

CS 410 Midterm Sample Solution

Spring 2003 [Bono]

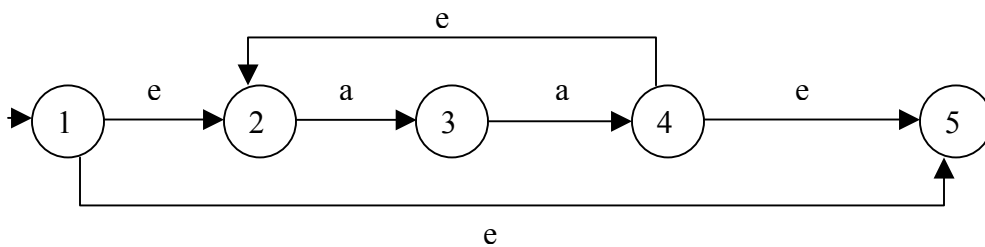
Problem 1

Answer :

1. b
2. a
3. d
4. c
5. b
6. d

Problem 2

Part A



Part B

$$e\text{-cl}([1]) = [1, 2, 5]$$

$$m([1, 2, 5], a) = [3]$$

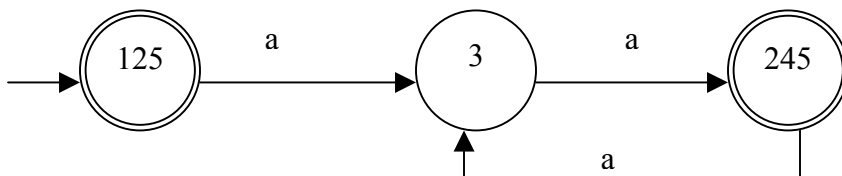
$$e\text{-cl}(3) = [3]$$

$$m([3], a) = [4]$$

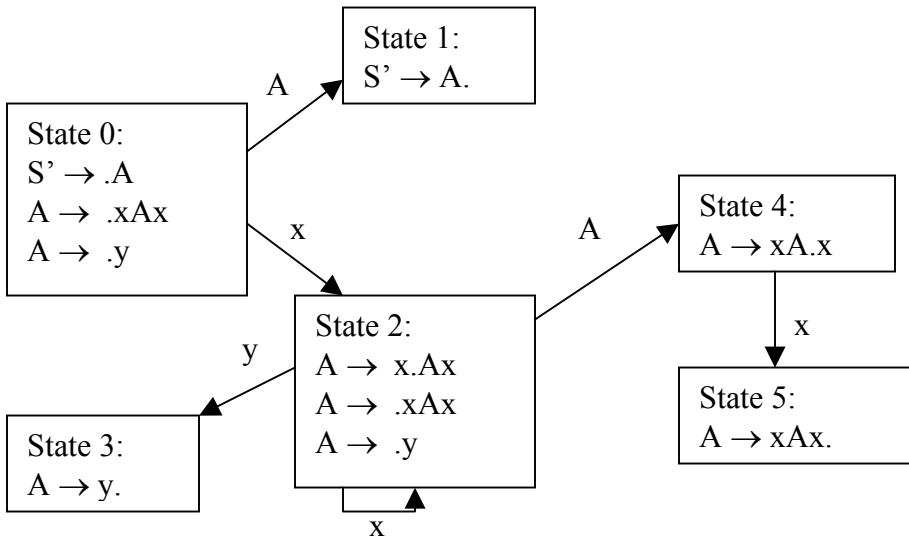
$$e\text{-cl}([4]) = [2, 4, 5]$$

$$m([2, 4, 5], a) = [3]$$

	a
*[1,2,5]	[3]
*[3]	[2,4,5]
*[2,4,5]	[3]



Problem 3
Part A



Part B

Follow(S') = {\$}
Follow(A) = Follow(S') U {x} = {x, \$}

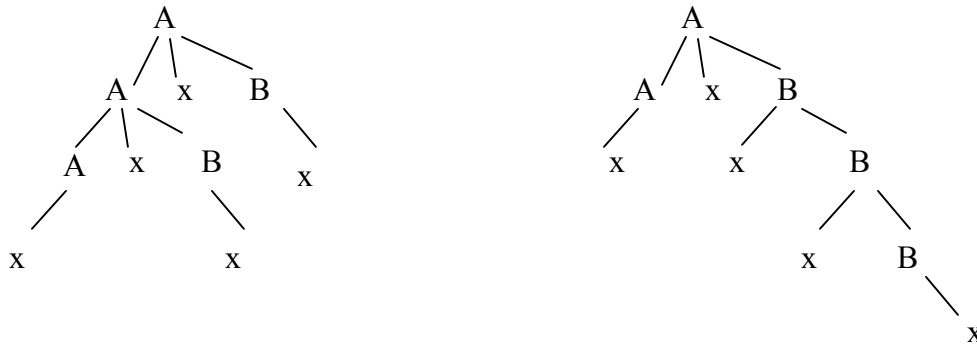
state	Action			GOTO
	x	y	\$	A
0	S2	S3		1
1			Acc	
2	S2	S3		4
3	R2		R2	
4	S5			
5	R1		R1	

Part C

Stack	Input	Action
\$0	xyx\$	S2
\$0x2	yx\$	S3
\$0x2y3	x\$	R2 (A->y)
\$0x2A4	x\$	S5
\$0x2A4x5	\$	R1 (A->xAx)
\$0A1	\$	Acc

Problem 4

The input string (xxxxx) has more than one parse trees. Two possible parse trees are given as below:



Problem 4

Solution 1:

```
A → x A1 y { A.evenx = ! (A1.evenx); }  
      | z { A.evenx = true; }
```

Solution 2:

```
A → x A1 y { A.n = A1.n + 1; A.evenx = (A.n % 2 == 0) ); }  
      | z { A.n = 0; A.evenx = true; }
```