Learning programming with Jennifer



Your first steps in programming: values, variables, decisions, loops, lists and functions, one small program at a time.

by @mplx

A program is a list of steps

```
use io;

io.printf("Hello, world!\n");
```

```
$ jennifer run hello.j
Hello, world!
```

Values have types

Type	Examples	What it holds
int	42, -7, 0	whole numbers
float	3.14, 0.5	numbers with a fractional part
string	"Ada", "hello"	text, in quotes
bool	true, false	yes or no

Variables are named boxes

```
use io;

def name as string init "Ada";
def age as int init 36;
$age = $age + 1;
io.printf("{$name} is {$age}\n");
```

```
Ada is 37
```

Doing sums

```
use io;

io.printf("%d\n", 7 + 3 * 2);
io.printf("%f\n", 7 / 2);
io.printf("%d\n", 7 // 2);
io.printf("%d\n", 7 % 2);
```

```
13
3.5
3
1
```

Making decisions

```
use io;

def temperature as int init 23;
if ($temperature > 30) {
    io.printf("hot\n");
} elseif ($temperature > 15) {
    io.printf("pleasant\n");
} else {
    io.printf("cold\n");
}
```

Questions with yes or no answers

You write	It asks
$a == $b	are they equal?
$a != $b	are they different?
$a < $b, $a >= $b	smaller? at least as big?
$hungry and $awake	are both true?
$rain or $snow	is at least one true?
not $done	is it false?

Doing it again: loops

```
use io;

def n as int init 3;
while ($n > 0) {
    io.printf("%d... ", $n);
    $n = $n - 1;
}
io.printf("lift-off!\n");

for (def i in 1..4) {
    io.printf("round %d\n", $i);
}
```

Lists keep things in order

```
use io;

def fruits as list of string init ["apple", "pear"];
$fruits[] = "plum";
io.printf("%d fruits, the first is %s\n", len($fruits), $fruits[0]);
for (def f in $fruits) {
    io.printf("- %s\n", $f);
}
```

```
3 fruits, the first is apple
```

Maps look things up by name

```
use io;

def ages as map of string to int init {"Ada": 36, "Alan": 41};
$ages["Grace"] = 85;
for (def who in $ages) {
    io.printf("%s: %d\n", $who, $ages[$who]);
}
```

```
Ada: 36
Alan: 41
Grace: 85
```

Functions give a name to steps

```
use io;

func area(width as float, height as float) {
    return $width * $height;
}

def room as float init area(4.5, 3.0);
io.printf("%f|prec=2 square metres\n", $room);
```

```
13.50 square metres
```

Mistakes become messages

```
$ jennifer run typo.j
typo.j: parse error at /home/ada/typo.j:4:19: undefined variable "totl"
  io.printf("%d\n", $totl);
                    ^

$ jennifer run check.j
check.j: runtime error at /home/ada/check.j:2:5: `if` condition must
be bool, got int
  if ($count) {
      ^
```

Putting it together

```
use io;
func grade(points as int) {
    if ($points >= 90) {
        return "A";
    } elseif ($points >= 50) {
        return "B";
    }
    return "F";
}
def scores as map of string to int init {"Ada": 95, "Alan": 78};
for (def who in $scores) {
    io.printf("%s|pad=6 %s\n", $who, grade($scores[$who]));
}
```

Try things in the REPL

```
$ jennifer repl
>>> def x as int init 6 * 7;
>>> $x;
42
>>> $x > 40;
true
>>> "Hello, " + "Ada";
"Hello, Ada"
```

Where to go next

- The user guide: docs.jennifer-lang.dev
- Install Jennifer: jennifer-lang.dev
- The next talk: *Jennifer for coders*, in the Jennifer Academy

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