Esame 07/2025

1 ottobre 2025

1 Esercizio 1

Calcolare tabella e indicare i conflitti di shift/reduce e reduce/reduce. Dire se viene parsata la stringa `acb`

$$S \to aSb \mid cA \mid Bc \mid AB$$
$$A \to aSb \mid cA$$
$$B \to Bc \mid \epsilon$$

Soluzione: grammatica su Grammophone , automa su Graphviz

States	a	b	c	$	S	A	B	Symbol map
s0	s2/r8	r8	s3/r8	r8	1	4	5	[]
s1				acc				[S]
s2	s2/r8	r8	s3/r8	r8	6	4	5	[a]
s3	s8		s9			7		[c]
s4	r8	r8	r8	r8			10	[A]
s5			s11					[B]
s6		s12						[aS]
s7	r2/r6	r2/r6	r2/r6	r2/r6				[cA]
s8	s2/r8	r8	s3/r8	r8	13	4	5	[ca]
s9	s8		s9			14		[cc]
s10	r4	r4	s15/r4	r4				[AB]
s11	r3/r7	r3/r7	r3/r7	r3/r7				[Bc]
s12	r1/r5	r1/r5	r1/r5	r1/r5				[aSb]
s13		s16						[caS]
s14	r6	r6	r6	r6				[ccA]
s15	r7	r7	r7	r7				[ABc]
s16	r5	r5	r5	r5				[caSb]

Tabella 1: Tabella di parsing LR(0)

States	a	b	c	$	S	A	B	Symbol map
s0	s2	r8	s3/r8	r8	1	4	5	[]
s1				acc				[S]
s2	s2	r8	s3/r8	r8	6	4	5	[a]
s3	s8		s9			7		[c]
s4		r8	r8	r8			10	[A]
s5			s11					[B]
s6		s12						[aS]
s7		r2/r6	r6	r2/r6				[cA]
s8	s2	r8	s3/r8	r8	13	4	5	[ca]
s9	s8		s9			14		[cc]
s10		r4	s15	r4				[AB]
s11		r3/r7	r7	r3/r7				[Bc]
s12		r1/r5	r5	r1/r5				[aSb]
s13		s16						[caS]
s14		r6	r6	r6				[ccA]
s15		r7	r7	r7				[ABc]
s16		r5	r5	r5				[caSb]

Tabella 2: Tabella di parsing SLR(1)

Symbol	Firstset	Followset	Nullable
S	a,c	b,$	No
A	a,c	b,c,$	No
B	c	b,c,$	Yes

2 Esercizio 2

Scrivere tabella di parsing LL1 della seguente grammatica:

$$S \to aSbA \mid bAaS \mid \epsilon$$
$$A \to Aab \mid ba$$

Soluzione: Grammatica su Grammophone

	a	b	$
S	$S \to aSbA$	$S \to bAaS$ $S \to \epsilon$	$S \to \epsilon$
A		$A \to Aab$ $A \to ba$	

Tabella 3: Tabella di parsing LL(1)

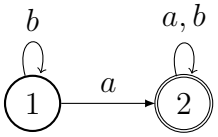
3 Esercizio 3

Dato

$$r_1 = \epsilon \mid b \mid (\epsilon \mid b)\,(a \mid \epsilon \mid b)^*\,(a \mid \epsilon \mid b)$$
$$r_2 = b^*a \mid b^*a\,(\epsilon \mid a \mid b)^*$$

trovare un DFA minimo per $\mathcal{L}(r_1 r_2)$

Soluzione:

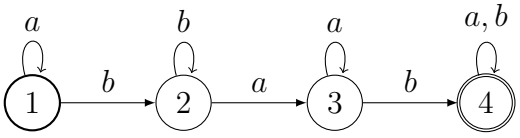


4 Esercizio 4

Dato $r_1 = a^*b^*a^*$, trovare il DFA minimo per il linguaggio

$$\mathcal{L}((a \mid b)^*) \setminus \mathcal{L}(r_1)$$

Soluzione:



5 Esercizio 5

Scrivere il codice intermedio generato per il seguente codice:

```
if (a = b) while(true) a = a * b * c
```

Soluzione:

```
          IF a = b then GOTO L1
          GOTO L0
  L1, L2:
          GOTO L3
          L3:
          T1 = a * b
          T2 = T1 * c
          a = T2
          GOTO L2
      L0:
```