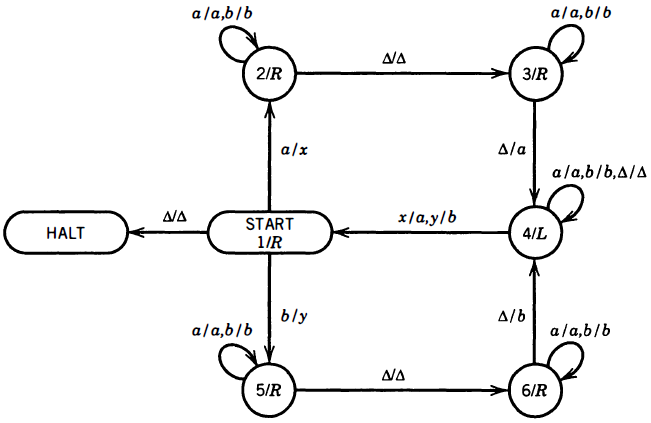
Variation on TM:

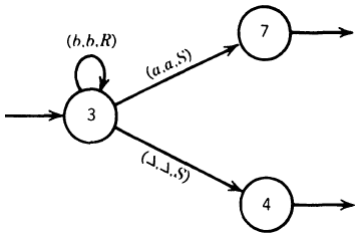
Move-In-State Machine:

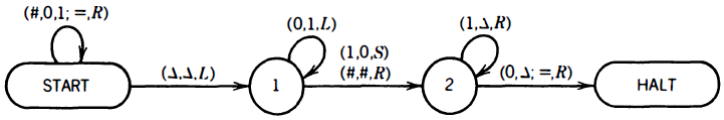


STATE	HEAD	TAPE	READ	WRITE	TAPE
1		baa	b	y	Yaa
5	R	yaa	a	a	yaa
5	R	yaa	a	a	yaa
5	R	yaaΔ	Δ	Δ	yaaΔ
6	R	yaaΔΔ	Δ	b	yaaΔb
4	L	yaaΔb	Δ	Δ	yaaΔb
4	L	yaaΔb	a	a	yaaΔb

$$\begin{aligned}
&\overset{1}{\underline{b}aa} \rightarrow \overset{5}{y\underline{a}a} \rightarrow \overset{5}{ya\underline{a}} \rightarrow \overset{5}{yaa\underline{\Delta}} \rightarrow \overset{6}{yaa\Delta\underline{\Delta}} \rightarrow \overset{4}{yaa\underline{\Delta}b} \rightarrow \overset{4}{ya\underline{a}\Delta b} \\
\rightarrow\ &\overset{4}{y\underline{a}a\Delta b} \rightarrow \overset{4}{\underline{y}aa\Delta b} \rightarrow \overset{1}{b\underline{a}a\Delta b} \rightarrow \overset{2}{bx\underline{a}\Delta b} \rightarrow \overset{2}{bxa\underline{\Delta}b} \rightarrow \overset{3}{bxa\Delta\underline{b}} \\
\rightarrow\ &\overset{3}{bxa\Delta b\underline{\Delta}} \rightarrow \overset{4}{bxa\Delta\underline{b}a} \rightarrow \overset{4}{bxa\underline{\Delta}ba} \rightarrow \overset{4}{bx\underline{a}\Delta ba} \rightarrow \overset{4}{b\underline{x}a\Delta ba} \rightarrow \overset{1}{ba\underline{a}\Delta ba} \\
\rightarrow\ &\overset{2}{bax\underline{\Delta}ba} \rightarrow \overset{3}{bax\Delta\underline{b}a} \rightarrow \overset{3}{bax\Delta b\underline{a}} \rightarrow \overset{3}{bax\Delta ba\underline{\Delta}} \rightarrow \overset{4}{bax\Delta\underline{b}aa} \rightarrow \overset{4}{bax\Delta\underline{b}aa} \\
\rightarrow\ &\overset{4}{bax\underline{\Delta}baa} \rightarrow \overset{4}{ba\underline{x}\Delta baa} \rightarrow \overset{1}{baa\underline{\Delta}baa} \rightarrow \text{HALT}
\end{aligned}$$

Stay-Option Machine:





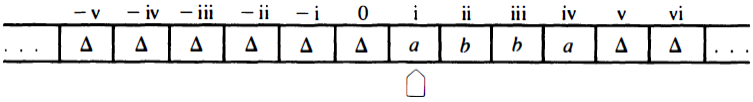
(#,0,1;=,R) If we read # or 0 or 1 simply move the head to R

State	Tape
START	#101001000
START	#101001000
START	#101001000
START	#101001000
START	#101001000
START	#101001000

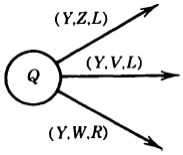
State	Tape
START	#101001000
START	#101001000
START	#101001000
START	#101001000
START	#101001000Δ
1	#101001000Δ

State	Tape
1	#101001001Δ
1	#101001011Δ
1	#101001111Δ
2	#101000111Δ
HALT	#101000111Δ

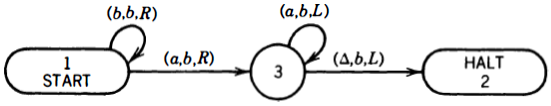
Two-Way Infinite Tape Model:



Non-Deterministic TM:



Encoding of TMs



From	To	Read	Write	Move
1	1	*b*	*b*	*R*
1	3	*a*	*b*	*R*
3	3	*a*	*b*	*L*
3	2	Δ	*b*	*L*

Coding Scheme

- Step 1: From x to y: $a^x b a^y b$

From (x)	To (y)	Read	Write	Move	Coding ($a^x b a^y b$)
1	1	b	b	R	abab
1	3	a	b	R	abaaab
3	3	a	b	L	aaabaaab
3	2	Δ	b	L	aaabaab

- Step 2: Read, Write

X_3, X_4	Code
a	*aa*
b	*ab*
Δ	*ba*
#	*bb*

From	To	Read	Write	Move	Coding
1	1	b	b	R	abab ab ab
1	3	a	b	R	abaaab aa ab
3	3	a	b	L	aaabaaab aa ab
3	2	Δ	b	L	aaabaab ba ab

- Step 3: Direction

X_5	Code
L	*a*
R	*b*

From	To	Read	Write	Move	Coding
1	1	b	b	R	abababab b
1	3	a	b	R	abaaabaaab b
3	3	a	b	L	aaabaaabaaab a
3	2	Δ	b	L	aaabaabbaab a

Final Table:

From	To	Read	Write	Move	Coding
1	1	b	b	R	abababab
1	3	a	b	R	abaaabaaabb
3	3	a	b	L	aaabaaabaaaba
3	2	Δ	b	L	aaabaabbaaba

Implementation before Coding:

Option #1:	Option #2:

int fr[x];
int to[x];
char rd[x];
char wr[x];
char mv[x];
	struct O {
	  int fr;
	  int to;
	  char rd;
	  char wr;
	  char mv;
	};
	O arr[x];

Implementation after Coding:

- Single-Dimensional Array of Strings
  - Preference: Dynamic
  - C Language:
    - malloc
    - free
  - C++:
    - new
    - delete
- Linked List of Strings