
inventons un langage de programmation



Philippe Marquet

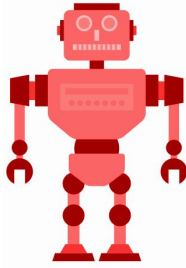
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maison pour la science, 1er mars 2017 

un langage pour programmer un robot

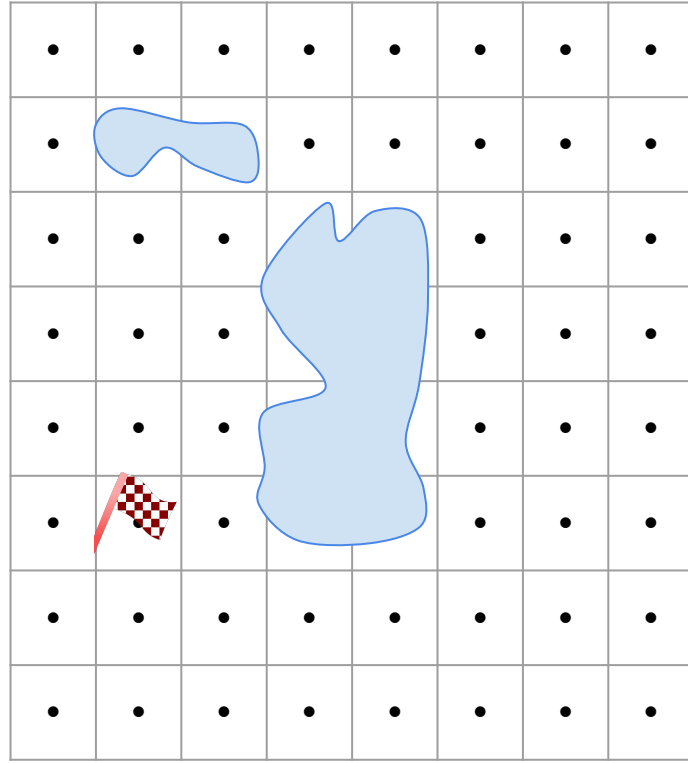
flévé

- robot



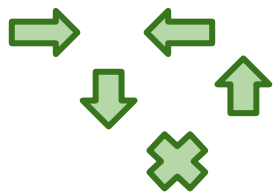
- plan de jeu

- obstacles
- objectif

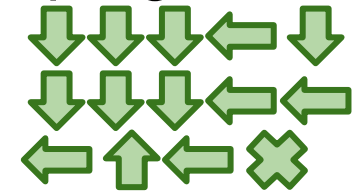


- langage

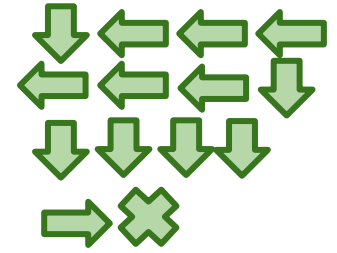
- 5 instructions



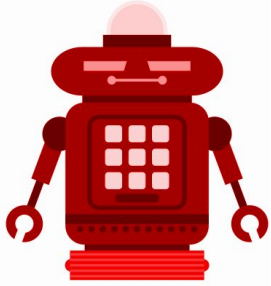
un programme



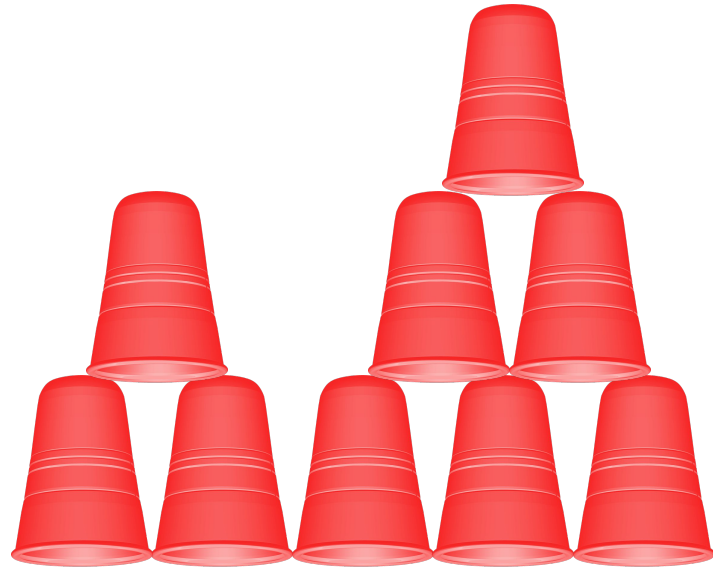
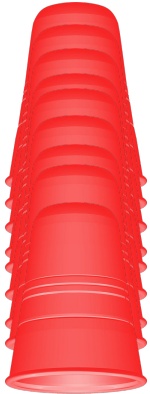
un autre programme



