

grammatiche *context-free*

ITADINFO 2023 – materiale didattico

la tartaruga che “impara”

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la tartaruga che “impara” obiettivi

comprendere:

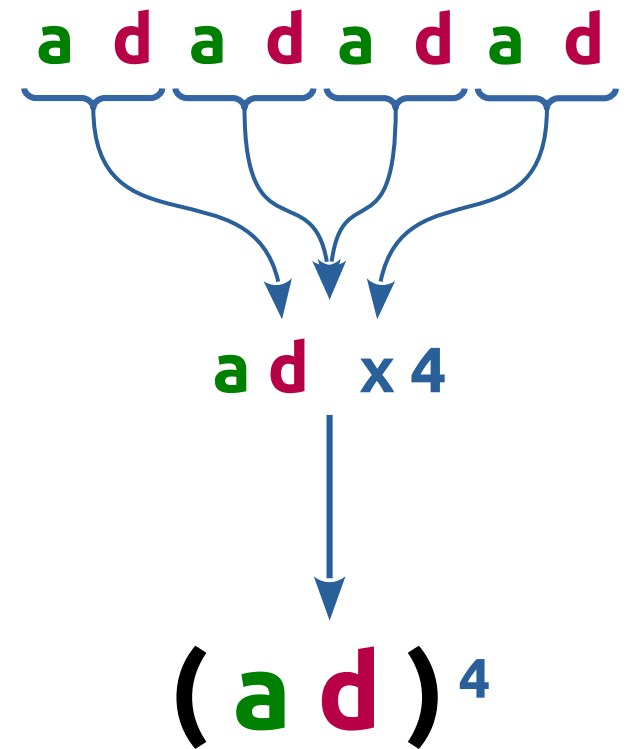
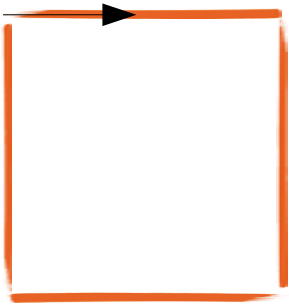
1. capacità di un **sistema simbolico** di comunicare info
2. caratteristiche: **alfabeto**, **sintassi**, **semantica**, grammatica
3. differenza tra **simboli terminali** e **non-terminali**

imparare:

4. **rappresentazioni** grafiche e simboliche
5. “**modellare**” casi reali

abbreviazioni

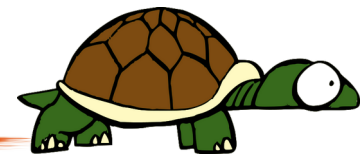
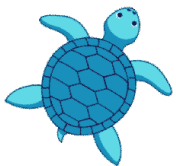
semplificazione una proposta



