



Version 0.6.1

June 4, 2024

Chapter 1

Variables and types

Like many languages, *Morpho* allows the programmer to define *variables* to contain pieces of information of *values*. A variable is created using the **var** keyword, which is followed by its name

```
var a
```

Variable names must begin with an alphabetical character or the underscore character `_`, and may consist of any combination of alphanumeric characters or underscores thereafter. Variable names are case sensitive, so

```
var a
```

```
var A
```

each refer to distinct variables.

After creating a variable, you may immediately store information in it by providing an *initializer*, which can be any value

```
var i = 1
var str = "Hello"
```

1.1 Types

Morpho is a dynamically typed language: Every value has a definite type, and *Morpho* is always able to tell what type it is, but variables may generally contain values of any type and functions or methods can accept arguments of any type.

There are a number of basic types in *Morpho*:

nil is a special value that represents the *absence* of information and is different from any other value. Unless an initializer is provided, *Morpho* variables initially contain `nil` after declaration.

Bool values contain either **true** or **false**.

Int values contain 32 bit signed integer numbers. An integer constant is written intuitively, e.g. 1, 50, 1000 and may include a negative sign -100.

Float values contain double precision floating point numbers. You can write numeric constants either using a decimal 1.5 or in scientific notation, e.g. 1e10, 1.6e-19 or 6.625e26.

Object values encompass many additional types, from Strings, Lists, Matrices and more.

1.2 Strings

Strings are sequences of unicode UTF8 encoded characters. You can access individual characters using index notation

```
var h = "Hello"  
print h[0]
```

1.3 Strings