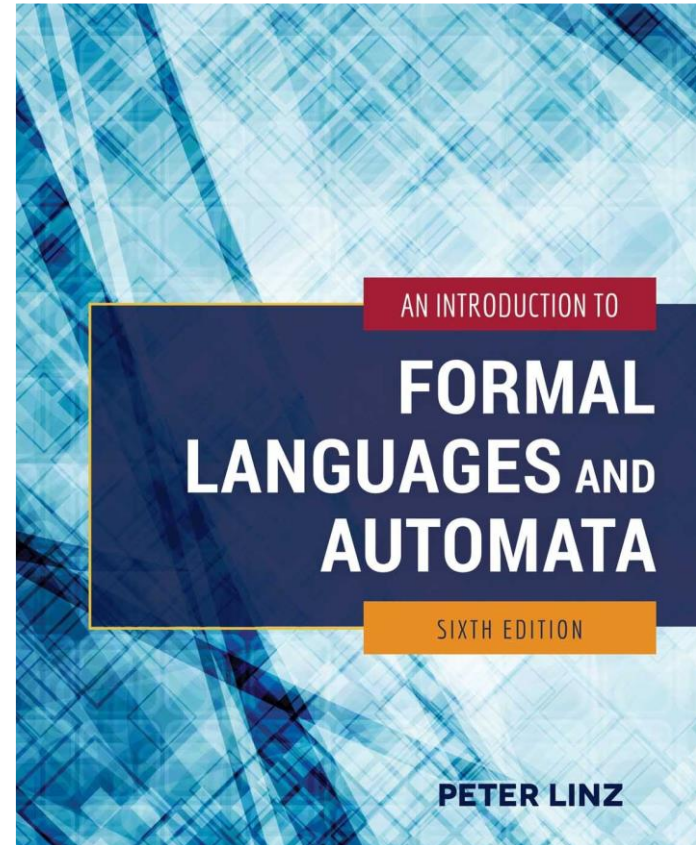
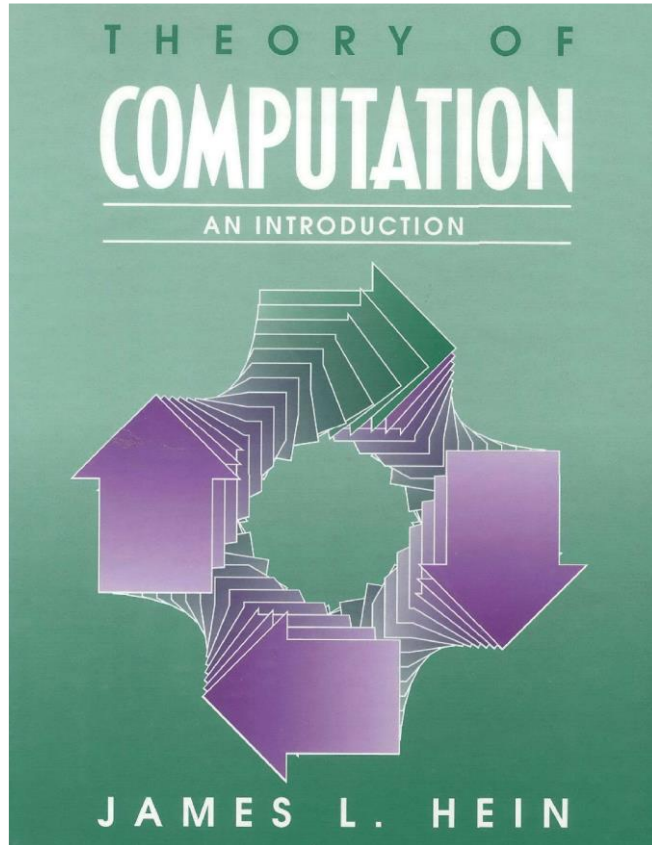


Automata and Formal Languages

Lecture 03

Books



PowerPoint

<http://www.bu.edu.eg/staff/ahmedaboalatah14-courses/14767>

The screenshot shows a web interface for Benha University. At the top, there is a blue header with the university logo, the name 'Benha University', and a welcome message for 'Ahmed Hassan Ahmed Abu El Atta' with a 'Log out' link. Below the header, a navigation menu on the left lists various university services. The main content area displays course details for 'Automata and Formal Languages' by 'Ass. Lect. Ahmed Hassan Ahmed Abu El Atta'. The details are presented in a table with blue headers and white content. A 'Course password' section is also visible. On the right side, there are social media icons and a vertical toolbar with icons for Google, a book, RG, LinkedIn, Facebook, Twitter, Google+, YouTube, WordPress, a camera, a globe, a question mark, and an edit icon.

