

Programming (The language of computers)

To make a computer do what you want it to, you have to give it commands. Computers understand only some commands; all the commands together are known as a computer language.

There are many computer languages. We will show you an introduction to one of them.

Your Language: You will be using this language today to perform certain tasks.

Movement

fd 1 ----1 steps forward.

rt 90 ----A 90 degree turn right.

lt 90 ----A 90 degree turn left.

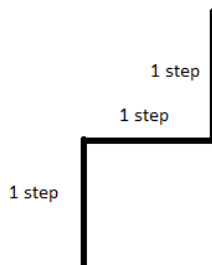
Ex.

```
fd 1
fd 1
rt 90
fd 1
fd 1
fd 1
rt 90
fd 1
fd 1
rt 90
fd 1
fd 1
fd 1
```

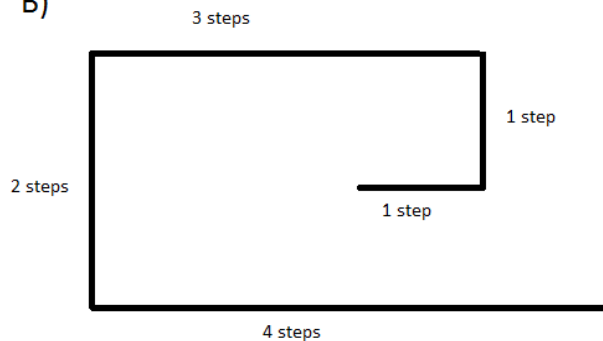
Can you figure out what this program does?

Can you make a program that makes the “computer” walk in these patterns:

A)



B)



C). Write a program that makes the “robot” walk on the border of a 10x10 square.

Variables

Variables are denoted by `:name` in our language. The colon is there to show the computer that the thing that follows next is a variable. Example: `:age`

make `"name quantity` ---makes the variable a certain quantity. Example: make `"s 5` (now the variable `s` has the value of 5)

A nice trick to change the value of a variable:

make `"name :name+quantity` ---makes the variable be greater than its previous value by a certain quantity. Ex. make `"var :var+1` (the variable `var` has become bigger by 1)

Mathematical Operations

Additions---`expr+expr`: example: `2+3`, `2+:age`

Subtractions---`expr-expr` example: `3-2`, `:age-3`

Multiplication---`expr*expr` example: `3*2`

Division---`expr/expr` example: `3/2`

Rounding---`round number` example: `round 1.3`

(You will need this for the last and hardest task on this sheet.)

Loops

`while condition [expression]` ----the commands in the brackets repeat while the expression is true. Example: `while :age<50 [fd 1 make "age :age+1]`

D. Make a program that makes the "robot" walk on the border of a 10x10 square. It should be shorter if you use variables and the while loop.

`repeat n [expression]` ----repeats whatever you have in the brackets `n` times. This loop does the same thing that the while loop can do with the variable being raised by one each time.

Example: `repeat 10 [fd 1]`

E. Write a program that makes the "robot" walk on the border of a 10x10 square with the command repeat.

Communication (Inputs/Outputs)

Make the computer write text.

Example: show [How old are you?] (the computer will display the question).

Provide computer with information:

Example: make “age readword (now the variable :age has the value that the person answered)

show [*whatever you want to show the user*] ---the computer will output whatever is in the brackets. Example: show [Your age is] show :age

If

If *condition* [*expression*] ---if the condition is true, then the computer does the commands written in the brackets. If the condition is not true, then the computer skips the commands in the brackets.

Example:

```
make “age ask “how old are you?”
```

```
if :age>13 [ show [You get to watch pg 13 movies now.]]
```

```
if :age<13 [ show [Haha. You cannot watch pg 13 movies.]]
```

F. Find the number of girls and boys in the room. Everyone walks up to you one by one, and you are supposed to ask whether they are a boy or girl, and count how many of each there are.

Here is the hard problem.

G. Make a program that finds the number from 1 to 10 that is randomly chosen. The program should ask questions of the type “Is the number greater/less than something?”

Write a program that makes "a computer" walk in the following patterns below.
Use loops.