gobot — un autre robot



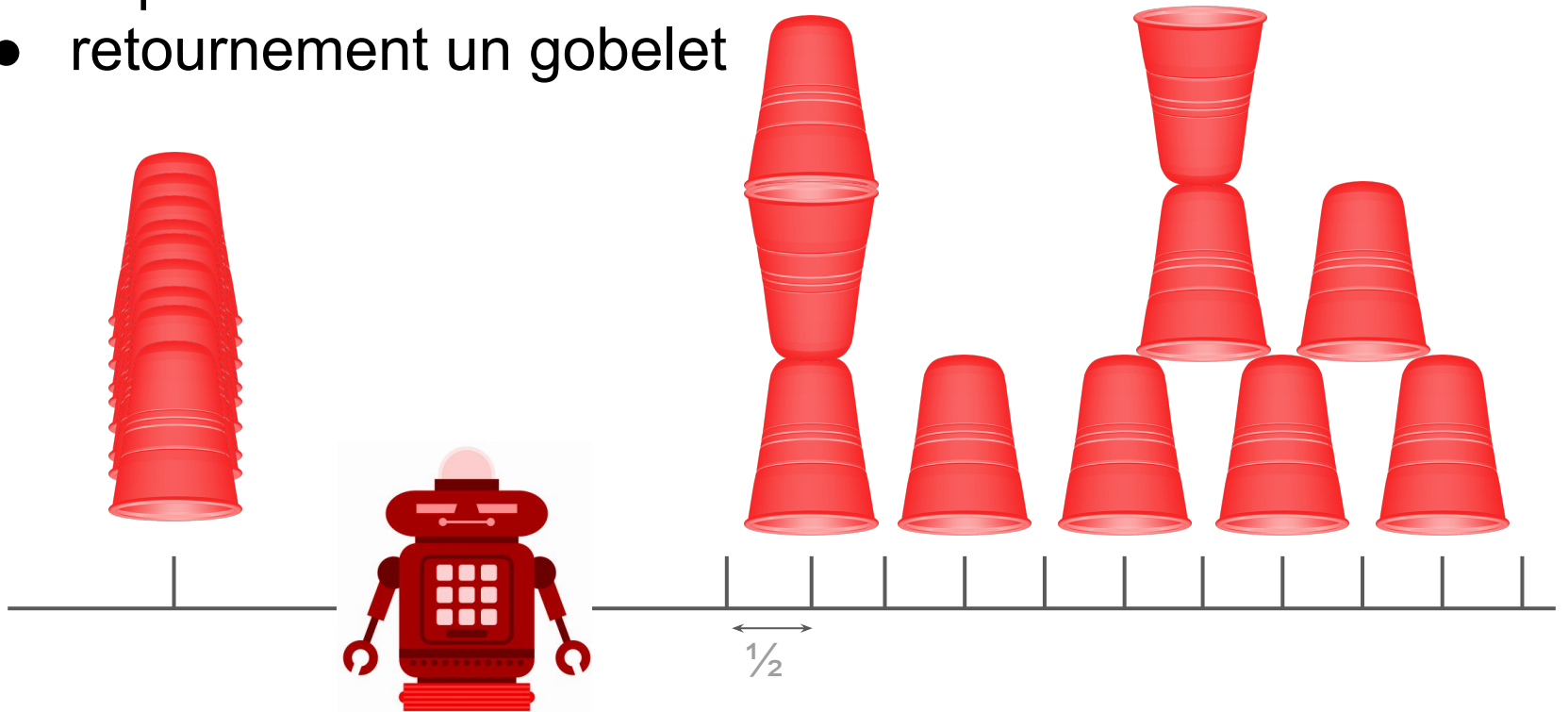
- construire des pyramides de gobelets



→ un langage pour programmer gobot

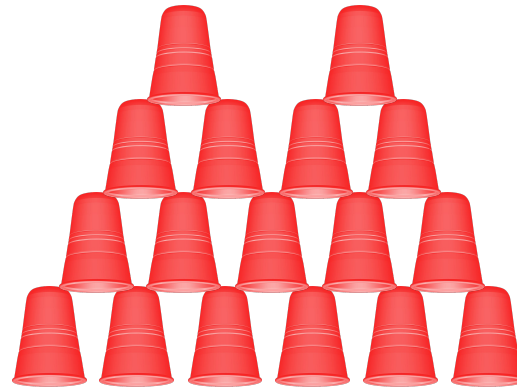
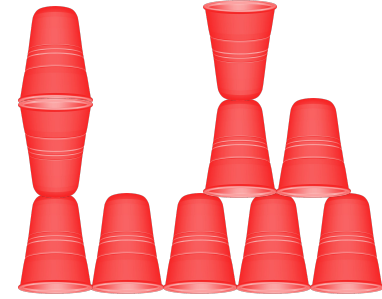
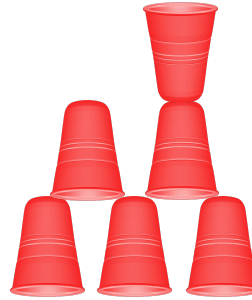
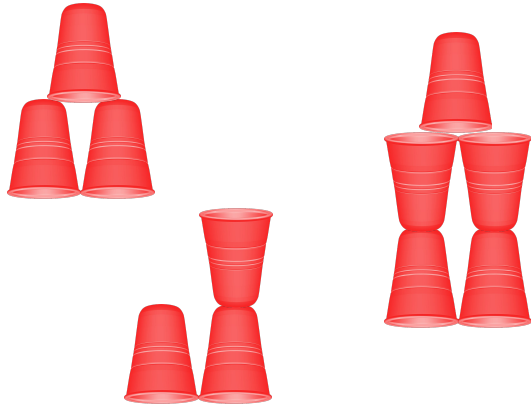
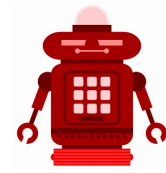
gobol — langage gobot

- prise / dépôt d'un gobelet
- déplacement
- retournement un gobelet



inventons *gobol*

programmmons en *gobol*



instructions *gobol*

- 5 instructions *simples*