Benha University

Staff Search: **Welcome: Ahmed Hassan Ahmed Abu El Atta (Log out)**

You are in: [Home](#) / [Courses](#) / [Automata and Formal Languages](#) [Back To Courses](#)

Ass. Lect. Ahmed Hassan Ahmed Abu El Atta :: Course Details:
Automata And Formal Languages [add course](#) | [edit course](#)

Course name	Automata and Formal Languages
Level	Undergraduate
Last year taught	2018
Course description	Not Uploaded
Course password	
Course files	add files
Course URLs	add URLs
Course assignments	add assignments
Course Exams & Model Answers	add exams

Course password

Course files [add files](#)

Course URLs [add URLs](#)

Course assignments [add assignments](#)

Course Exams & Model Answers [add exams](#)

(edit)

FINITE AUTOMATA & Regular Language Examples

Agenda

- Example 01: words odd length?
- Example 02: a's odd length?
- Example 03: What is the language?
- Example 04: prefix ab?
- Example 05: substring 001?
- Example 06: except substring 001?
- Example 07: What is the language?
- Example 08: is regular?
- Example 09: NFA transitions table?
- Example 10: odd a's and even b's?

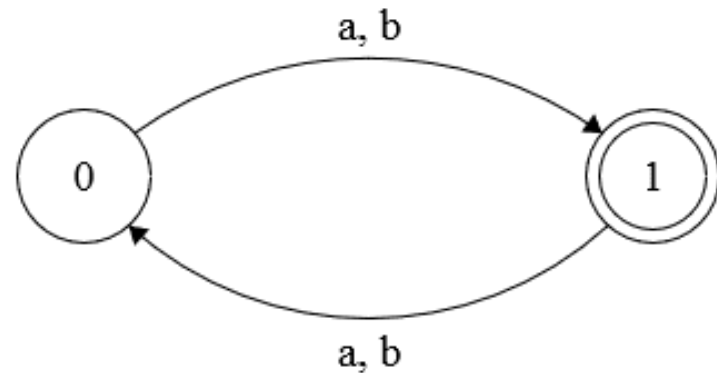
Example 01: words odd length?

Construct an FA that accepts language over { a, b } with odd length words?

$L = \{a, b,$

aaa, aab, aba, baa, abb, bab, bba,
bbb,

aaaaa, aaaab,}



Example 02: a's odd length?

Construct an FA that accepts language over { a, b } with odd a's?