abbreviazioni #2

tartaruga

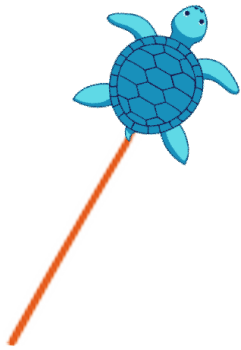
una passeggiata più lunga



tartaruga

una passeggiata più lunga

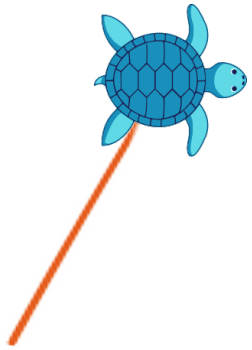
a



tartaruga

una passeggiata più lunga

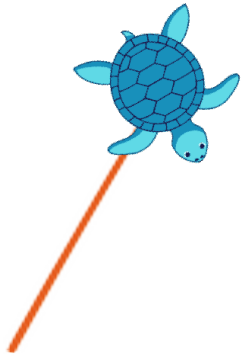
a d



tartaruga

una passeggiata più lunga

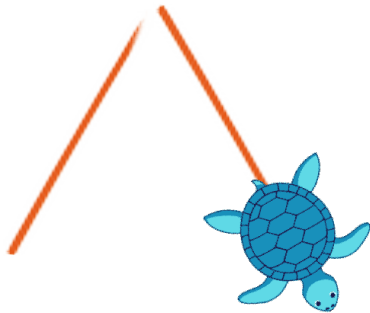
a d d



tartaruga

una passeggiata più lunga

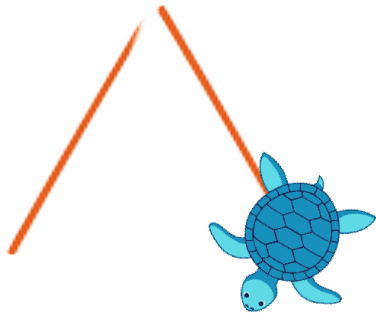
a d d a



tartaruga

una passeggiata più lunga

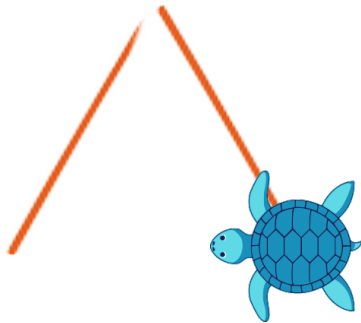
a d d a d



tartaruga

una passeggiata più lunga

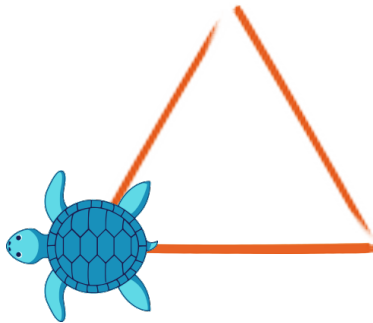
a d d a d d



tartaruga

una passeggiata più lunga

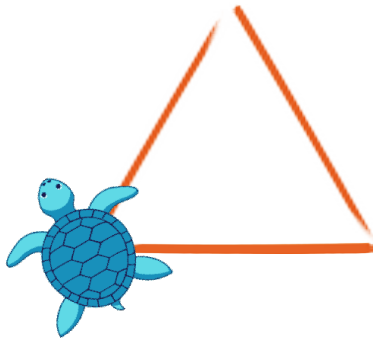
a d d a d d a



tartaruga

una passeggiata più lunga

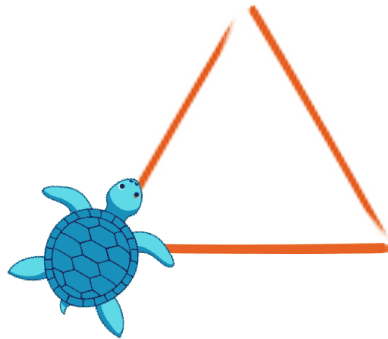
a d d a d d a
d



tartaruga

una passeggiata più lunga

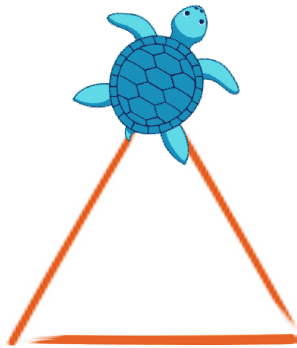
a d d a d d a
d d



tartaruga

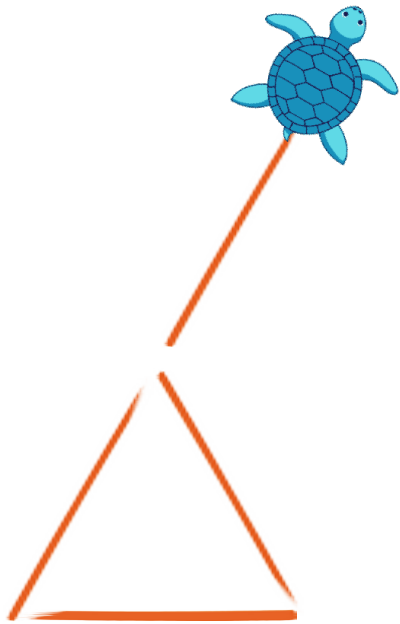
una passeggiata più lunga

a d d a d d a
d d a



tartaruga

una passeggiata più lunga

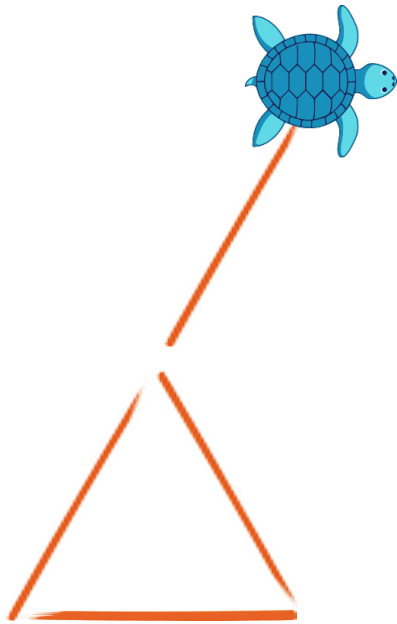


a d d a d d a
d d a
a



tartaruga

una passeggiata più lunga

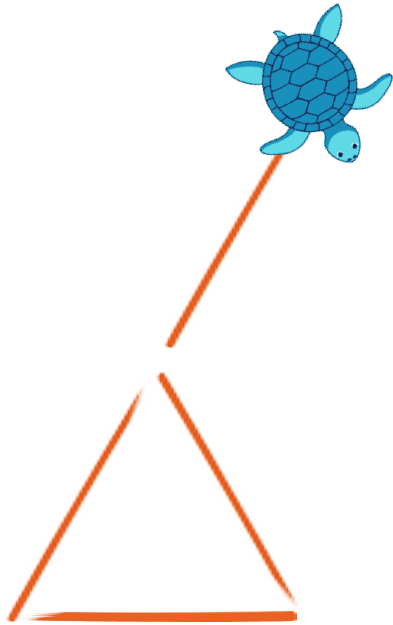


