

i23.2535 | ,22-1378

Compiler Construction

(S-A | Muhammad) Harris Archer

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O.R.E for token type

RegEx: (start|finish|loop|condition|declare|output|input|function|return
break|continue|else)

② Identifiers:

RegEx: [A-Z][a-zA-Z][0-9][0-30]
P.E. (Uppercase letter)(letter + digit)*

③ Integer literals.

RegEx: [-]?[0-9]+
P.E. (Sign + E) Digit . Digit *

④ Floating Point literals.

RegEx: [-]?[0-9]+\.[0-9]{1,6}([eE][-]?[0-9]+)?
P.E. (Sign + E) Digit Digit*. Digit Digit* (e + E + L) (sign) Digit

⑤

String literals:

RegEx: "([^\n\r]|\n\r)|\"[\n\r])*"

⑥ Character literals

RegEx: '([^\n\r]|\n\r)'



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① Boolean Literals

Reger.: (true/false)

R.E.: true + false

② Operator

Arithm. $\sim | * | + | - | ^ | / | \cdot | \%$

Relop. $\sim (= | != | <= | >= | < | >)$

Logical $\sim (\& | \mid | \mid \mid \mid \mid)$

Assignment $\sim (+= | -= | *= | /= | \:= | \:=)$

③ Incre/Decr op. $\sim (++ | --)$

Operator $\sim (*+ | ++ | -+ | -= | *= | -= | /= | \:= | \:= | <= | >= | \geq | \leq | \mid | + | - | > | / | \cdot | \%$
 $| \mid | \cdot | = | \leq | \geq | \mid | !)$

④ Punctuator

Reger.: [() { } [] { ; , : . }]

10. Comment

S. M Rger.: $\# [\gamma \alpha]^*$

Mult: $\therefore \# \backslash + ([\gamma \alpha] | \backslash + + [\gamma \alpha \#])^* | \# + H$

⑤ Whitespace

Reger.: [\t \r \n] +

\t \r \n



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(S-A)

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 Compiler Assignment #1

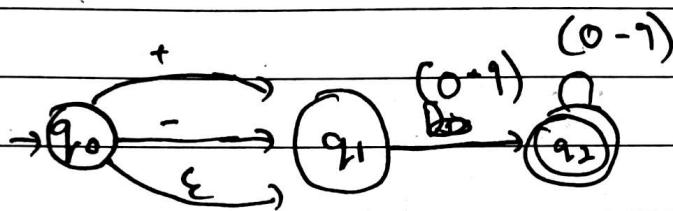
① NFA:

① Integer literal $\rightarrow [+-]?[0-9]^*$

Regular Expression: $\text{Sign} \rightarrow +|-$
 $\text{Integer} = 0-9$

$$R.E.: ((\text{Sign} + \epsilon) (\text{Digit})^*)^+ (\text{Sign} + \epsilon) \text{ Digit}^* \text{ Digit}^*$$

② NFA



② Transition Table

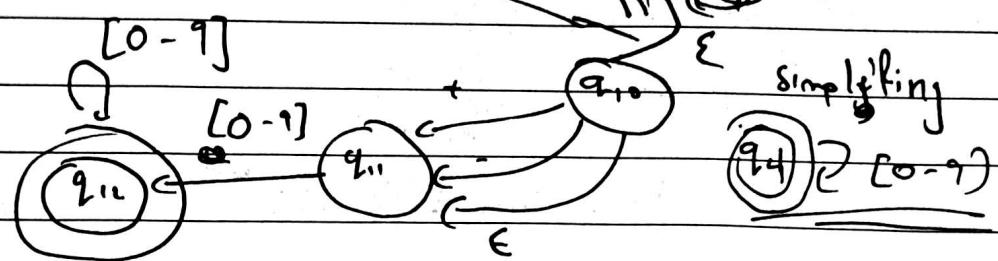
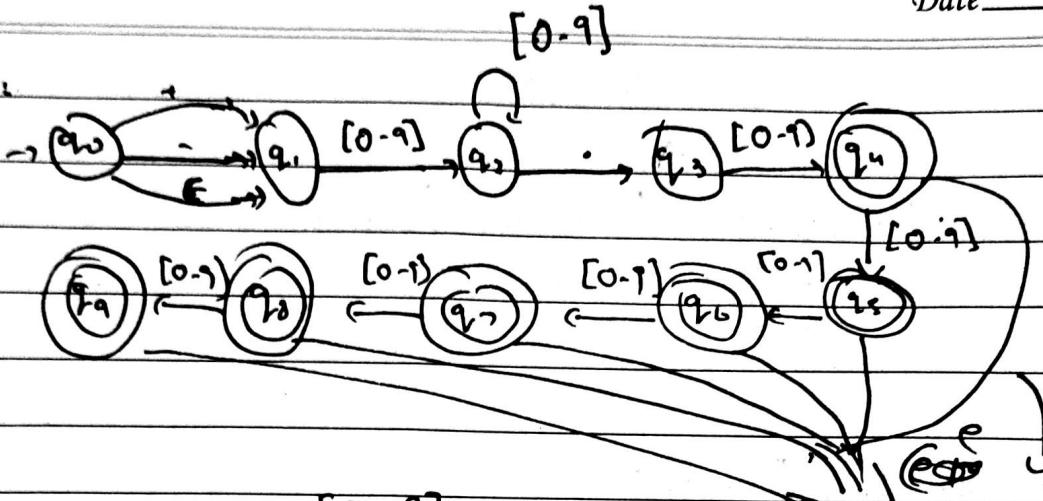
state	Input +	Input -	Input 0-9	Input E
q_0	q_1	q_1	q_1	q_1
q_1	\emptyset	\emptyset	q_2	\emptyset
q_2	\emptyset	\emptyset	q_2	\emptyset