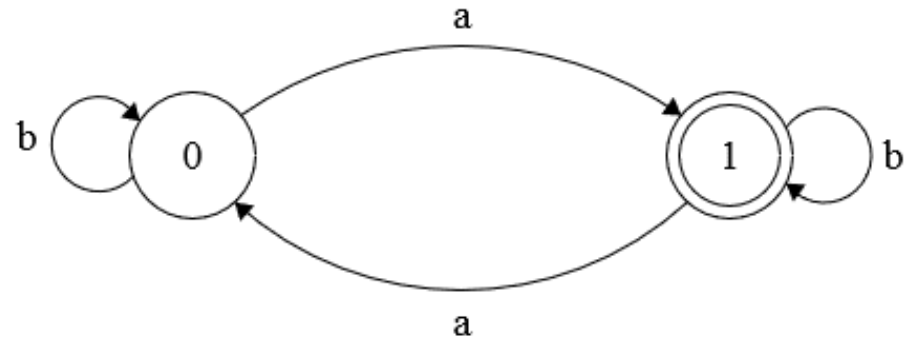
$L = \{a, ab, ba, abb, bab, bba, \dots$

$aaa, aaab, aaba, abaa, baaa, abbb,$

$aaabb, aabab, abaab, baaab,$

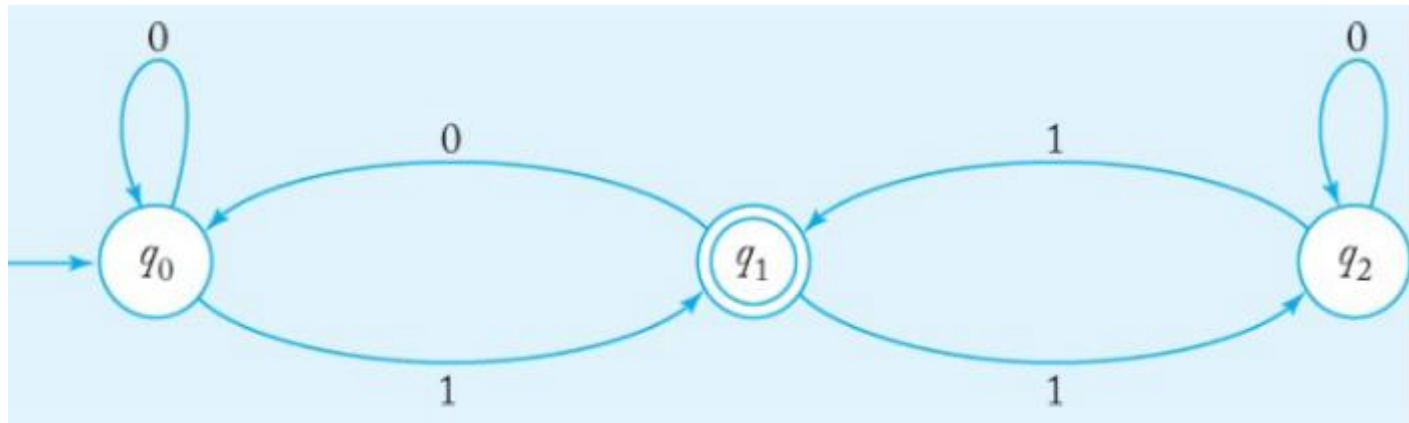
$aabba, ababa, baaba, abbaa,$

$babaa, bbaaa, \dots\}$



Example 03: What is the language?

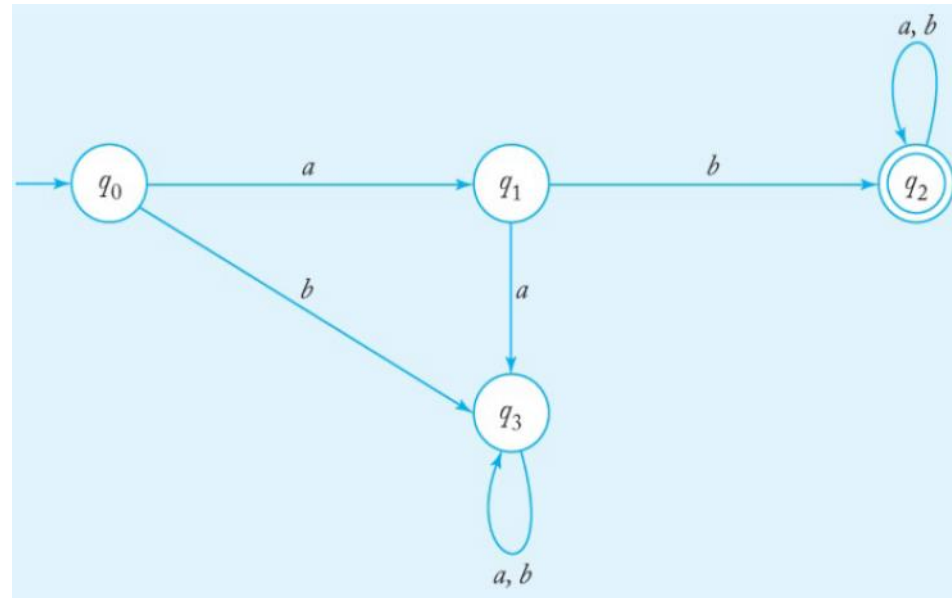
- 101, ✓
- 0111, ✓
- 11001, ✓
- 100, ✗
- 1100, ✗
- 0001, ✓
- 01101, ✓
- 00001101, ✓



Example 04: prefix ab ?

Find a deterministic finite accepter that recognizes the set of all strings on $\Sigma = \{a, b\}$ starting with the prefix ab ?