a d d a d d a
d d a
a d



tartaruga

una passeggiata più lunga

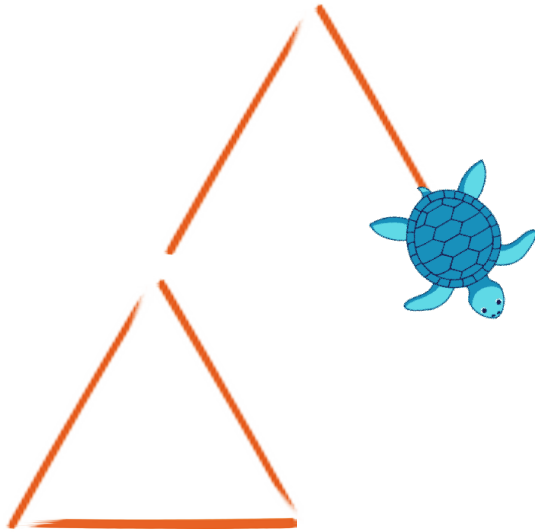


a d d a d d a
d d a
a d d



tartaruga

una passeggiata più lunga

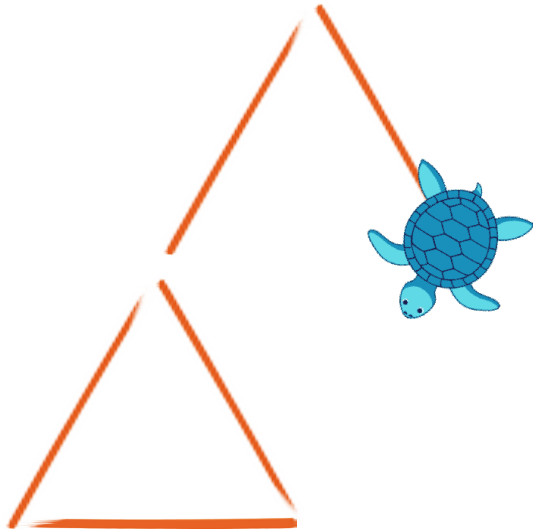


a d d a d d a
d d a
a d d a



tartaruga

una passeggiata più lunga

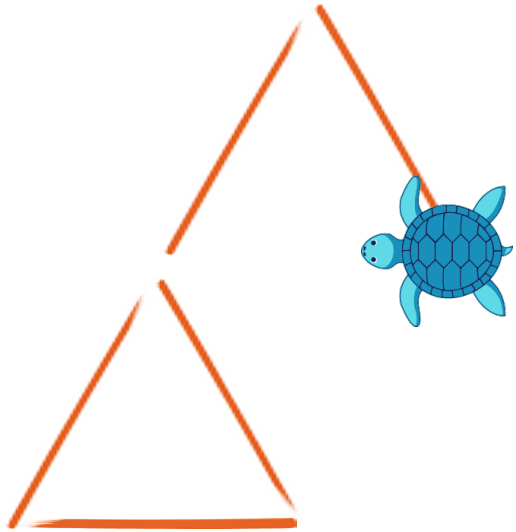


a d d a d d a
d d a
a d d a d



tartaruga

una passeggiata più lunga

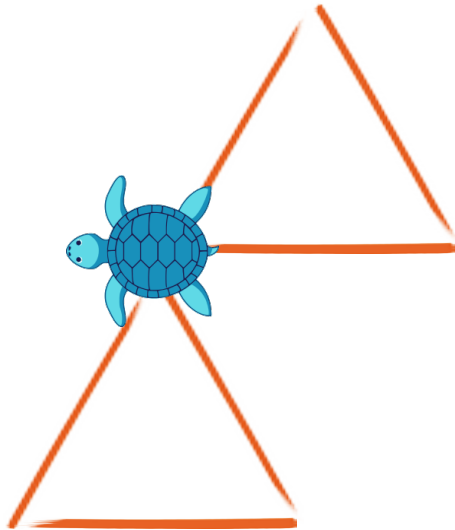


a d d a d d a
d d a
a d d a d d



tartaruga

una passeggiata più lunga

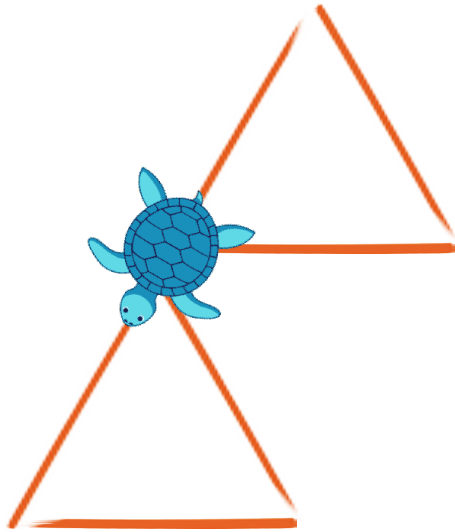


a d d a d d a
d d a
a d d a d d a



tartaruga

una passeggiata più lunga

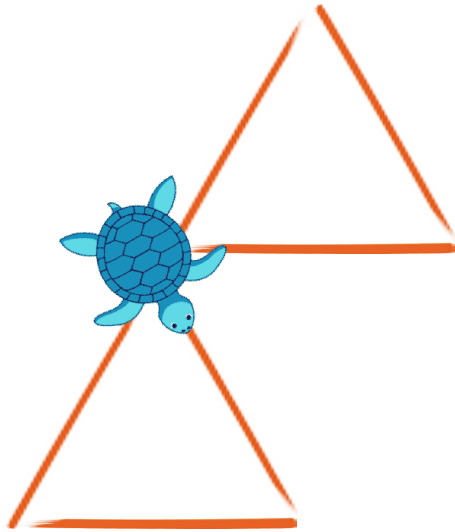


a d d a d d a
d d a
a d d a d d a
s



tartaruga

una passeggiata più lunga

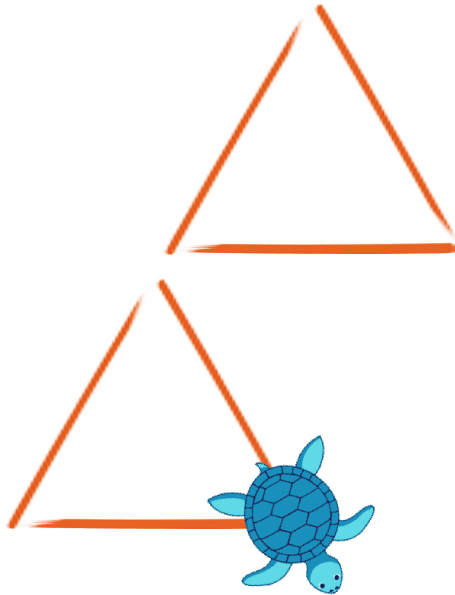


a d d a d d a
d d a
a d d a d d a
s s



tartaruga

una passeggiata più lunga

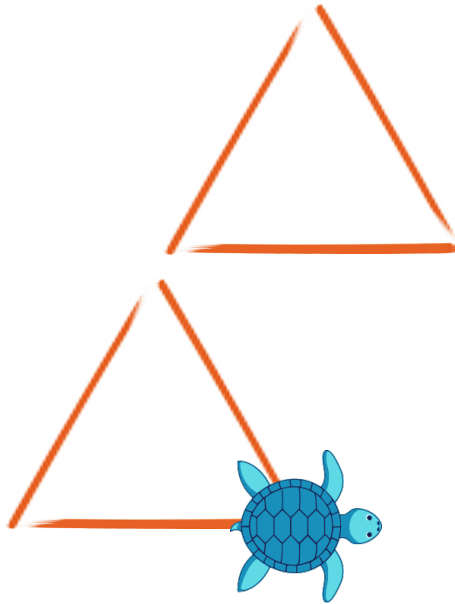


a d d a d d a
d d a
a d d a d d a
s s a



tartaruga

una passeggiata più lunga

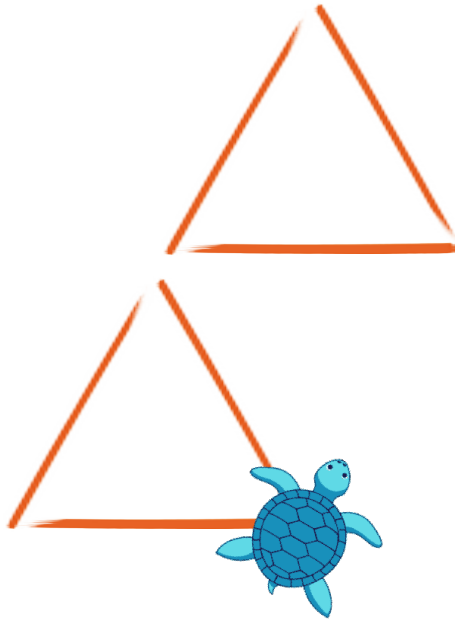


a d d a d d a
d d a
a d d a d d a
s s a s



tartaruga

una passeggiata più lunga

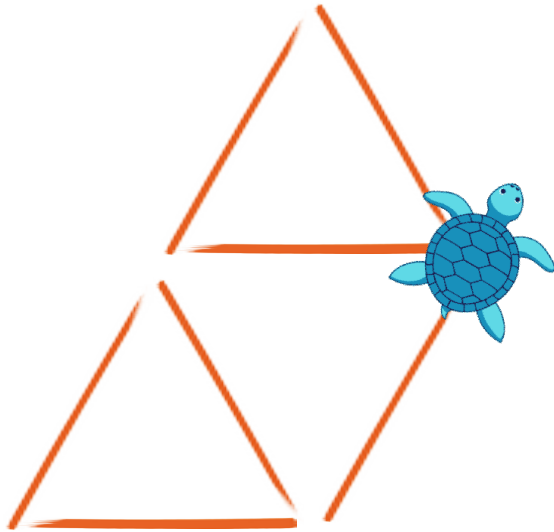


a d d a d d a
