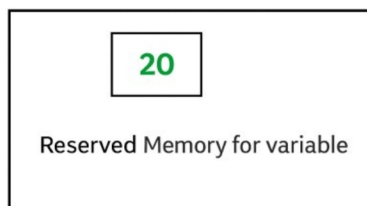# Basic knowledge (computer science)

Concept of Variable

Variables play an important role in algorithms and programming. The value stored by a variable can change as a program is running. Variables are extremely useful in programming because they make it possible for the same program to process different sets of data.

int age = 20; ← value

datatype variable_name

20

Reserved Memory for variable

RAM

DATA TYPE	DESCRIPTION	EXAMPLE	EXAMPLES OF USE
integer	Used to store whole numbers without a fractional part	30	age = 30 number = 5
real or float	Used to store numbers with a fractional part (decimal place). Real numbers are sometimes referred to as floats (short for floating point)	25.5	weight = 25.5 price = 12.55
Boolean	Only has two possible values: True or False	False	correct = False lightOn = True
character*	A character can be a single letter, a symbol, a number or even a space. It is one of the four basic data types	'm'	gender = 'm' char = ':'
string	A set of characters which can include spaces and numbers and are treated as text rather than numbers	'the computer'	name = 'Catherine' type = 'liquid'

Think of a variable as a labeled jar where the content can change whenever needed.

Assignments

Assignments in programming are used to store a value in a variable. This is done with the assignment operator (=).
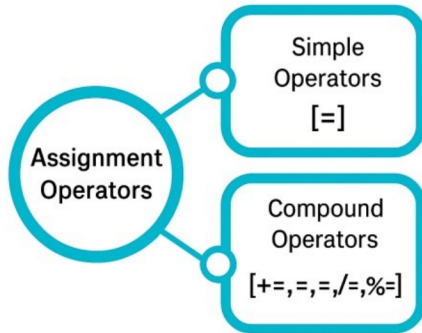

لطفا اگر این کتاب را در هر شبکه اجتماعی یا پیام‌رسانی دیدید، به آکادمی دان اطلاع دهید و هدیه آموزشی دریافت کنید!

Assignment Operator	Name	Example
=	Assignment Operator	c = a + b
+=	Add AND assignment	a += b is same as a = a + b
-=	Subtract AND assignment	a -= b is same as a = a – b
*=	Multiply AND assignment	a *= b is same as a = a * b
/=	Divide AND assignment	a /= b is same as a = a / b

Example:
```python
x = 5  # Assigns the value 5 to the variable x
```
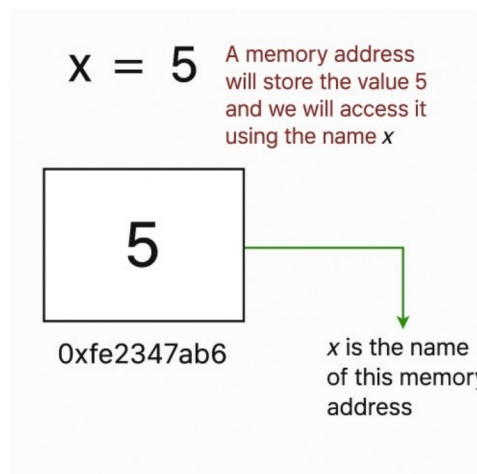
Testing vs Assignment

Assignment: Using = to store a value in a variable.
Testing: Using == to check if two values are equal.

Example:
```python
x = 5  # Assignment
if x == 5:  # Testing
   print('x is 5')
```

Arithmetical Operations

Basic arithmetic operations include:
- Addition (+)
- Subtraction (-)
- Multiplication (*)
- Division (/)
- Modulo (%) - Gives the remainder after division.

OPERATOR	FUNCTION	EXAMPLE
+	Addition: add the values together.	8 + 5 = 13 myScore1 + myScore2
–	Subtraction: subtract the second value from the first.	17 – 4 = 13 myScore1 – myScore2
*	Multiplication: multiply the values together.	6 * 9 = 54 numberBought * price
/	Real division: divide the first value by the second value and return the result including decimal places.	13 / 4 = 3.25 totalMarks/numberTests
DIV	**Quotient**: like division, but it only returns the whole number or *integer*.	13 DIV 4 = 3 totalMarks DIV numberTests
MOD	**Modulus**/modulo: this will return the remainder of a division.	13 / 4 = 3 remainder 1 Therefore 13 MOD4 = 1
^	Exponentiation: this is for 'to the **power** of'.	3 ^ 3 = 27 It is the same as writing 3^3

RELATIONAL OPERATOR	PYTHON, JAVA, C#
Equal to	==
Greater than	>
Greater than or equal to	>=
Less than	<
Less than or equal to	<=
Not equal to	!=

Examples of Programming Languages

C: Low-level programming language that offers fast performance and control over hardware.
Python: High-level, easy-to-read language often used for beginners and in data science.

In Python this would be:

```
total = 0
total = total + admissionCharge
```

In Java this would be:

```
Scanner scan = new Scanner(System.in);
int admissionCharge = scan.nextInt();
int total = 0;
total = total + admissionCharge;
```

In C#, variables must be declared before use. When you declare a variable, you need to state the data type that the variable will store, for example:

```
// declare a variable called total that will be used to
store floating point numbers and assign the value 0.0 to it
float total = 0.0;
// add the value stored in the variable admissionsCharge
to the total
total = total + admissionsCharge;
```

آکادمی دان