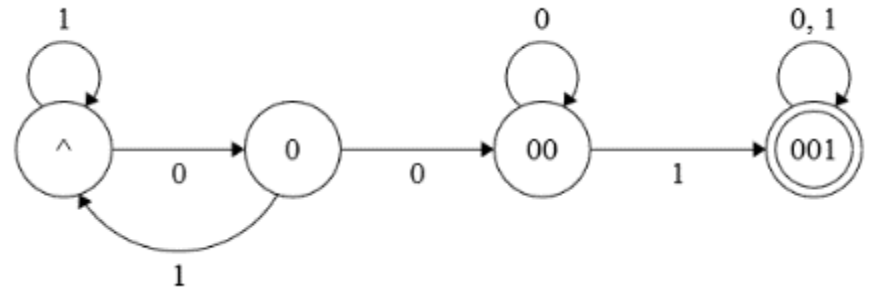
$L = \{ab, aba, abb, abaa, abab, abba, abbb, abaaa, \dots\}$



Example 05: substring 001?

Find a DFA that accepts all the strings on $\{0, 1\}$, those containing the substring 001?

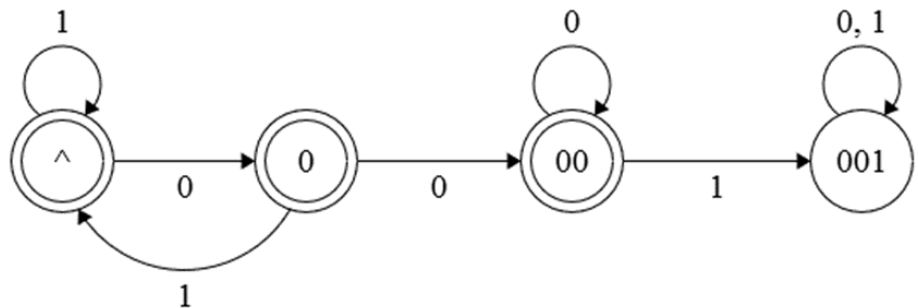
$L = \{001, 0001, 1001, 0010, 0011, 00001, 01001, 10001, 11001, 00010, 00011, 10010, 10011, 00100, 00101, 00110, 00111, \dots\}$



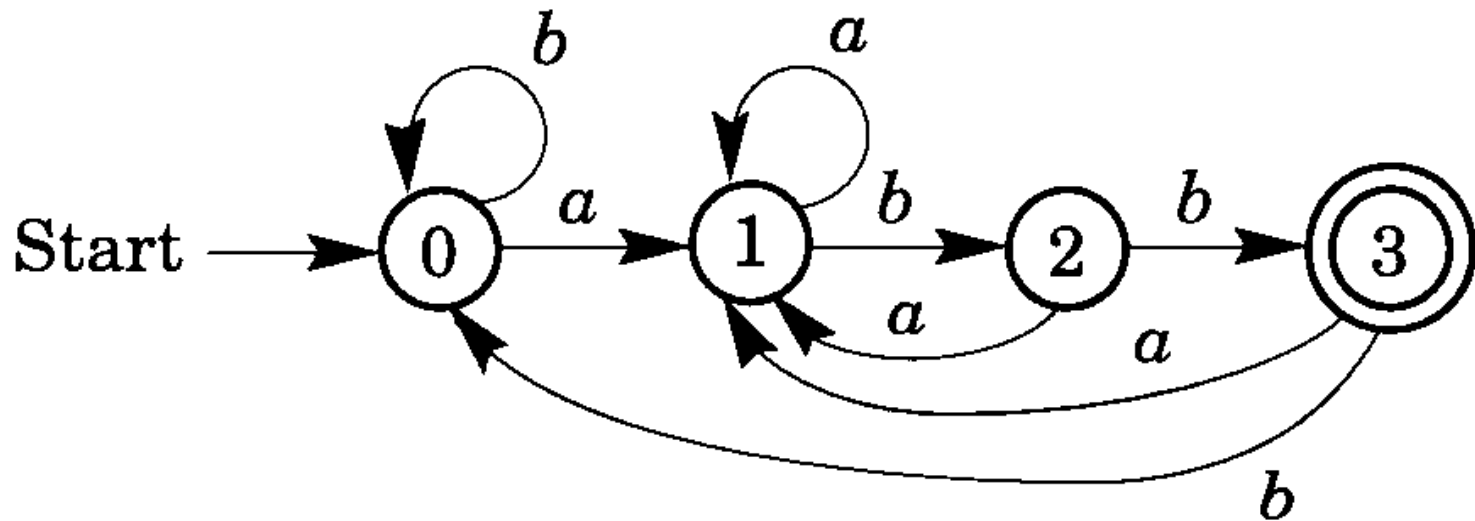
Example 06: **except** substring 001?