P prendre un gobelet

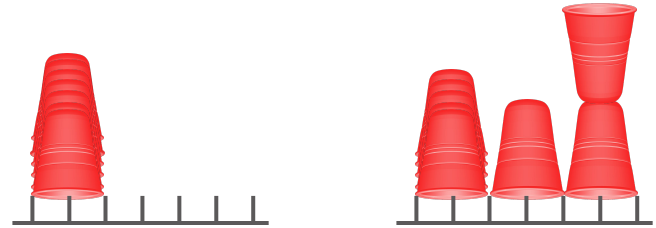
L laisser un gobelet

D droite

G gauche

R retourner le gobelet

- séquence d'instructions



un programme

P D D D D L

G G G G

P D D D D R L

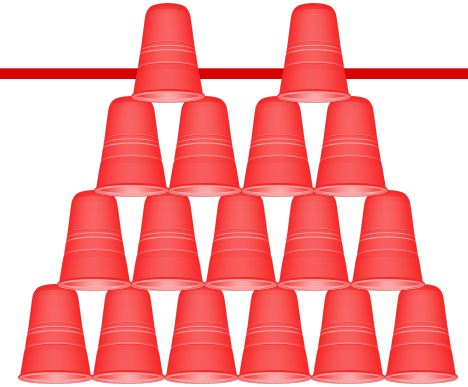
G G G G

P D D L

G G

grande pyramide

```
P D D L G G
P D D D D L G G G G
P D D D D D D L G G G G G G
...
```



- exprimer la **répétition**
 - *constructeur* – instruction composée
-

une répétition

P D D L G G

P D D D D L G G G G

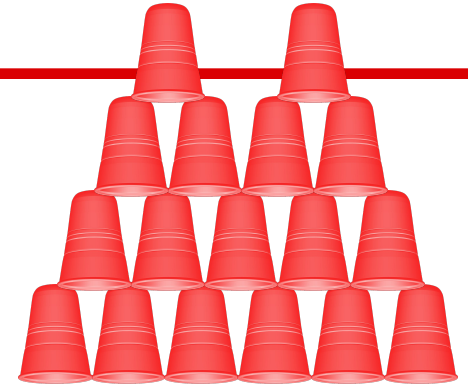
P D D D D D D L G G G G G G

...

