

6th July 2022

Python

Advantages of Python

1. Easy to use
2. Expressive language
3. It is an interpreted language
4. Cross platform language
5. Free and open source

Disadvantages of Python

1. Lesser libraries
2. Not strong on type binding
3. Not easily convertable

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Tokens

The smallest individual unit in a program is known as token.

Types of Tokens

- 1) Keywords
- 2) Identifiers
- 3) Literals
- 4) Operator
- 5) Punctuator

1. Keywords:

A Keyword is a word having special meaning reserved by programming language. Eg- True, False, None, Break, for, while, etc.

Python character Set:

Set of valid characters that the language can recognize, A-Z, These include characters like A-Z, a-z, 0-9 and Special Symbols (> < , + , - , * ,) , [] , { } , ! , , ≥ , ≤)

white spaces → Space, new line character (\n), tab space (\t)

2 Identifiers : Variables.

Rules of naming Identifiers

1. An identifier is a sequence of letters and digits
2. The 1st character must be a letter or a underscore
3. Upper and lower case letters are different
4. Digit 0-9 can be part of the identifier except for the first character.
5. Identifiers are unlimited in length
6. An Identifier must not be a keyword
7. An identifier can not contain any special character except for underscore .

Valid Identifiers

dat_9_77

My_File

OK

CLR

Hello_World

Invalid Identifiers

2-9 clt

Data - rec

krcack

My. File

1567_Hi

3. Literals :

Literals are data items that have a fixed value.

Types of Literals

- 1 String
- 2 Numeric literal
- 3 Boolean
- 4 Special literal none

4. String :

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Note :

Python is a case sensitive ~~language~~ language

1. String :

Single line string :

Code:

```
a = "hello world"  
print(a)
```

Output : hello world

Multiline string :

(1) Code:

```
a = "Hello \  
world \  
from Python"  
print(a)
```

Double quotes

Output = HelloworldPython

2) Triple quotes

Code

`a = """ hello``world``python"``print(a)``print(a)`

Output:

`hello``world``python`11th July 2022

Length function: len()

(I) Code:

`a = "abc"``print(len(a))`

Output: 3

(IV) `d = "Hello World"``print(len(d))`

Output: 11

(II)

~~`x = "gx`~~~~`b\`~~~~`c"`~~~~`print(len(x))`~~

Output: 3

(V) `e = "Hello`~~`World"`~~~~`print(len(e))`~~

Output: 10

(III)

~~`y = "a`~~~~`b`~~~~`c""`~~~~`print(len(y))`~~

Output: 5

(VI) `z = "Hello`~~`World"`~~~~`print(len(z))`~~

Output: 11

Escape Sequence: \n, \t

(i) $f = "Hello\nWorld"$
 $\text{print}(\text{len}(f))$
 Output = 11

(ii) $g = "Hello\tPython"$
 $\text{print}(g)$
 Output = Hello Python'

(iii) $h = "Hello\"Python\""$
 $\text{print}(h)$
 Output : Hello "Python"

(iv) $i = "Hello \"Python\""$
 $\text{print}(i)$
 Output = Hello "Python"

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Ques

Numeric Literals:

i) Integer Literals:

Integer literals are whole number without any fractional part

Types of Integer Literals

- i) Decimal
- ii) Octal
- iii) Hexadecimal

Decimal:

$(5.10)_{10}$

$\frac{5}{10} \rightarrow 0.5$

$()_{10} \rightarrow \text{Any digit from 0 to 9}$

Octal:

$0 (72)_8$

$()_8 \rightarrow \text{Any digit from 0 to 7}$

Hexadecimal:

$(401ACB7)_{16}$

$()_{16} \rightarrow \text{Any digit/letter from 0 to 9 and A to F}$

$$A - 10 \quad D = 13$$

$$B - 11 \quad E = 14$$

$$C - 12 \quad F = 15$$

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Number Conversion

1) Decimal to Binary:

Note:

Base of a number system is called as radix

1) Decimal to Binary:

$$1 \quad (5)_{10} \rightarrow \boxed{(101)_2} \quad \text{Binary}$$

$$\begin{array}{r} 2 | 5 \\ 2 | 2 \quad 1 \\ \hline 1 \quad 0 \end{array} \quad (101)_2$$

$$2 \quad (9)_{10} \rightarrow (1001)_2$$

$$\begin{array}{r} 2 | 9 \\ 2 | 4 \quad 1 \\ \hline 2 | 2 \quad 0 \\ \hline 1 \quad 0 \end{array} \quad (1001)_2$$

$$3 \quad (85)_{10} \rightarrow (1010101)_2 \quad 4 \quad (200)_{10} \rightarrow (11001000)_2$$

$$\begin{array}{r} 2 | 85 \\ 2 | 42 \quad 1 \\ \hline 2 | 21 \quad 0 \\ \hline 2 | 10 \quad 1 \\ \hline 2 | 5 \quad 0 \\ \hline 2 | 2 \quad 10 \\ \hline 1 \quad 0 \end{array} \quad (1010101)_2$$

$$\begin{array}{r} 2 | 200 \\ 2 | 100 \quad 0 \\ \hline 2 | 50 \quad 0 \\ \hline 2 | 25 \quad 0 \\ \hline 2 | 12 \quad 1 \\ \hline 2 | 6 \quad 0 \\ \hline 2 | 3 \quad 0 \\ \hline 1 \quad 0 \end{array} \quad (11001000)_2$$

5 $(11)_{10} \rightarrow (1011)_2$

2	11
2	5
2	2
1 0	

6 $(43)_{10} \rightarrow (101011)_2$

2	43
2	21
2	10
2	5 0
2	2
0 0	

1) Binary to Decimal

1 $(1011)_2 \rightarrow (11)_{10}$ 4) $(101011)_2 \rightarrow (43)_{10}$

$$\begin{array}{r}
 \downarrow & 0 & 1 & | \\
 \text{MSB} & & \uparrow & \text{LSB} \\
 2^3 & 2^2 & 2^1 & 2^0 \\
 8 & 4 & 2 & 1 \\
 8 \times 1 + 4 \times 0 + 2 \times 1 + 1 \times 1 \\
 8 + 2 + 1 \\
 = 11
 \end{array}$$

$$\begin{array}{r}
 \text{MSB} \rightarrow 1 & 0 & 1 & 0 & 1 & 1 & \leftarrow \text{LSB} \\
 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\
 32 & 16 & 8 & 4 & 2 & 1 \\
 32 \times 1 + 16 \times 0 + 8 \times 1 + 4 \times 0 + 2 \times 1 + 1 \\
 32 + 8 + 2 + 1 \\
 = 43
 \end{array}$$

2) $(101)_2 \rightarrow (5)_{10}$

$$\begin{array}{r}
 \text{MSB} \rightarrow 1 & 0 & 1 & \leftarrow \text{LSB} \\
 2^2 & 2^1 & 2^0 \\
 4 & 2 & 1 \\
 4 \times 1 + 2 \times 0 + 1 \times 1 \\
 = 4 + 1 \\
 = 5
 \end{array}$$

3) $(1001)_2 \rightarrow (9)_{10}$

$$\begin{array}{r}
 \text{MSB} \rightarrow 1 & 0 & 0 & 1 & \leftarrow \text{LSB} \\
 2^3 & 2^2 & 2^1 & 2^0 \\
 8 & 4 & 2 & 1 \\
 8 \times 1 + 4 \times 0 + 2 \times 0 + 1 \times 1 \\
 = 8 + 1 \\
 = 9
 \end{array}$$

$$5) (1010101)_2 \rightarrow (85)_{10}$$

$$\begin{array}{r} 1 \ 0 \ 1 \ 0 \ 1 \ 0 \ 1 \\ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \end{array}$$

$$\begin{aligned} &= 64 \times 1 + 32 \times 0 + 16 \times 1 + 8 \times 0 + 4 \times 1 + 2 \times 0 + 1 \times 1 \\ &= 64 + 16 + 4 + 1 \\ &= 64 + 21 \\ &= 85 \end{aligned}$$