Find a DFA that accepts all the strings on $\{0, 1\}$, **except** those containing the substring 001?

$L = \{\epsilon, 0, 1, 00, 01, 10, 11, 000, 010, 100, 110, 101, 011, 111, 0000, 0100, 1000, 1100, 1010, 0101, 0110, 0011, \dots\}$



Example 07: What is the language?



$L = \{$
abb,
aabb, babb,
aaabb, ababb, baabb, bbabb,
aaaabb, aababb, abaabb, baaabb, abbabb, bababb, bbaabb, bbbabb,}

Example 08: is regular?

Show that the language

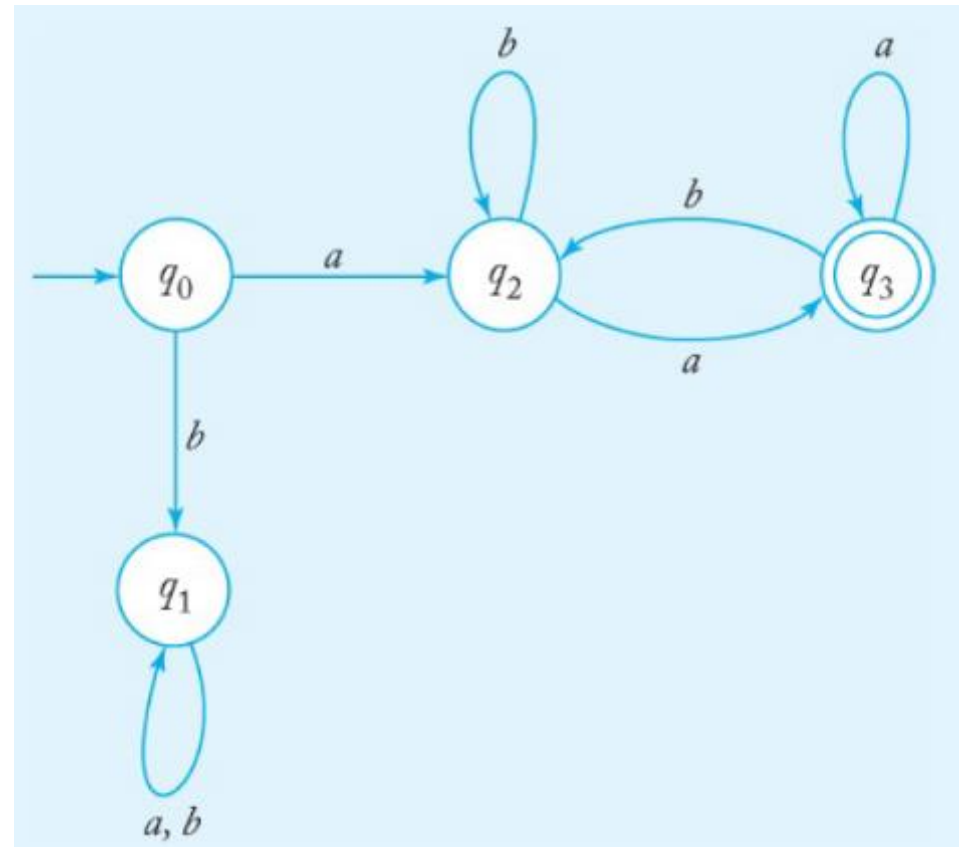
$$L = \{awa : w \in \{a, b\}^*\}$$

is regular?

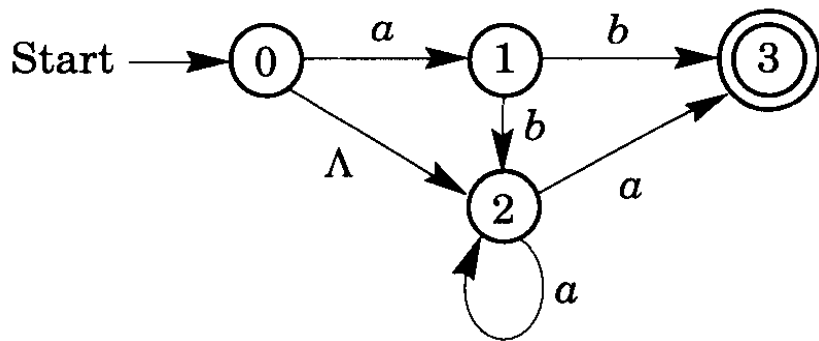
$L = \{aa, aaa, aba,$

$aaaa, aaba, abaa, abba,$

$aaaaa, aaaba, aabaa, abaaa,$
 $aabba, ababa, abbaa, abbba, \dots\}$



Example 09: NFA transitions table?