d d a
a d d a d d a
s s a s s



tartaruga

una passeggiata più lunga

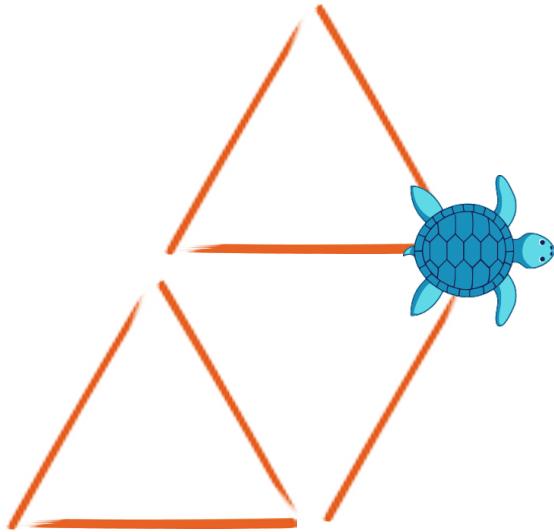


a d d a d d a
d d a
a d d a d d a
s s a s s
a



tartaruga

una passeggiata più lunga

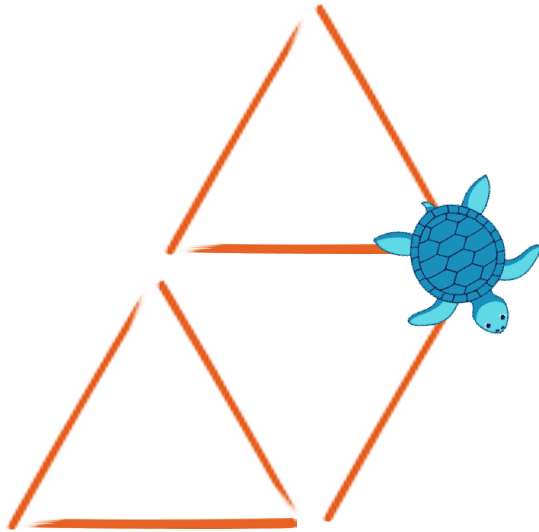


a d d a d d a
d d a
a d d a d d a
s s a s s
a d



tartaruga

una passeggiata più lunga

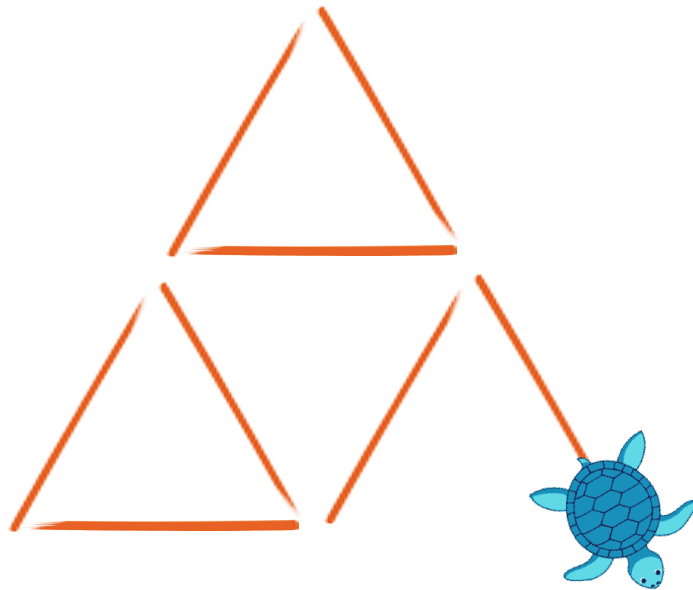


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d



tartaruga

una passeggiata più lunga

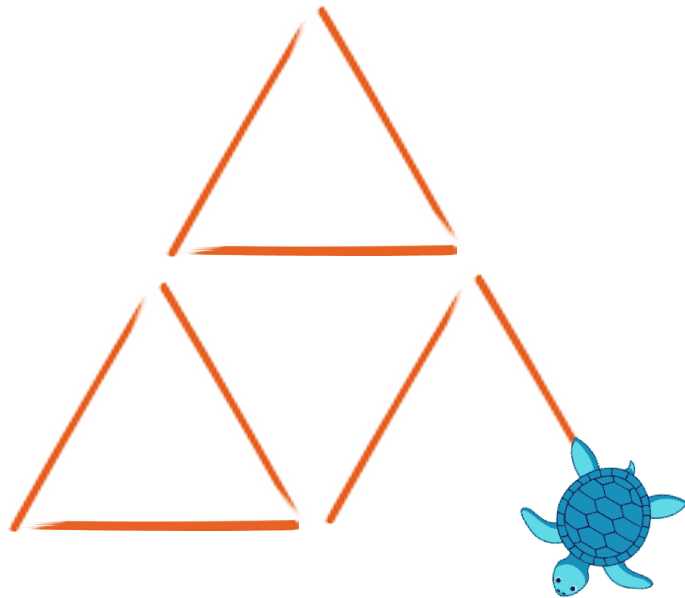


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a



tartaruga

una passeggiata più lunga

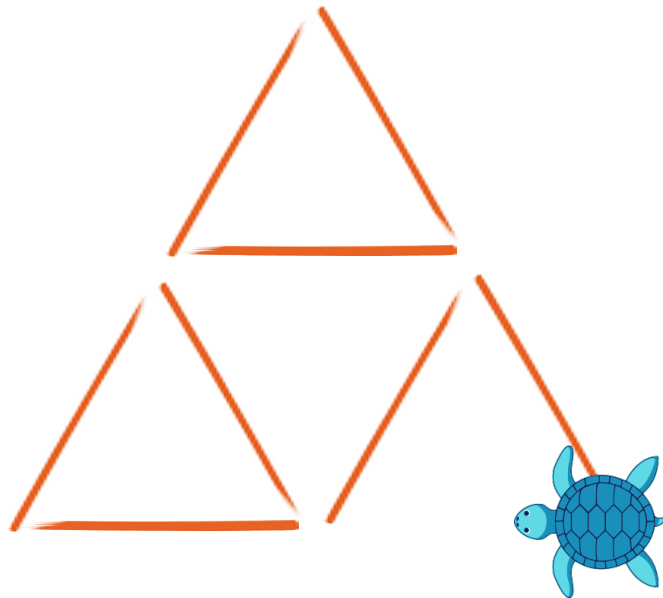


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a d

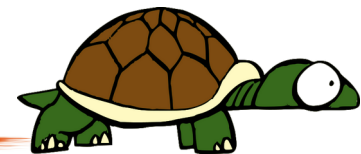


tartaruga

una passeggiata più lunga

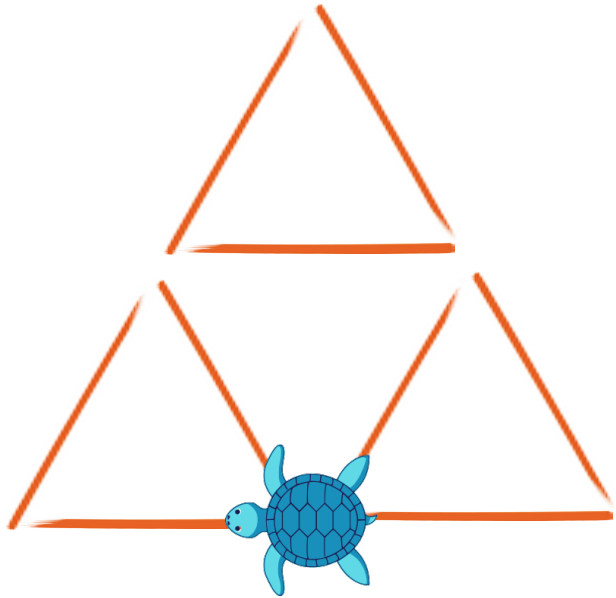


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a d d



tartaruga

una passeggiata più lunga

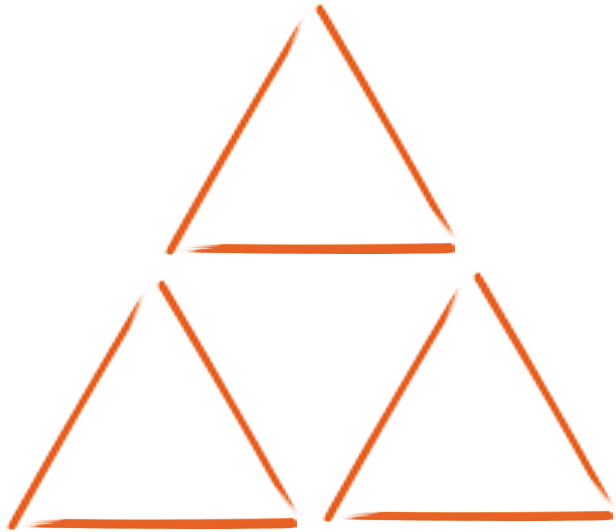


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a d d a

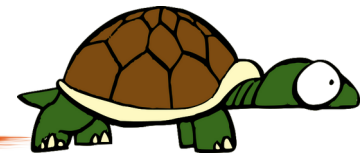


tartaruga

una passeggiata più lunga

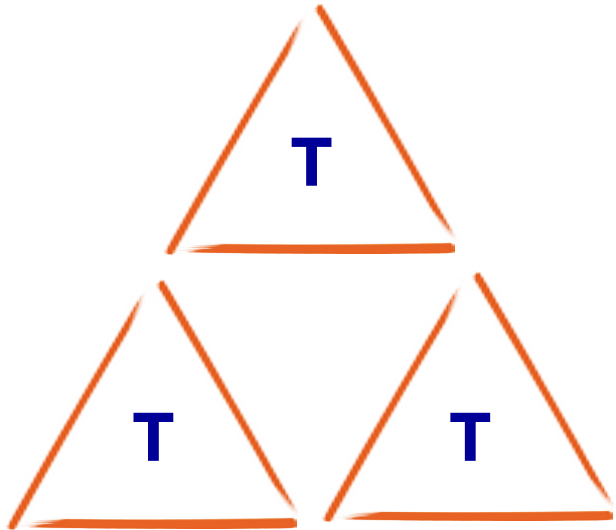


a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a d d a