↙

$$6) (11001000)_2 \rightarrow (200)_{10}$$

$$\begin{array}{r} 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0 \ 0 \\ 2^7 \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \end{array}$$

$$\begin{aligned} &= 128 \times 1 + 64 \times 1 + 32 \times 0 + 16 \times 0 + 8 \times 1 + 4 \times 0 + 2 \times 0 + 1 \times 0 \\ &= 128 + 64 + 8 \\ &= 128 + 72 \\ &= 200 \end{aligned}$$

↙

$$7) (1010)_2 \rightarrow (10)_{10}$$

$$\begin{array}{r} 1 \ 0 \ 1 \ 0 \\ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 8 \ 4 \ 2 \ 1 \end{array}$$

$$\begin{aligned} &= 8 \times 1 + 4 \times 0 + 2 \times 1 + 1 \times 0 \\ &= 8 + 2 \\ &= 10 \end{aligned}$$

↙

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(11)

Decimal \rightarrow Octal

$$(1) \cancel{25} (25)_{10} \rightarrow (31)_8$$

$$\begin{array}{r} 8 | 25 \\ \underline{-} 3 \quad 1 \uparrow \end{array}$$

$$(11) (266)_{10} \rightarrow (412)_8$$

$$\begin{array}{r} 8 | 266 \\ \underline{-} 33 \quad 2 \uparrow \\ 4 \quad 1 \end{array}$$

14th July 2022 (v) Decimal (Fractional) \rightarrow Binary

$$(1) (25.75)_{10} \rightarrow (10001.11)_2$$

$$\begin{array}{r} 2 | 25 \\ \underline{-} 2 \quad 12 \quad 1 \uparrow \\ 2 | 6 \quad 0 \\ \underline{-} 2 \quad 3 \quad 0 \\ 1 \quad 0 \end{array} \quad \begin{array}{r} 0.75 \\ \times 2 \\ \hline 1 \square .50 \\ \times 2 \\ \hline 1 .00 \end{array}$$

$$(11) (25.35)_{10} \rightarrow (11001.01011)_2$$

$$\begin{array}{r} 2 | 25 \\ \underline{-} 2 \quad 12 \quad 1 \uparrow \\ 2 | 6 \quad 0 \\ \underline{-} 2 \quad 3 \quad 0 \\ 1 \quad 1 \end{array} \quad \begin{array}{r} 0.35 \\ \times 2 \\ \hline 0.70 \\ \times 2 \\ \hline 1.40 \\ \times 2 \\ \hline 0.80 \\ \times 2 \\ \hline 1.60 \\ \times 2 \\ \hline 0.20 \\ \times 2 \\ \hline 0.60 \end{array}$$

(V) Octal to Decimal

$$(1) (412)_8 \rightarrow (266)_{10}$$

4	1	2
8^2	8^1	8^0
64	8	1

$$= 64 \times 4 + 8 \times 1 + 1 \times 2$$

$$= 256 + 10$$

$$= 266$$

(VI) Fractional Binary to Decimal (Fractional)

$$(1) (11001.01011)_2 \rightarrow (25.35)_{10}$$

1	1	0	0	1	.	0	1	0	11
2^4	2^3	2^2	2^1	2^0		2^{-1}	2^{-2}	2^{-3}	$2^{-4} 2^{-5}$
16	8	4	2	1		$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16} \frac{1}{32}$

$$16 + 8 + 1 + \frac{1}{4} + \frac{1}{16} + \cancel{\frac{1}{32}}$$

25.

