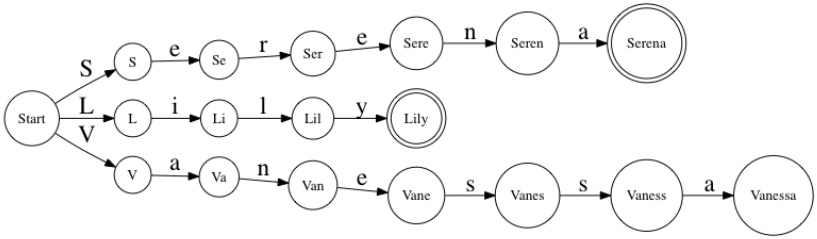

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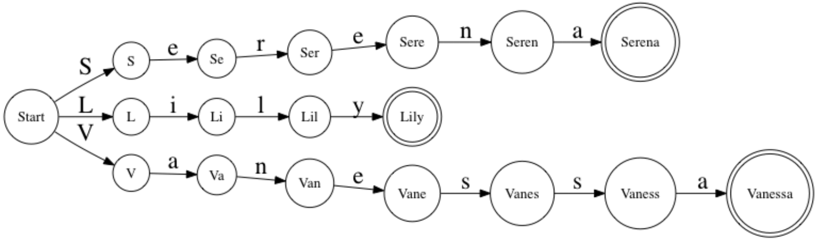

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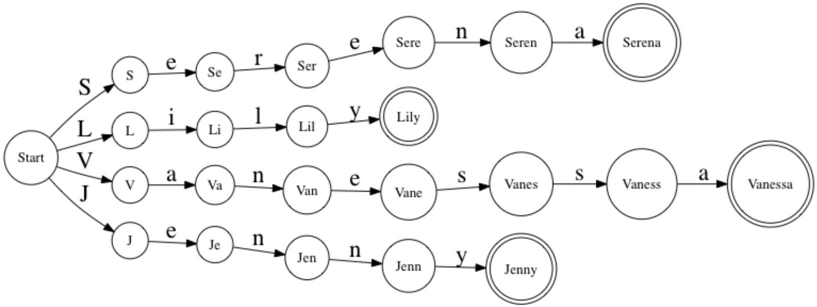

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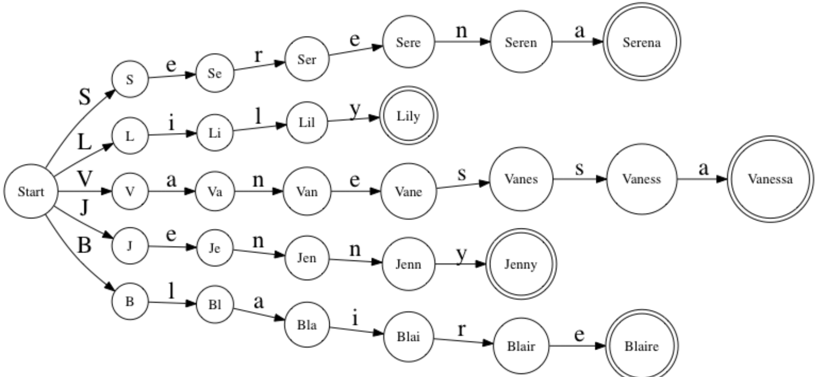
Serena Lily Vanessa Jenny <u>Blaire</u>



Whitelist

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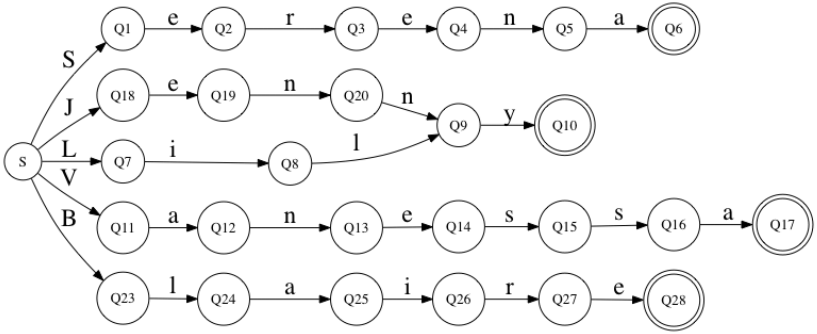
$$\begin{tikzcd}
 & Q1 \arrow[r, "e"] & Q2 \arrow[r, "r"] & Q3 \arrow[r, "e"] & Q4 \arrow[r, "n"] & Q5 \arrow[r, "a"] & Q6 & \\
 & Q7 \arrow[r, "i"] & Q8 \arrow[r, "l"] & Q9 \arrow[r, "y"] & Q10 & & & \\
s \arrow[uur, "S"] \arrow[ur, "L"] \arrow[r, "V"] \arrow[dr, "J"] \arrow[ddr, "B"'] & Q11 \arrow[r, "a"] & Q12 \arrow[r, "n"] & Q13 \arrow[r, "e"] & Q14 \arrow[r, "s"] & Q15 \arrow[r, "s"] & Q16 \arrow[r, "a"] & Q17 \\
 & Q18 \arrow[r, "e"] & Q19 \arrow[r, "n"] & Q20 \arrow[r, "n"] & Q21 \arrow[r, "y"] & Q22 & & \\
 & Q23 \arrow[r, "l"] & Q24 \arrow[r, "a"] & Q25 \arrow[r, "i"] & Q26 \arrow[r, "r"] & Q27 \arrow[r, "e"] & Q28 &
\end{tikzcd}$$