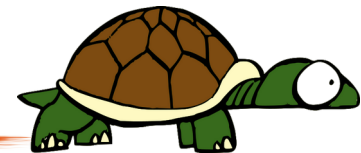
tartaruga

abbreviazioni



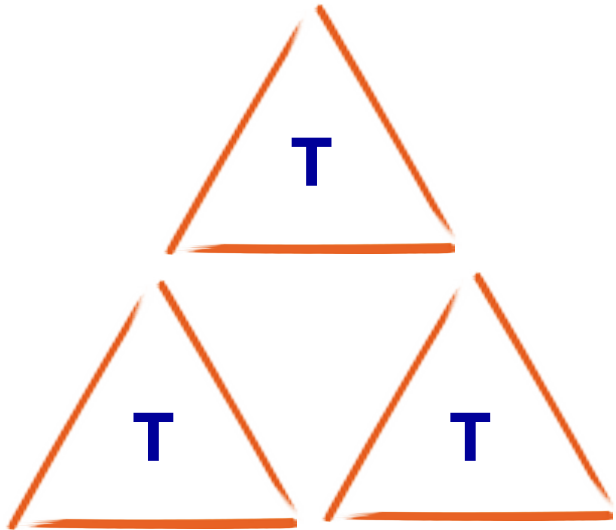
a d d a d d a
d d a
a d d a d d a
s s a s s
a d d a d d a

T → a d d a d d a



tartaruga

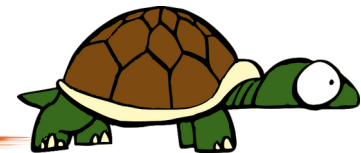
abbreviazioni



T → a d d a d d a
d d a

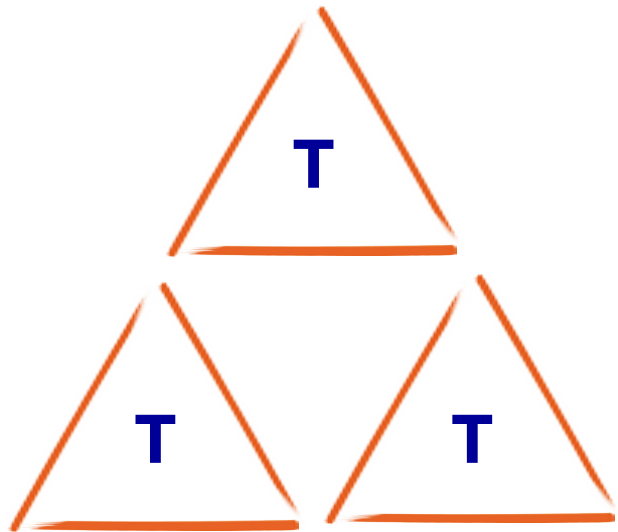
T → a d d a d d a
s s a s s

T → a d d a d d a



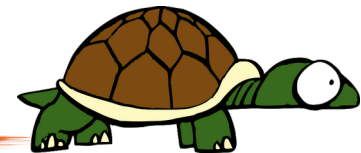
tartaruga

abbreviazioni



T
d d a
T
s s a s s
T

T → a d d a d d a



tartaruga

esercizio #5

1. dividetevi in coppie
2. disegnate un percorso complesso fatto di elementi semplici
3. date un “nome” ad ogni elemento del percorso e scrivetene la stringa
4. scrivete la stringa che rappresenta il percorso usando i nomi
5. condividetela!

grammatiche

tartaruga e linguaggi formali

ingredienti

1. alfabeto $\Sigma = \{ \mathbf{a}, \mathbf{s}, \mathbf{d} \}$

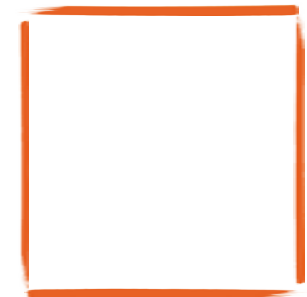
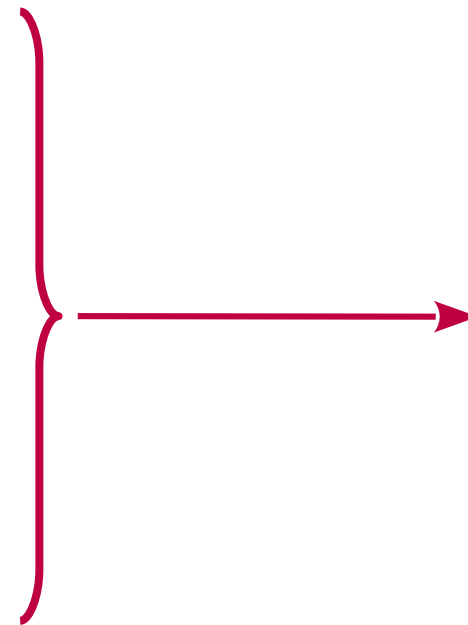
2. parola **adadada**

3. interpretazione

a: avanti

s: sinistra

d: destra



tartaruga e simboli

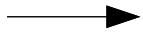
1. terminali

1. “non-sostituibili”
2. minuscole: **a,s,d**, ...