48

25.35

(VII) Binary to Octal

$$(1) \underbrace{(001,110,011,100,101,011)}_{{\begin{matrix}1 & 6 & 3 \\ 4 & 5 & 3\end{matrix}}}_2 \rightarrow (163453)_8$$

convert into decimal

$$(ii) (0011100111111001111)_2 = (2737717)_8$$

01 0 111 0 111111001111 2737717
 2 3 7 7 7 81 7

0011100111111001111 (1637717)₈
 1 6 3 7 1 1 7

ix) Octal to Binary

$$(i) (1637717)_8 \rightarrow (0011100111111001111)_2$$

1 6 3 7 7 1 7
 ↓ ↓ ↓ ↓ ↓ ↓ ↓
 001 110 0111111001111

x) Decimal to Hexadecimal

$$(i) (423)_{10} \rightarrow (1A7)_{16}$$

16 | 423
 16 | 26 7 ↑
 - | - 1 A

$$(ii) (214)_{10} = (D6)_{16}$$

16 | 214
 - | 13 6
 → D

x i) Hexadecimal to Decimal

(i) $(356)_{16} — (854)_{10}$

$$\begin{array}{r}
 3 \quad 5 \quad 6 \\
 16^2 \quad 16^1 \quad 16^0 \\
 256 \quad 16 \quad 1 \\
 \hline
 = 256 \times 3 + 16 \times 5 + 6 \times 1 \\
 = 768 + 80 + 6 \\
 = 854
 \end{array}$$

x ii) Hexadecimal to Binary

(i) $(3AF)_{16} — (001110101111)_2$

$$\begin{array}{r}
 3 \quad A \quad F \\
 \downarrow \quad \downarrow \quad \downarrow \\
 3 \quad 10 \quad 15 \\
 \downarrow \quad \downarrow \quad \downarrow \\
 (0011 \quad 1010 \quad 1111)_2
 \end{array}$$

(ii) $(ACFD2CA)_{16} — (1010110011111101001011001010)_2$

$$\begin{array}{cccccccc}
 A & C & F & D & 2 & C & A \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 10 & 12 & 15 & 13 & 2 & 12 & 10 \\
 1010 & 1100 & 1111 & 1101 & 0010 & 1100 & 1010
 \end{array}$$

XIII) Binary to Hexadecimal

$$(1111\ 0000\ 1100\ 1110\ 0101\ 010)_2 = (\text{FOCF2A})_{16}$$

1111 0000 1100 111 0010 1010

15 0 12 15 2 10

Questions.

$$(I) (24.6)_8 \rightarrow (\)_{10}$$

$$(II) (3.1)_8 \rightarrow (\)_2$$

$$(III) (010110.0101)_8 \rightarrow (\)_8$$

$$(IV) (56.08)_{16} \rightarrow (\)_{10}$$

$$(V) (3BF.5C)_{16} \rightarrow (\)_2$$

$$(VI) (1010110.01011100)_{16} \rightarrow (\)_{16}$$

$$(VII) (1948.86)_{16} \rightarrow (\)_8$$

Answers

$$(I) (24.6)_8 - (20.75)_{10} \quad (II) 3.1$$

$$\begin{array}{r}
 2 \quad 4 \quad . \quad 6 \\
 8^1 \quad 8^0 \quad 8^{-1} \\
 8 \quad 1 \quad , \quad \frac{1}{8} \\
 \hline
 \end{array}
 \quad (011.001)_2$$

$$2 \times 8 + 4 \times 1 + 3 \times \frac{1}{8} = \frac{16 + 4 + 0.375}{8} = \frac{20.375}{8}$$

$$= 16 + 4.75$$

$$= (20.75)_{10}$$

(III)

$$\begin{array}{r} \underline{0 \ 1 \ 0 \ 1 \ 1 \ 0 \cdot 0 \ 1 \ 9 \ 0 \ 0} \\ 2 \ 6 \ 2 \ 4 \end{array}$$

$$(26.24)_8$$

(IV)