② Floating Point literals:

 $\rightarrow \text{RegEx: } [+-]?[0-9]^* \cdot [0-9] \{1,6\} ([eE][+-]?[0-9]^*)? ?$

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NFA.



Transition Table:

s/t	+/-	0-1	.	c/E	E
-/q0	q1	∅	∅	∅	q1
q1	q	q2	∅	∅	∅
q2	∅	q2	q3	∅	∅
q3	∅	q4	∅	∅	∅
(q4)	∅	[q _{max}]	∅	q ₁₀	∅
q5	"	"	"	"	"
q6	"	"	"	"	"
q7	"	"	"	"	"
q8	"	"	"	"	"
q9	∅	∅	∅	q ₁₀	∅
q10	q ₁₁	∅	∅	∅	q ₁₁
q11	∅	q ₁₁	∅	∅	∅
(q12)	∅	q ₁₂	∅	∅	∅

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transis..

③ Identifier

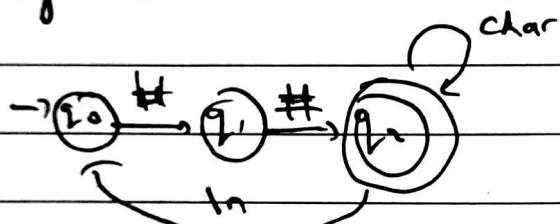
Refer. [A-Z][a-zA-Z0-9_]{0-30}



	[A-Z]	[a-zA-Z0-9_]	{0-1}	-
q0			∅	∅
q1			∅	∅
q2			∅	∅

↳ Simplifying we will need 30 states to keep cont.

