Key

Homework #1

1.)

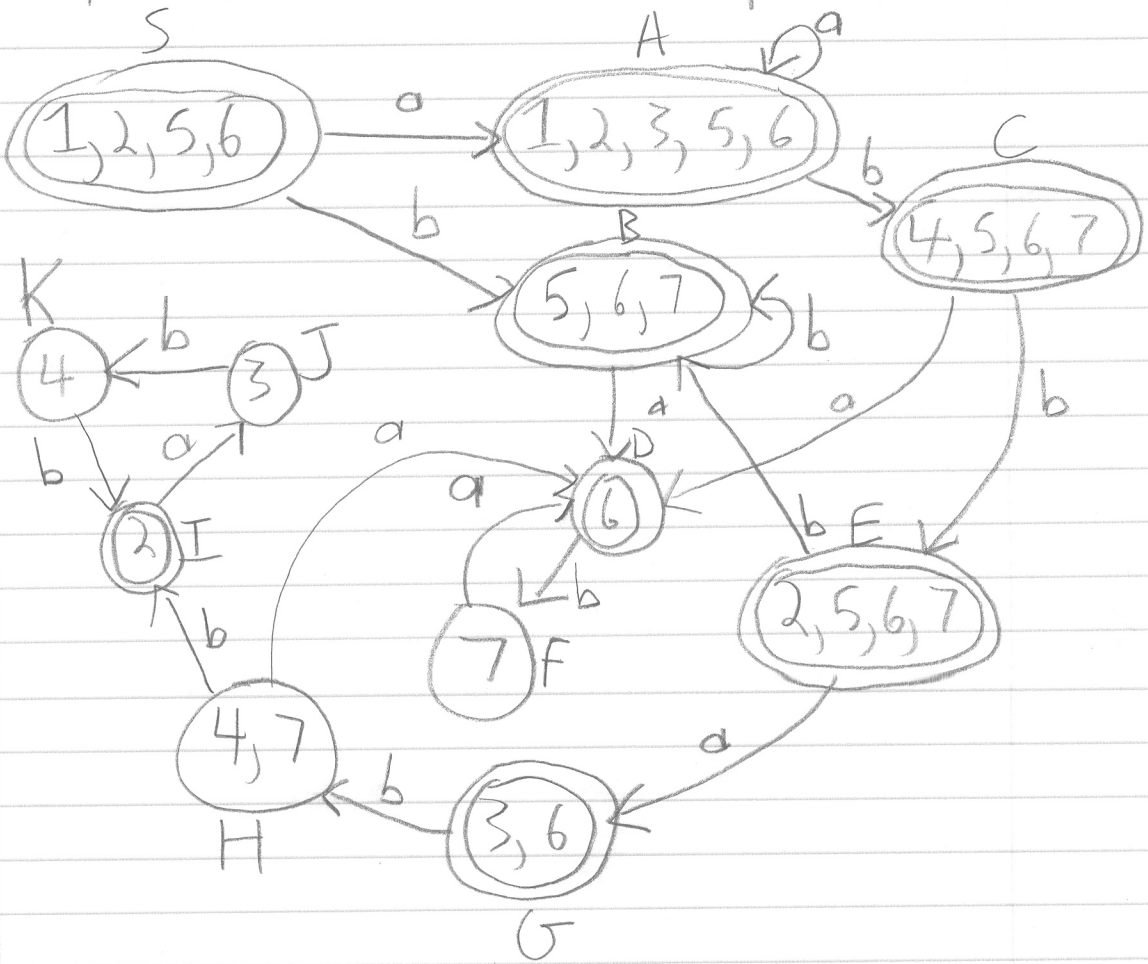
```
public
static
void
main
(
String
args
[
]
)
{
System
.
out
.
println
(
"Hello, World!"
)
;
}
return
;
}
```

White space tokens have been omitted.

Key

2.

	a	b	Label
1,2,5,6	1,2,3,5,6	5,6,7	S
1,2,3,5,6	1,2,3,5,6	4,5,6,7	A
5,6,7	6	5,6,7	B
4,5,6,7	6	2,5,6,7	C
6	—	7	D
2,5,6,7	3,6	5,6,7	E
7	6	—	F
3,6	—	4,7	G
4,7	6	2	H
2	3	—	I
3	—	4	J
4	—	2	K



Key

3. Using the labels from problem 2:

$S \to aA \mid bB \mid \lambda$

$A \to aA \mid bC \mid \lambda$

$B \to aD \mid bB \mid \lambda$

$C \to aD \mid bE \mid \lambda$

$D \to bF \mid \lambda$

$E \to aG \mid bB \mid \lambda$

$F \to aD$

$G \to bH \mid \lambda$

$H \to aD \mid bI$

$I \to aJ \mid \lambda$

$J \to bK$

$K \to bI$

Key

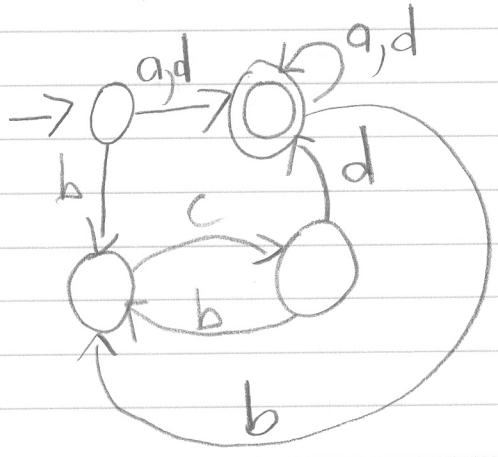
(AC 3.) $(a\,b^*a \mid b\,a^*b)$

This DFA accepts strings that have the same start and end character, where this character only appears at the start and end.