~~$$(5 \ 6 \cdot 0 \ 8)_8$$~~

$$\begin{array}{r} 5 \ 6 \cdot 0 \ 8 \\ 16' \ 16' \ 16' \ 16' \end{array}$$

$$16 \times 5 + 1 \times 6 \cdot \frac{1 \times 0 + 1 \times 8}{16}$$

$$80 + 6 \cdot 0.5$$

~~$$86.5$$~~

V)

$$\begin{array}{ccccccc} 3 & B & F & \cdot & 5 & C \\ \downarrow & \downarrow & \downarrow & & \downarrow & \downarrow \\ 3 & 11 & 15 & \cdot & 5 & 12 \\ 0011 & 1011 & 1111 & \cdot & 0101 & 1100 \end{array}$$

$$(001110111111 \cdot 01011100)_2$$

VI)

$$1 \ 0 \ 1 \ 0 \ 1 \ 1 \ 0 \cdot 0 \ 1 \ 0 \ 1 \ 1 \ 0 \ 0$$

$$\begin{array}{r} \underline{0 \ 1 \ 0 \ 1 \ 0 \ 1 \ 1 \ 0} \cdot \underline{0 \ 1 \ 0 \ 1 \ 1 \ 0 \ 0} \\ 5 \ 6 \end{array}$$

VII)

$$\begin{array}{r} 1 \ 9 \ 48. B 6 \\ \downarrow \ \downarrow \ \downarrow \ \downarrow \ \downarrow \\ 0001 \ 1001 \ 0100 \ 1000 \cdot 1011 \ 0110 \\ 00001100101001000 \cdot 10110110 \end{array}$$

$$(14510.554)_8$$

CS Worksheet

CH: 6

Getting Started with Python

1. Who developed python programming language?

Ans Python programming language was developed by Guido van Rossum in the late 1980s.

2. "Python is an interpreted high-level language." What does it mean to you?

Ans Python is an interpreted high-level language, which means that the source code of a Python program is converted into bytecode that is then executed by the Python virtual machine. Or in other words, it compiles and runs the code line by line.

3. What does a cross platform language mean?

Ans A cross platform language means it can run well on variety of platforms.

4. Python is Free and Open-Source language, what do you understand by this feature?

Ans It means to download Python, one needs not pay anything, because it is Free. And its source code is also available, which can be modified because it is open source.

5. What is the difference interactive mode and script mode in python.

Ans Script Mode is used when the user is working with more than one single code or block of code.

Interactive mode is used when an user wants to run one single line or one block to of code.

6. Which of the following are not valid strings in python?

- (a) "Hello"
- (b) 'Hello'
- (c) 'Hello"
- (d) {Hello}
- (e) "Hello"

Ans option (c) "Hello" , (d) {Hello} and e) "Hello" are not valid strings in python.

~~Ans~~

CH: 2

Data Representation

1) Do the following conversions:

1) $(13)_{10} = (1101)_2$

$$\begin{array}{r} 2 | 13 \\ \hline 2 | 6 \quad 1 \\ \hline 2 | 3 \quad 0 \\ \hline 1 \quad 1 \end{array}$$

5) $(1010100.011)_2 = 8\frac{7}{8}$

$$\begin{array}{r} 1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1 \quad 1 \\ \hline 2^6 \quad 2^5 \quad 2^4 \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0 \quad 2^{-1} \quad 2^{-2} \quad 2^{-3} \\ 64 + 16 + 4 \cdot \frac{1}{4} + \frac{1}{8} \end{array}$$

2) $(106)_{10} = (1101010)_2$

$$\begin{array}{r} 2 | 106 \\ \hline 2 | 53 \quad 0 \\ \hline 2 | 26 \quad 1 \\ \hline 2 | 13 \quad 0 \\ \hline 2 | 6 \quad 1 \\ \hline 2 | 3 \quad 0 \\ \hline 1 \quad 1 \end{array}$$

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~~$(84.375)_{10}$~~

6) $(11011110101110)_2 = (37AE)_{16}$

$$\begin{array}{r} 1001 \quad 10 \quad 1111 \quad 0 \quad 10 \quad 111 \quad 0 \\ \hline 3 \quad 7 \quad 10 \quad 0 \quad 14 \\ (37AE)_{16} \end{array}$$