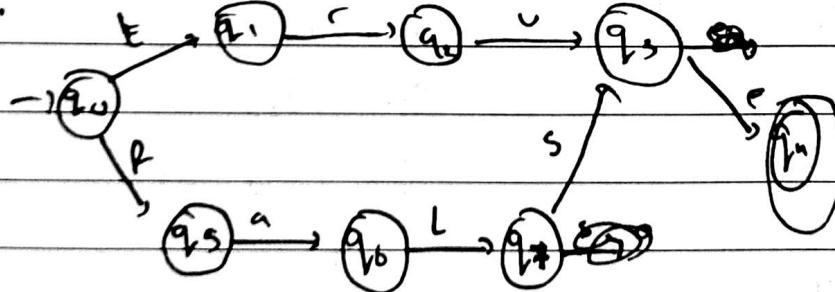
④ Single Line Comments



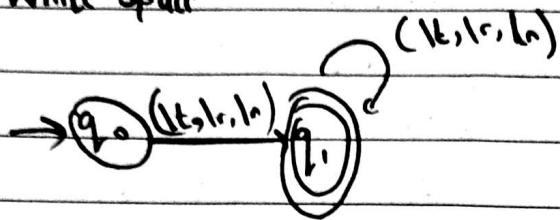
transis. L1L2

	#	char	/-
q0	∅	∅	∅
q1	∅	∅	∅
q2	∅	∅	∅

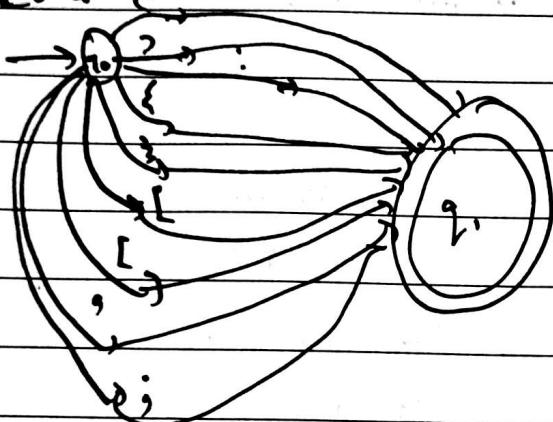
⑤ Boolean literal



⑥ White Space



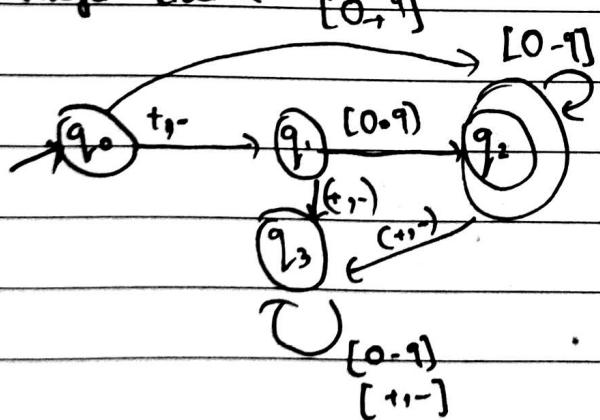
⑦ Punctuators



Minimized DFA :-

Transition table.

① Integer Literal



	$[+, -]$	$[0-9]$
q_0		q_1
q_1	q_3	q_2
q_2		q_3
q_3		q_3

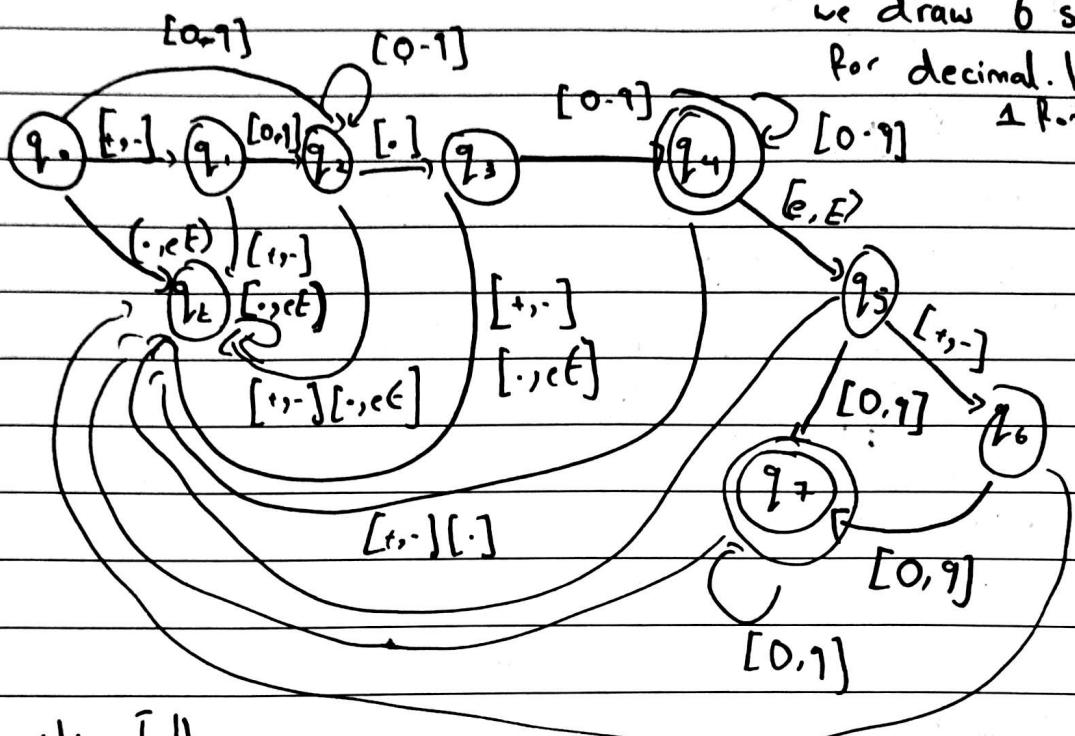
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② Floating Point Literal:

Simplifying state

we draw 6 states

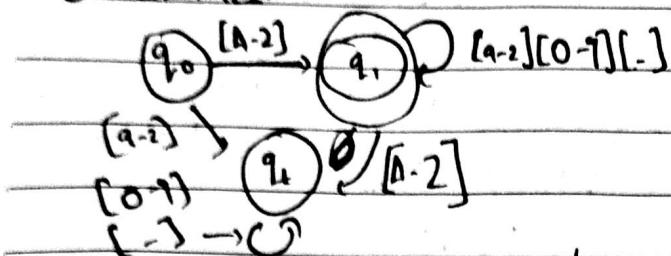
for decimal. 1 for decimal
1 for sign



Transition Table:

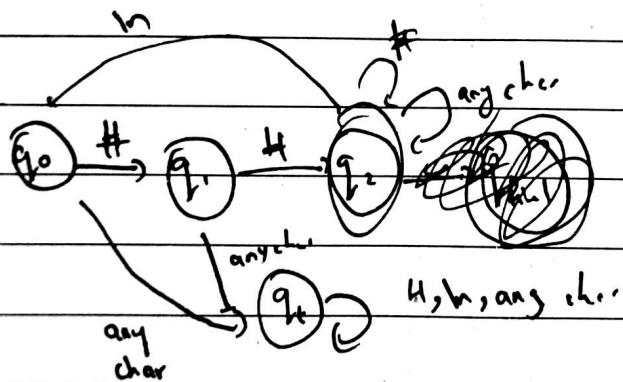
	[+,-]	[0-9]	.	[e, E]
q0	q1	q2	q4	q5
q1	q5	q2	q4	q5
q2	q5	q3	q4	q5
q3	q4	q4	q6	q5
q4	q5	q5	q5	q5
q5	q6	q7	q6	q6
q6	q5	q7	q5	q6
q7	q5	q7	q5	q6
q8	q5	q4	q4	q5

③ IDENTIFIER.



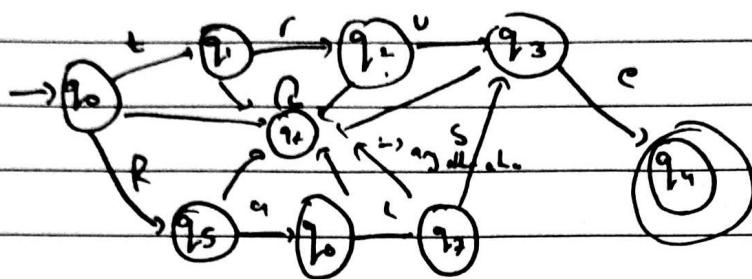
state	A-Z	a-z	0-9	-
q0	q1	q1	q1	q2
q1	q2	q2	q1	q1
q2	q3	q3	q3	q4

④ Comment Final



state	#	ln	any ch.
q0	q1	q1	q1
q1	q2	q1	q1
q2	q2	q0	q2
q3	q2	q1	q1

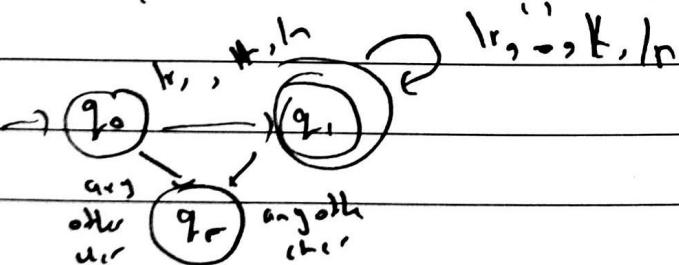
⑤ Boolean literal:



transition table: true false any other ch.

state	Input t	R	next corresp.
q0	q6	q11	q14
q1	q7	q6	qnext
q2	q8	q1	qnext
q3	q9	q6	q6
q4	q10	q1	q1
q5	q11	q1	q1
q6	q12	q1	q1
q7	q13	q1	q1
q8	q14	q1	q1
q9	q1	q1	q1
q10	q1	q1	q1
q11	q1	q1	q1
q12	q1	q1	q1
q13	q1	q1	q1
q14			

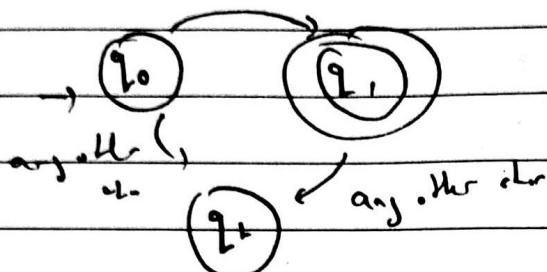
⑥ White Space



state	t, r, ;, ,	any other ch.
q0	q1	q2
q1	q2	q0
q2	q1	q1

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① Punctuation (., ?, ?, [.], , , ; , :)



(., ?, ?, [.], , , ; , :)			any other char
q.	q.		q.
q.	q.		q.
q.	q.		q.