2. non-terminali

1. abbreviazioni
2. maiuscole: **T,Q,R**, ...

simboli
il nostro solito quadrato...



simboli

il nostro solito quadrato...



a

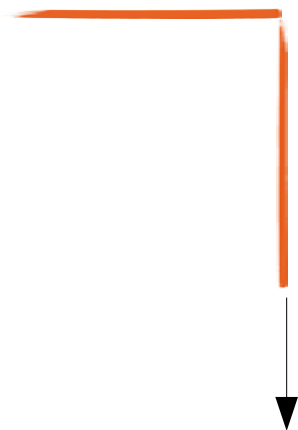
simboli
il nostro solito quadrato...



a d

simboli

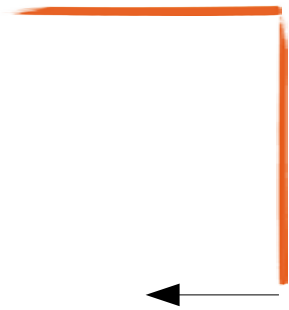
il nostro solito quadrato...



a d a

simboli

il nostro solito quadrato...



a d a d

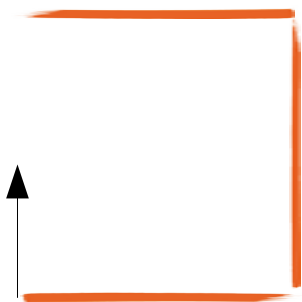
simboli
il nostro solito quadrato...



a d a d a

simboli

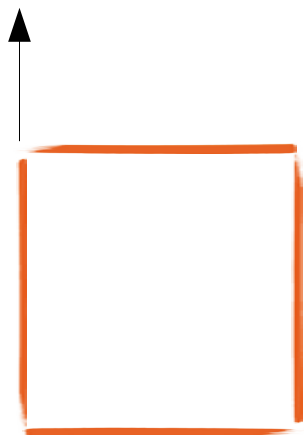
il nostro solito quadrato...



a d a d a d

simboli

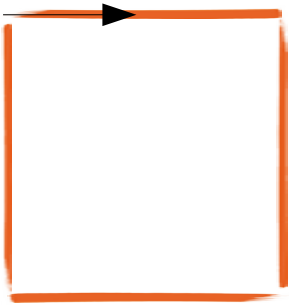
il nostro solito quadrato...



a d a d a d a

simboli

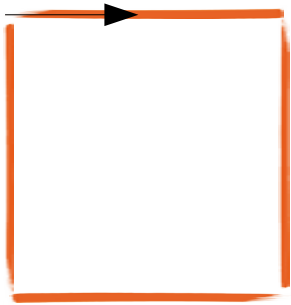
il nostro solito quadrato...



a d a d a d a d

simboli

il nostro solito quadrato...



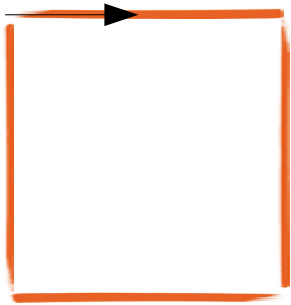
a d a d a d a d



(a d)⁴

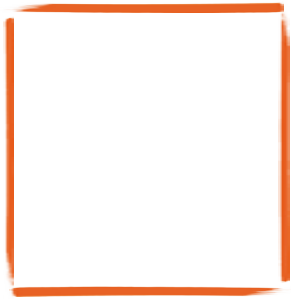
simboli

il nostro solito quadrato...



(a d) ⁴

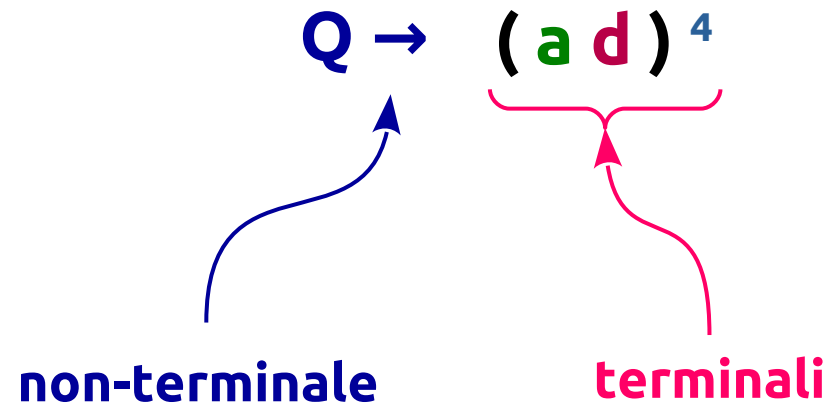
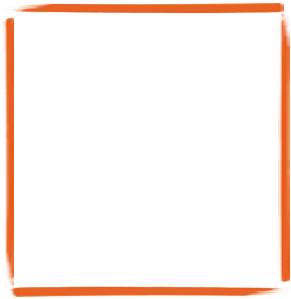
grammatiche e regole
il nostro solito quadrato...



$$Q \rightarrow (a d)^4$$

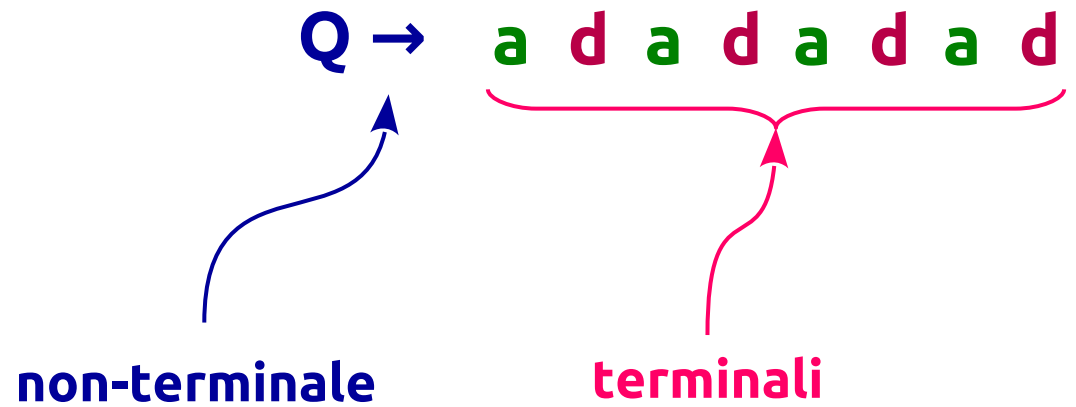
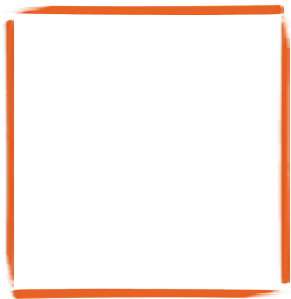
grammatiche e regole

il nostro solito quadrato...

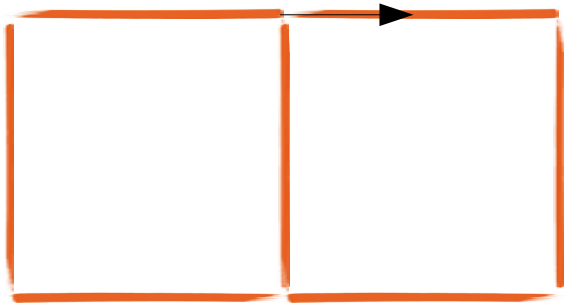


grammatiche e regole

il nostro solito quadrato...

