**2.Variables**

**Topics:**

**x = 10**

**x in 10 places**

**2x+2y+3z = 100.Find value of z when x= 10 and y=20.Prove that z =13.333**

**LHS = RHS**

**x = get\_emp\_details(10,20)**

**why we need to use x as variable in 20 lines of code, why not 20 directly?**

**X =30**

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x = 10+20+30

30 + 30

60

LHS = RHS

….

….

X = 20 # write operation

Print(X) # read operation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |

7 6 5 4 3 2 1 0

3421213

0101010001011110001

x = 20

here x is a variables which is referring to address of some memory location  
 2 20

2 10 0

2 5 0

2 2 1

1 0 =🡺 10100 1MB – 1024 KB

1 KB – 1024 bytes

1 byte – 8 bits

1 byte

123456

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

7 6 5 4 3 2 1 0 I

2 2 2 2 2 2 2 2 B

0 + 0 + 0 + 16 + + 0 + 4 + 0 + 0 C

20

12345

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

7 6 5 4 3 2 1 0

2 2 2 2 2 2 2 2

0 + 0 + 0 + 16 + 0 + 4 + 0 + 0

20

12345

X = 20 Write

print(X) Read

ASCII values – Search on internet

0 to 255

Least – 0

Highest -255

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

* 1. **Variables:**

**A bcdfsafdfdsaf#$#@%!$343244326556 0-255 65 97**

**X = 60 -----2 - 60**

**2 - 30 – 0**

**2 - 15 – 0**

**7- 1**

**3 - 1**

**1 - 1**

**60 – binary value - 111100**

**111100**

**1245278**

**X = 60**

**X = 30**

**x = 30**

**emp\_id = 30**

**sal = 15500.04**

**sal = 123**

**\_sal**

**\_myage**

**\_mysal2**

**CASE SENSITIVE :**

**---------------------------**

**namE=”Madhu”**

**name=”MAdhu”**

**if**

**same IN DB :**

**-----------------------------------------------------------**

**select \* from employee;**

**SELECT \* FROM EMPLOYEE;**

**age = 20 -🡪 int**

**name = “Python” ==🡺 string**

**sal = 1000.43 --🡪 float**

* Variable is a name which is used to refer **memory location of value**.
* Variable also known as identifier and used to hold value.
* A variable, as the name indicates is something whose value is changeable over time.
* In Python, **we don't need to specify the type of variable (int, float)** because Python is a type infer language and smart enough to get variable type.
* **Rule :**Variable names can be a group of both letters and digits, but they have to begin with a letter or an underscore.
* It is recomended to use **lowercase letters** for variable name. Rahul and rahul both are two different variables.

#### Note - Variable name should not be a keyword.

* Based on the **data type of a variable**, the interpreter allocates memory and decides what can be stored in the reserved memory. Therefore, by assigning different data types to variables, you can store integers, decimals or characters in these variables.

Age = 20

age = 20

1.Python interpreter allocates memory(2 bytes)

2. Converts to binary format (10100)

3. Copy above binary data to reserved memory

4. Give address of above memory location to variable **“age”**

## Declaring Variable and Assigning Values

## JAVA/Others :

## int x; Declaration of variable

## int x = 10; Initialization/Assigning value to variable

## expression vs equation

## x2+y+z --- expression

## x2+y+z = 100 --- equation

## Python :

## x = 10 Initialization of variable

## Python :

## x = 10

Python does no**t bound us to declare variable** before using in the application. Python variables **do not need explicit declaration** to reserve memory space.It allows us to create variable at required time.

We don't need to declare explicitly variable in Python. When we assign any value to the variable that variable is declared automatically.

The equal **(=)** operator is used to assign **value** to a **variable**.

## The declaration happens automatically when you assign a value to a variable. The equal sign (=) is used to assign values to variables.

## For Ex : age = 20

## In above ex. operand to the left of the = operator is the name of the variable and the operand to the right of the = operator is the value stored in the variable. For example

counter = 100 # An integer assignment

miles = 1000.5 # A floating point

emp\_name = "1234578" # A string

print(counter)

productid productname specif ssellername manfunit address cost tax totalcost

deliverydate 12214324324324 orde\_ref\_no

System.out.println(counter); # JAVA

print(miles)

print(name)

Here, 100, 1000.0 and "John" are the values assigned to counter, miles, and name variables, respectively. This produces the following result −

100

1000.0

John

## Multiple Assignment

## i`. Assigning single value to multiple variables

Python allows you to assign a single value to several variables simultaneously. For example −

a = b = c = 100

Here, an integer object is created with the value 1, and all three variables are assigned to the same memory location.

**ii.Assigning multiple values to multiple variables:**

You can also assign multiple objects to multiple variables. For example −

a, b, c = 1, 2.5, "john"

Here, two integer objects with values 1 and 2 are assigned to variables a and b respectively, and one string object with the value "john" is assigned to the variable c.

The values will be assigned in the order in which variables appears.