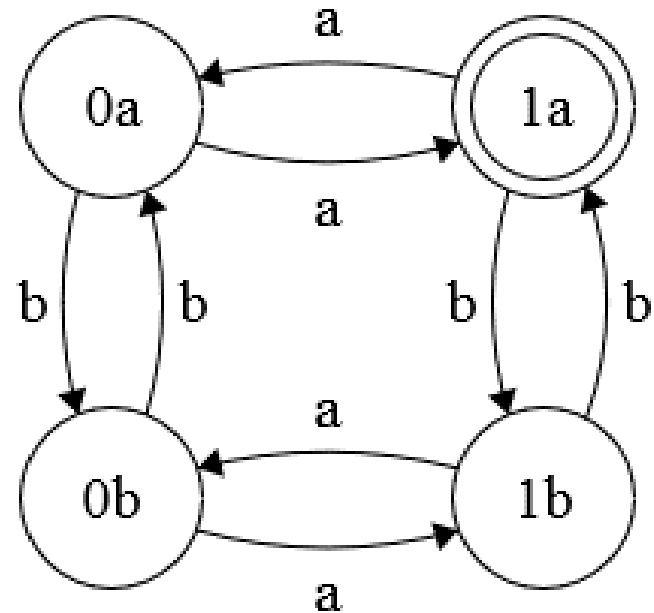


	T	a	b	Λ
start	0	{1}	\emptyset	{2}
	1	\emptyset	{2,3}	\emptyset
	2	{2,3}	\emptyset	\emptyset
final	3	\emptyset	\emptyset	\emptyset

Example 10: odd a's and even b's?

Find a deterministic finite accepter that recognizes the set of all strings on $\Sigma = \{a, b\}$ with odd a's and even b's?

$L = \{a, aaa, abb, bab, bba, aaaaa, aaabb, aabab, abaab, baaab, aabba, ababa, baaba, abbaa, babaa, bbaaa, \dots\}$



Example 10: odd a's and even b's?

0,a -> 1

a,a -> a

0a,a -> 1a

0,b -> 0

a,b -> b

0a,b -> 0b

0,a -> 1

b,a -> b

0b,a -> 1b

0,b -> 0

b,b -> a

0b,b -> 0a

1,a -> 0

a,a -> a

1a,a -> 0a

1,b -> 1

a,b -> b

1a,b -> 1b

1,a -> 0

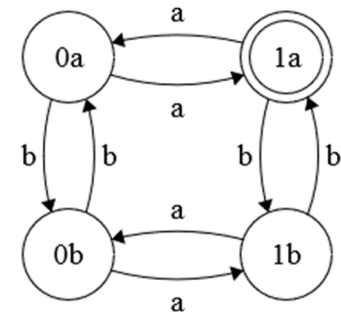
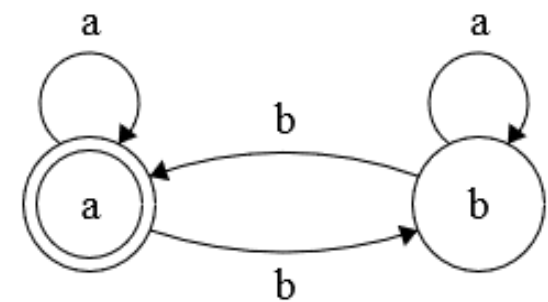
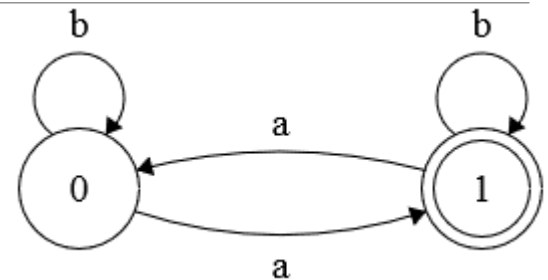
b,a -> b

1b,a -> 0b

1,b -> 1

b,b -> a

1b,b -> 1a



Example 10: odd a's and even b's?