P 2 D L 2 G

P 4 D L 4 G

P 6 D L 6 G



d'autres répétitions

P D D L G G

P D D D D L G G G G

P D D D D D D L G G G G G G

...

AR2

AR4

AR6

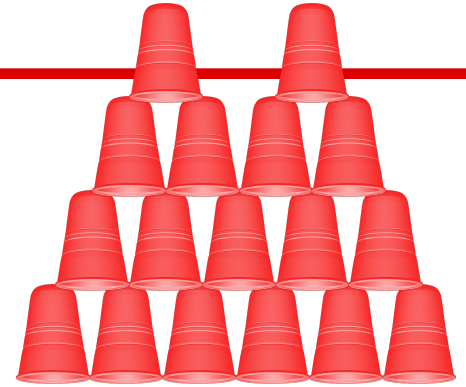
...

AR (2)

AR (4)

AR (6)

AR (i)



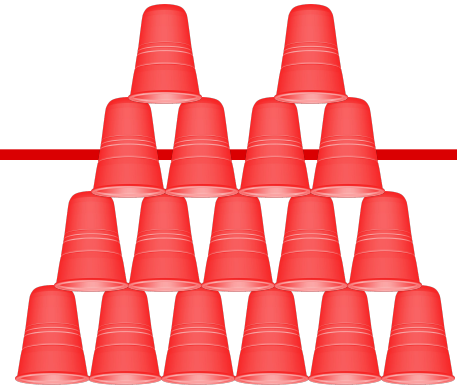
de nouveaux mots

- définir $AR(i)$

→ nouveau mot, AR

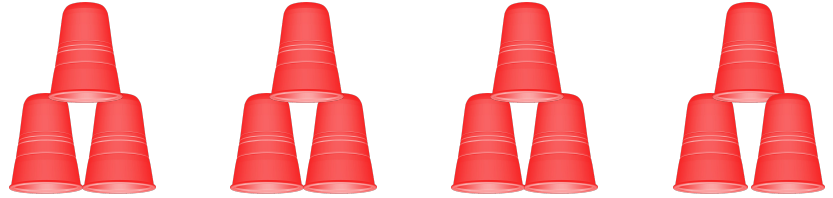
- utiliser $AR(i)$

$AR(2)$ $AR(4)$ $AR(6)$ $AR(8)$...



des petits tas

- un tas
- un autre tas

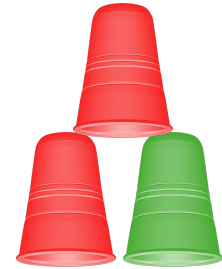


AR (2)	AR (4)	AR (3)
AR (8)	AR (10)	AR (9)
AR (14)	AR (16)	AR (15)
...		

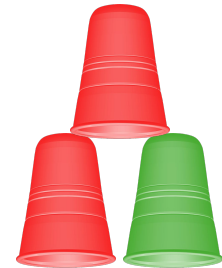
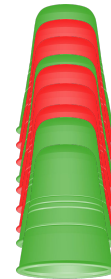
- des tas de tas
-

en couleur

- deux couleurs de gobelets



- on ne connaît pas l'organisation de la pile initiale





langage de programmation

- **instructions**

→ modification **état** de l'**environnement**

- P L D G ...

- **concepts universels**

- bloc d'instructions
 - répétition
 - alternative

 - fonction, paramètre
 - expression arithmétique
-

concevoir un langage de programmation

- liste d'instructions, de constructeurs
 - P D D G ...
 - blocs d'instructions
 - répétition
 - ...
 - **syntaxe** d'une instruction
 - "sucre syntaxique"
 - **sémantique** d'une instruction
 - effet de l'**exécution** de l'instruction
-

— ?

— ...

— !

crédits

- images

- <http://www.opengraphicdesign.com/art/retro-robots-in-vector-format/>
 - <https://pixabay.com/fr/verre-tasse-en-plastique-656716/>
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