$a(bcda \mid cda)^*$

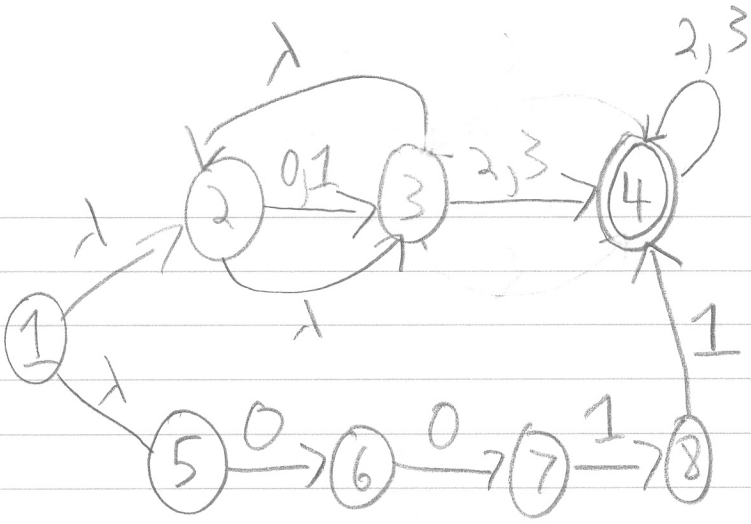
This DFA accepts strings that start with a followed by zero or more repetitions of "bcda" or "cda."

(AC 4.)



One or more a's or zero or more "bcd"s followed by d.

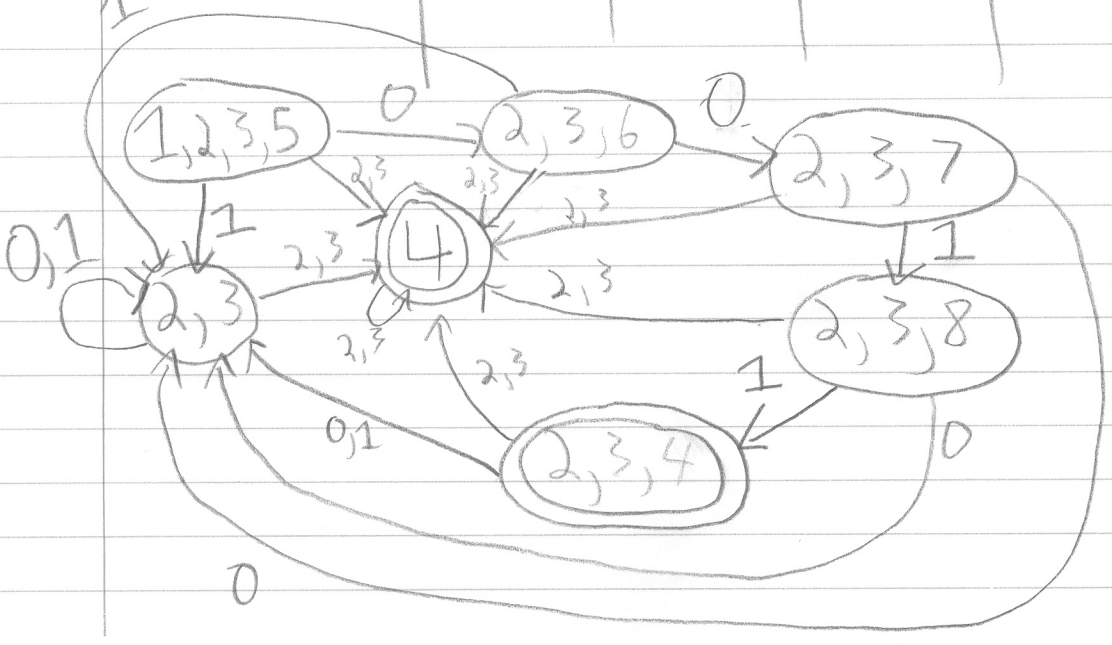
(AC 4b.)



Not a full expansion, but enough to get the job done.

Now convert to DFA

	0	1	2	3
1,2,3,5	2,3,6	2,3	4	4
2,3,6	2,3,7	2,3	4	4
2,3	2,3	2,3	4	4
4	-	-	4	4
2,3,7	2,3	2,3,8	4	4
2,3,8	2,3	2,3,4	4	4
2,3,4	2,3	2,3	4	4



Key

(CA(5.) Let X represent [1-9]
Let Y represent [0-9]

$(0 \mid XY^*).(0 \mid$  $)$