3) $(3.25)_{10} = (11.01)_2$ 7) $(4A8C)_{16} = (010010101000)_2$

$$\begin{array}{r} 2 | 3 \qquad 0.25 \\ \hline 1 \quad 1 \quad \times \quad 2 \\ \hline 1 \quad 0 \cdot 50 \\ \times \quad 2 \\ \hline 1 \cdot 00 \end{array}$$

$$\begin{array}{r} 4 \quad A \quad 8 \quad C \\ \hline 1 \quad 1 \quad 1 \quad 1 \\ 4 \quad 10 \quad 8 \quad 12 \\ \hline 1 \quad 1 \quad 1 \quad 1 \end{array}$$

$(01001010100041100)_2$

4) $(101010)_2 = (42)_{10}$

$$\begin{array}{r} 1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \\ \hline 2^5 \quad 2^4 \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0 \\ 32 + 8 + 2 \times 1 \end{array}$$

8) $(2C9)_{16} = (713)_{10}$

$$\begin{array}{r}
 2 \quad C \quad 9 \\
 \downarrow \quad \downarrow \quad \downarrow \\
 2 \quad 12 \quad 9 \\
 256 \quad 16 \quad 1
 \end{array}$$

$$\begin{aligned}
 &= 512 + 192 + 9 \\
 &= 713
 \end{aligned}$$

9) $(72905)_{10} = (11CC9)_{16}$

$$\begin{array}{r}
 16 \mid 72905 \\
 16 \mid 4556 \quad 9 \\
 16 \mid 284 \quad 12 \\
 16 \mid 17 \quad 12 \\
 \hline
 & 1 \quad 1
 \end{array}$$

10) $(1011110100011000111)_2 = (1364307)_8$

$$\begin{array}{ccccccccc}
 0 & 0 & 1 & 0 & 1 & 1 & 1 & 0 & 1 \\
 \hline
 1 & 3 & 6 & 4 & 3 & 0 & 7
 \end{array}$$

11) $(3674)_8 = (011110111100)_2$

$$\begin{array}{r}
 3 \quad 6 \quad 7 \quad 4 \\
 | \quad \downarrow \quad | \quad | \\
 011 \quad 110 \quad 111 \quad 100
 \end{array}$$

12) $(B2F)_{16} =$

12) $(B\ 2\ F)_{16} = (5457)_8$

$$\begin{array}{r}
 B & 2 & F \\
 \downarrow & \downarrow & \downarrow \\
 11 & 2 & 15 \\
 \downarrow & | & \\
 \underline{1010} & \underline{100101} & \underline{111} \\
 5 & 4 & 5 & 7
 \end{array}$$

13) $(5\ 14)_8 = (332)_{10}$

$$\begin{array}{r}
 5 & 1 & 4 \\
 8^2 & 8' & 8^0
 \end{array}$$

$$64 \times 5 + 8 \times 1 + 1 \times 4$$

$$320 + 12$$

$$= 332$$

14) $(11001010)_2 = (202)_{10}$

$$\begin{array}{r}
 1 & 1 & 0 & 0 & 10 & 10 \\
 27 & 2^6 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0
 \end{array}$$

$$128 + 64 + 8 + 2$$

$$= 202$$

15) $(8\ 89)_{10} = (1571)_8$

$$\begin{array}{r}
 8 | 889 \\
 \hline
 8 | 111 & 1 \\
 \hline
 8 | 13 & 7 \\
 \hline
 1 & 5
 \end{array}$$

$$16) \quad (10.75)_8 = (8.95)_{10}$$

$$\begin{array}{r} 1 \quad 0 \quad . \quad 7 \quad 5 \\ 8^1 \quad 8^0 \quad 8^{-1} \quad 8^{-2} \\ 8 \times 1 + 1 \times 0 \cdot \frac{1}{8} \times 7 + \frac{1}{64} \times 5 \end{array}$$

