

VARIABLES

An Introduction to Computer Science



Let's learn about Variables.

Purpose

```
our_ages = [15, 27, 32, 14]
```

```
total_age = 0
```

```
for age in our_ages:
```

```
    total_age += age
```

```
print total_age
```

Variables!



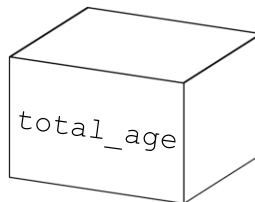
Variables let us store and load information.

In other words, we can "read" from and "write to" a variable with data.

This lets us use data later.

Metaphor

88



You can think of a variable as a box that holds data.
That data could be a number, a string, or any type of data.
After the data is put in, we can take it out later.

Variables vs. Data

```
print(14)
```

Write

```
age = 14  
print(age)
```

Read



Anywhere that you use literal data, you can replace it with a variable.

Different from Math

Math (Algebra)



$y = 5 * x + 3$

$y = 5 * (1 + y) + 3$

$y = 5 + 5 * y + 3$

$y - 5 * y = 8$

$-4 * y = 8$

$y = -2$

Computing



```
football_score = 0
```

```
print(football_score)
```

```
football_score = 10
```

```
print(football_score)
```

```
football_score = 27
```

```
print(football_score)
```



Variables in computing are very different from variables in math.

In math, a variable is an unknown that we are solving for.

In computing, we always know the value of a variable, but we are manipulating it.

A variable varies over time, but according to instructions that the programmer has written.

Names

Tomorrow's
temperature
in Celsius?

```
temperature = 20
```

Today's
temperature
in Fahrenheit?



Variables are defined by their name.

Names are absolutely crucial in programming, and choosing them is an art.

Names are best when they are accurate, meaningful, and concise.

We use good variable names to communicate clearly; not just with other programmers, but with ourselves as we try to figure out code that we have written.

Of course, computers do not understand variable names

Naming Rules

1. Names can only have

- Letters
- Numbers
- Underscores (_)

2. Names must begin with

- A letter
- An underscore (_)



There are two rules for naming variables:

Names can only have letters, numbers, and underscores.

Names must begin with a letter or underscore