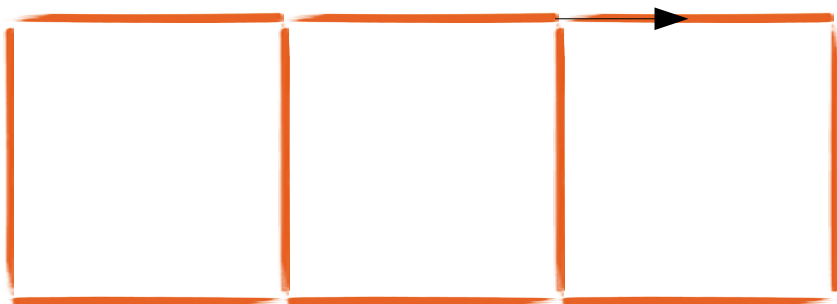


grammatiche e regole
tutto insieme...



$$Q \rightarrow (a d)^4$$
$$Q \rightarrow a (a d)^4$$

simboli esempio



Q → (a d)⁴

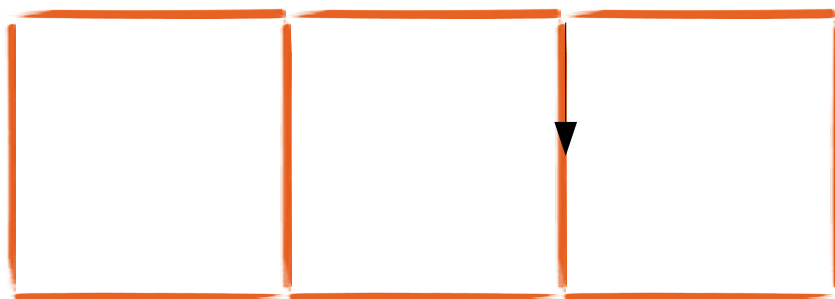
a

Q → (a d)⁴

a

Q → (a d)⁴

simboli esempio



Q → (a d)⁴

a

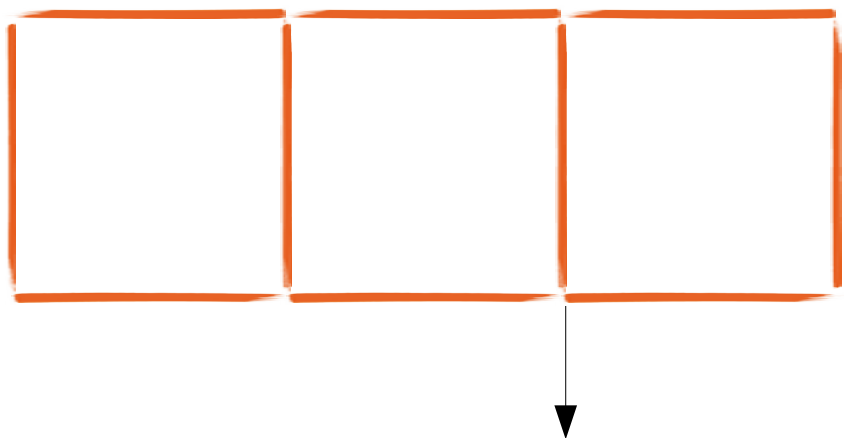
Q → (a d)⁴

a

Q → (a d)⁴

d

simboli esempio



Q → (a d)⁴

a

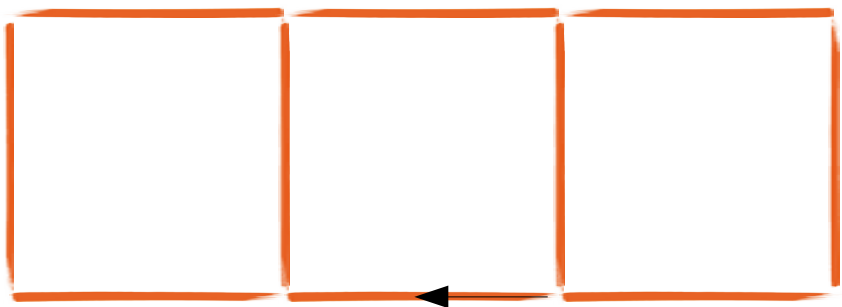
Q → (a d)⁴

a

Q → (a d)⁴

d a

simboli esempio



Q → (a d)⁴

a

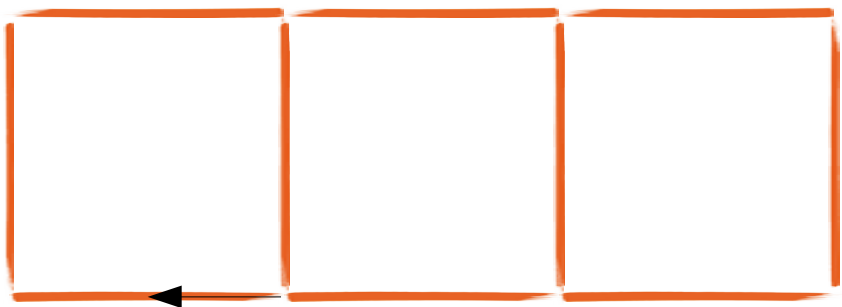
Q → (a d)⁴

a

Q → (a d)⁴

d a d

simboli esempio



Q → (a d)⁴

a

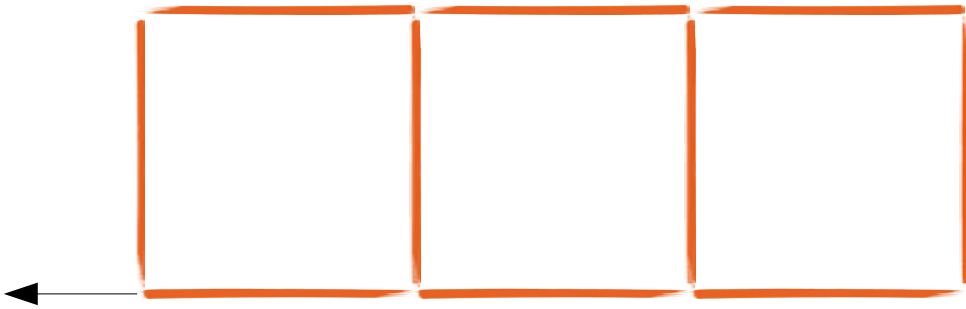
Q → (a d)⁴

a

Q → (a d)⁴

d a d a

simboli esempio



$$Q \rightarrow (a d)^4$$

a

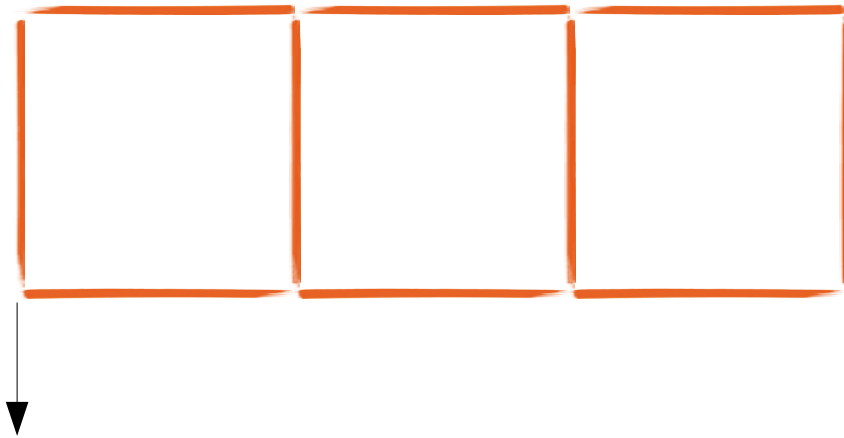
$$Q \rightarrow (a d)^4$$

a

$$Q \rightarrow (a d)^4$$

d a d a a

simboli esempio



Q → (a d)⁴

a

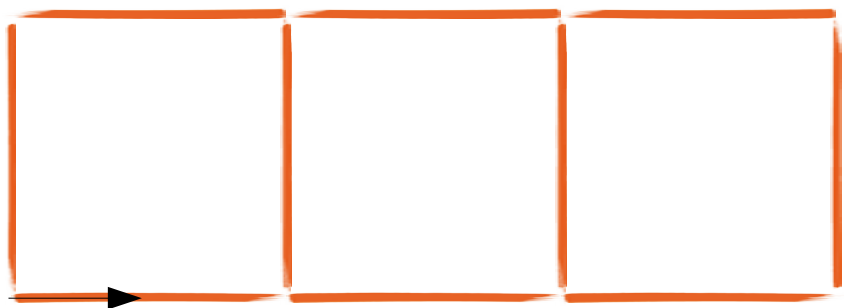