$$8 \cdot \frac{7}{8} + \frac{5}{64}$$

$$8 \cdot \frac{56+5}{64}$$

$$8 \cdot 95$$

$$17) \quad (548)_{10} = (224)_{16}$$

$$\begin{array}{r} 16 \mid 548 \\ 16 \mid 34 \quad 4 \\ \quad \quad | \quad 2 \quad 2 \end{array}$$

$$18) \quad (100.25)_{10} = (74.4)_{16}$$

$$\begin{array}{r} 2 \mid 100 & 0.25 \\ 2 \mid 50 \quad 0 & \times 2 \\ 2 \mid 25 \quad 0 & \boxed{0} \cdot 50 \\ 2 \mid 12 \quad 1 & \times 2 \\ 2 \mid 6 \quad 0 & \boxed{1} \cdot 00 \\ 2 \mid 3 \quad 1 & \end{array}$$

$$\begin{array}{r} 0.1 \quad 1 \quad 10 \quad 100 \quad 10 \quad 100 \\ \hline 7 \quad 4 \quad 4 \end{array}$$

$$19) (6C.34)_{16} = (108.203)_{10}$$

$$\begin{array}{r}
 6 & C & . & 3 & 4 \\
 | & \downarrow & & \downarrow & \downarrow \\
 6 & 12 & . & 3 & 4 \\
 16' & 16'' & . & 16^{-1} & 16^{-2} \\
 16 \times 6 + 1 \times 12 & . & \cancel{3} + \cancel{8} + 4 & \\
 & & 16 & 256 \\
 96 + 12 & . & 203
 \end{array}$$

$$20) (9E1A)_K = (\cancel{40456})_{10}$$

$$\begin{array}{r}
 9 & E & 1 & A \\
 \downarrow & \downarrow & \downarrow & \downarrow \\
 9 & 14 & 1 & 10 \\
 16^3 & 16^2 & 16^1 & 16^0 \\
 4096 & 256 & 16 & 1
 \end{array}$$

$$36846 + 3584 + 16 + 10$$

~~Ques~~

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Binary Addition

Rules

$$0 + 1 = 1$$

$$1 + 0 = 1$$

$$0 + 0 = 0$$

$$1 + 1 + 1 = 11$$

$$1 + 1 = 10$$

(1)

$$\begin{array}{r} 10111.1101 \\ 00100.0011 \\ \hline 111100.0000 \end{array}$$

(2) $(B2F)_{16} + (721)_8 = (3328)_{10}$

$$\begin{array}{r} B2F + 721 \\ \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \\ 1011\ 0010\ 1111 \quad 111\ 010\ 001 \end{array}$$

$$\begin{array}{r} 1011\ 0010\ 1111\ 101 \\ + 0001\ 1101\ 0001 \\ \hline 1101\ 0000\ 0000 \end{array}$$

$$\begin{aligned} & 2048 + 1024 + 256 \\ & = (3328)_{10} \end{aligned}$$

QWV

Encoding Scheme

An encoding scheme is a pre determined set of each recon letter, number and symbol

When a key is pressed on the keyboard the keyboard sends the code for that key from the encoding scheme scheme, computer then looks for ~~receives~~ receive code in the encoding scheme and lets the letters, numbers and symbol pressed.

Encoding Scheme

(I) ASCII :

American standard code for Information Interchange

It is a 7 byte code so it has 2^7 possible code groups

(II) ISC II:

Indian standard code for information interchange

It is a 8 byte code so it has 2^8 possible code groups.

(III) UNI CODE:

UNI code is developed as a universal character set with an aim

i) To define all the characters needed for writing majority of known language in use on in computers in one place.

ii) It is a super set of all other characters that have been encoded.