**2.2 Tokens and their types :**

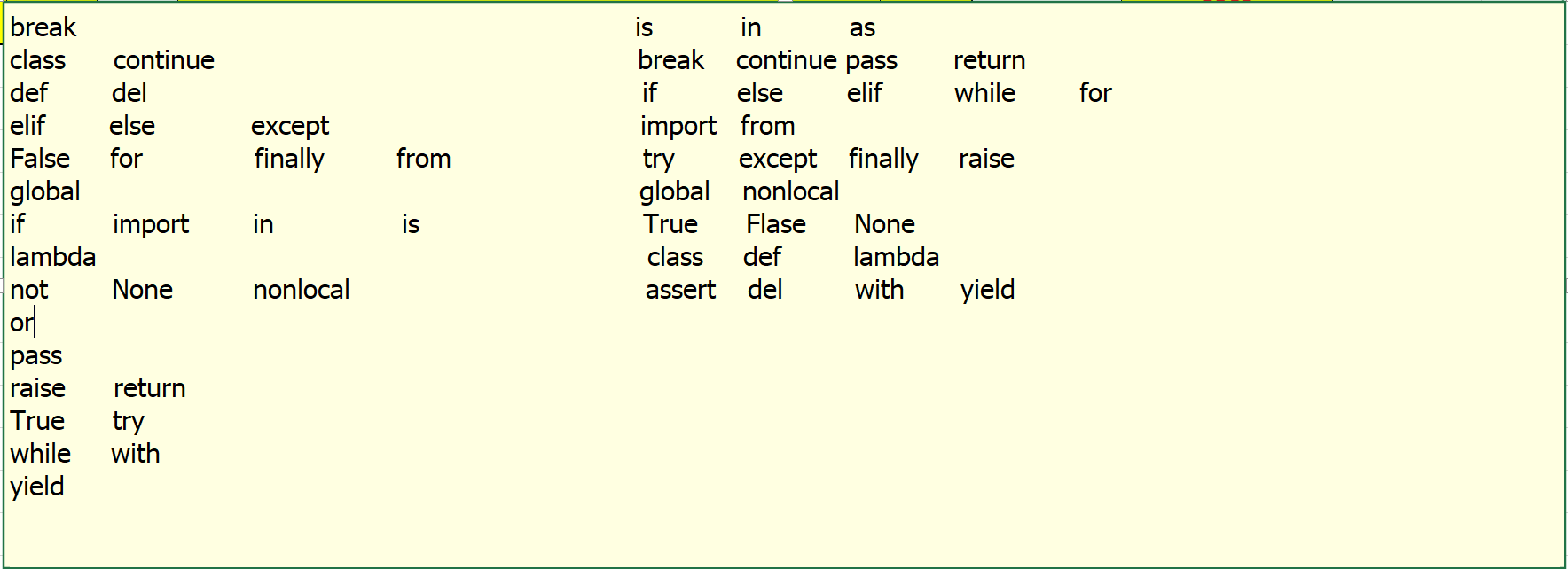
* Tokens can be defined as a punctuator mark, reserved words and each individual word in a statement.
* **Token is the smallest unit inside the given program.**

There are following tokens in Python:

**Keywords identifiers literals operator constant KILOC**

**a.Keywords** : == == !=

Are **reserved words** and has specific meaning in a language and they cannot be used as ordinary identifiers.



**b.Identifiers** :

An **identifier is a variable name.** A Python identifier is a name used to identify a variable, function name, class name, module name or other object name.

An identifier starts with a letter A to Z or a to z or an underscore (\_) followed by zero or more letters, underscores and digits (0 to 9)

### Rules for writing Identifiers

There are some rules for writing Identifiers.

But first you must know **Python is case sensitive.** That means **Name** and **name** are two different identifiers in Python.

Here are some rules for writing Identifiers in python. **PEP8 standards**

<https://www.python.org/dev/peps/pep-0008/>

\_age emp\_name emp\_sal student\_id

* Identifiers can be combination of uppercase and lowercase letters, digits or an underscore(\_). So **myVariable**, **variable\_1**, **variable\_for\_print**all are valid python identifiers.
* An Identifier can not start with digit. So while **variable1** is valid, **1variable** is not valid.
* We can’t use special symbols like !,#,@,%,$ etc in our Identifier.
* Identifier can be of any length.

Though these are hard rules for writing identifiers, also there are some naming conventions which are not mandatory but rather good practices to follow.

**Naming Conventions:**

1. **Class names** start with an **uppercase** letter.
2. All **other** identifiers start with a **lowercase** letter. **\_age \_\_age\_\_**
3. Starting an identifier with a single leading underscore indicates the identifier is private.
4. If the identifier starts and ends with two underscores, than means the identifier is language-defined special name.
5. While **c = 10** is valid, writing **count = 10** would make more sense and it would be easier to figure out what it does even when you look at your code after a long time.
6. Multiple words can be separated using an underscore, for example this\_is\_a\_variable.

**c = 10**  **emp\_id = 10**

**c.Literals** :

In computer science, a literal is a notation for **representing a fixed value** in source code.

**Variable** - name = “John” --- String literal

identifier

age = 10 --- integer literal

age = 10+20

The **literals** include the string, unicode string, integer, float, long, list, tuple and dictionary types

**d.Operators** :

Operators are special symbols in **Python** that carry out arithmetic or logical computation.The value that the **operator** operates on is called the operand

**>>> 2 + 3**

**5**

Here **+** is an **operator** which is performing arithmetic computation.

**2** and **3** are the **operands** and

**5** is the output of the operation.

## Constants

A constant is a **type of variable** whose value cannot be changed. It is helpful to think of constants as containers that hold information which cannot be changed later.

Non technically, you can think of constant as a bag to store some books and those books cannot be replaced once placed inside the bag.

### Assigning value to a constant in Python:

age = 10 # **variable**

PI = 3.14 22/7 # PI **constant**

*GRAVITY = 9.8* # GRAVITY is a **constant**

WEEKS = {MONDAY,TUE,WED,THU,FRI,SAT,SUN}

**2.3 Scope of variable:**

A **scope** in any programming is a region of the program where a defined **variable** can have its existence and beyond that **variable** it cannot be accessed

# **Global** and **Local** Variables in Python