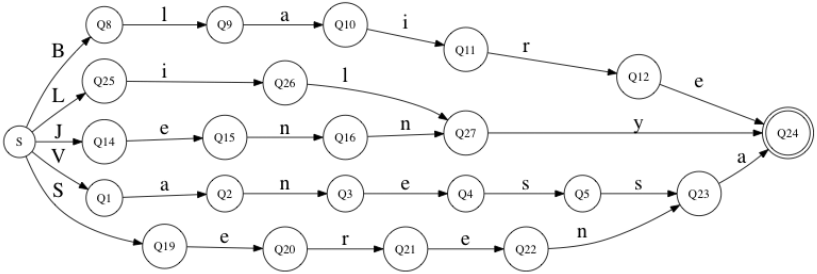
Minimization

Serena Lily Vanessa Jenny Blaire *Valid?*



Minimization

Serena Lily Vanessa Jenny Blaire *Valid?*



Minimization

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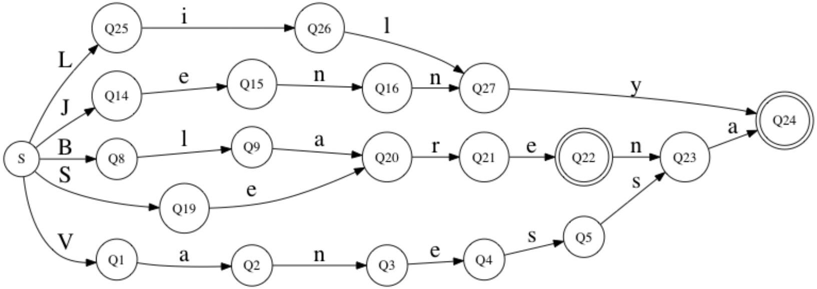

Minimization

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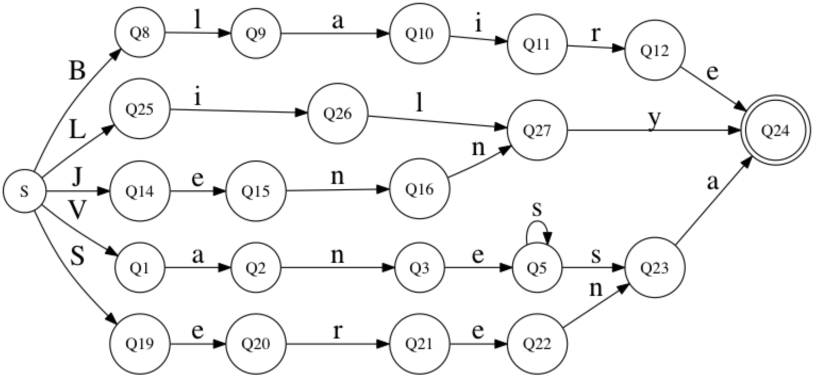

Representation: Node Class

```
class Node {
  Map<String, Node> transitions;
  String nodeLabel;

  public Node(String label) {
    transitions = new HashMap<String, Node>();
    this.nodeLabel = label;
  }

  public void addTrans(String on, Node to) {
   transitions.put(on, to);
  }
}

Node s = new Node("S");
Node q1 = new Node("Q1");
s.addTrans("b", q1);
```

Representation: Adjacency List

```
Map<String, Map<String, String>> adjList =
    new HashMap<String, Map<String, String>>();

Map<String, String> edgesOfS =
    new HashMap<String, String>();

edgesOfS.put("b", "Q1");

adjList.put("S", edgesOfS);
```

Representation: Adjacency Matrix

```
int c = getNumberOfNodesNeeded();
String[][] m = new String[c][c];

m[0][1] = "b";
```

Representation

Method	Insert	Lookup	Space
Node	$O(1)$	$O(1)$	$O(n)$
List	$O(1)$	$O(1)$	$O(n)$
Matrix	$O(1)$	$O(1)$	$O(n^2)$

Questions?