Q → (a d)⁴

a

Q → (a d)⁴

d a d a a s

simboli esempio



Q → (a d)⁴

a

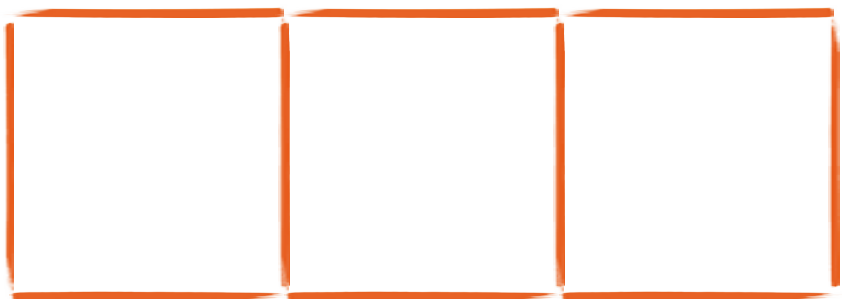
Q → (a d)⁴

a

Q → (a d)⁴

d a d a a s s

simboli esempio



$Q \rightarrow (a d)^4$

a

$Q \rightarrow (a d)^4$

a

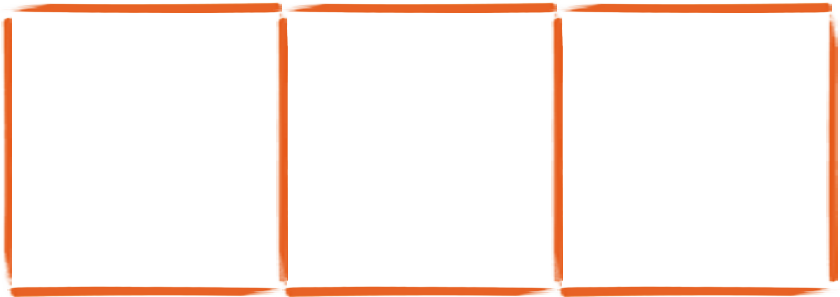
$Q \rightarrow (a d)^4$

d a d a a d d



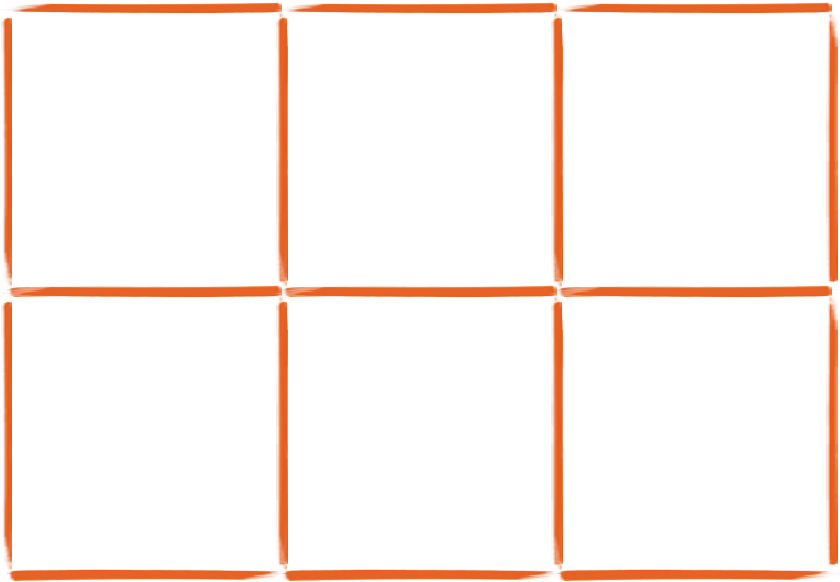
R

simboli
esempio



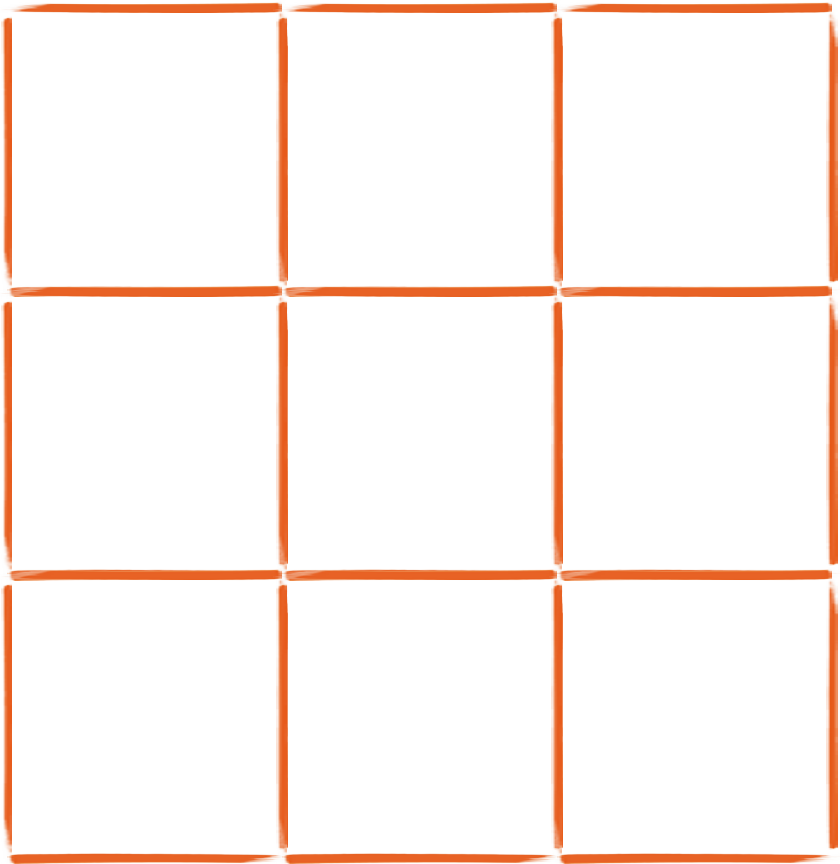
R

simboli
esempio



R R

simboli
esempio



R R R

linguaggi formali elementi

1. **alfabeto** (*simboli*) $\Sigma = \{ a, s, d \}$

2. **regole**
(*abbreviazioni*)

$Q \rightarrow (a d)^4$

$R \rightarrow Q a Q a Q d a d a a d d$

nota

- una **parola** contiene solo simboli **terminali** (minuscole)
→ devo sostituire tutte le maiuscole (**non terminali**)

Grazie per la vostra pazienza!



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