4. Operators:

(i) Unary operator :

- , + Works on 1 operand

(ii) Binary operator :

Works on 2 operands

(i) Arithmetic operator : +, -, *, /, %, //,

**

Exponent

Modulo

↓

Floating

division

(iii) Byte wise operator:

(iv) Shift operator:

(v) Identity operator:

(vi) Relational :

(vii) Logical :

(viii) Membership operators

Q) Write a programme to make take length and breadth from the user and print the area.

```
length = int(input("Enter the length"))
```

```
breadth = int(input("Enter the breadth"))
```

```
area = length * breadth
```

```
print("The area of the rectangle is ", area)
```

5. Punctuators:

{ }, [], (), ' ', " ", ''' ''''.

Q WAP to compute the square root of any number

Sol a = int (input("Enter the number "))

square_root = a ** (1/2)

print ("The square root of the number is ", square_root)

Output :

Enter the number : 81

The square root of the number is 9

Comments

- Comments are the additional readable information to clarify the source code
- Comments in python begin with the symbol # generally ends with the end of the physical line
- There are 2 types of comments

Single line: #

Double line: ^{Multi}''' - - - #'''

- . - - -
- - - - -'''

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Predict the output

1) $a, b, c = 5, 10, 7$

$b, c, a = a+1, b+2, c-1$
`print(a, b, c)`

Output:

6, 6, 12

2) $a, b, c = 5, 10, 7$

$b = a + 1$

$c = b - 2$

$a = c - 1$

`print(a, b, c)`

Output:

7 6 8

Q WAP to take 2 no. as input and swap them

`a = int(input("Enter the first number: "))`
`b = int(input("Enter the second number: "))`
`a, b = b, a`
`print(a, b)`

Q WAP to take a no. as input and print its unit digit

`a = int(input("Enter the number: "))`
`b = a % 10`
`print(c)`

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Python Fundamental

L-Values:

L-Values are the objects to which you can assign a value or expression. L-values can come on LHS of an assignment statement.

R-Values:

R-Values are the literals and expression that are assigned to L-Values

print(x)

x = 10

print(x)

When you will run the above code it will produce an error for the first statement. The reason of the above error is that a variable is not created until some value is assigned to it.

So, in this

Dynamic typing:

A variable pointing to a value of a certain type can be made to point to a value of different type is this called dynamic typing

x = 10

x = "abc"

Code:

$x = 56$

$x = x/2$

print (x)

$x = 'abc'$

$x = x/2$

print (x)

Output:

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Error

It shows error in second part as we cannot divide a string with a integer

Static typing:

In static typing a data type is attached with a variable when it is defined first and it is fixed i.e. data type of a variable cannot be changed in static typing whereas there is no restriction in dynamic typing.

Programming languages like C, C++ support static typing
In Python we use dynamic typing.

Code

int a = 10;

a = "abc";

cout << a;

Output:

Error

Type function:

This function is used to determine the type of an object

Code:

```
a = 10  
print(type(a))
```

Output:

<class 'int'>

Code:

```
a = 49.5  
print(type(a))
```

Output:

<class 'float'>

Code:

```
a = "ABC"  
print(type(a))
```

Output:

<class 'str'>

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Input function:

For integer - int()
 For float - float()
 For string - str()

Print function:

1) Code:

```
print("Hello", "World", "Python", "abc")
```

Output:

Hello World Python abc

2) Code :

```
print("Hello", "World", sep = ":::....")
```

Output:

Hello :::::....World

Sep → Separator

End → use to ~~use~~ add multiline code in one line

3) Code:

```
print("Hello", end = "!@#")
```

```
print("World")
```

Output:

Hello !@# World as a input

Q WAP to take a number ⁿ from the user and print its inverse

Code:

```
# Taking input from the user
num = int(input("Enter the number you want to reverse"))
```

Reversing the value

```
reversed_num = 0
```

~~reversed_~~

```
while num != 0:
```

```
    digit = num % 10
```

```
    reversed_num = reversed_num + num // 10
    num = num // 10
```

Printing

```
print("Reversed Number:", reversed_num)
```

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Q WAP to swap the ~~number~~ variable after taking the ~~in~~ number as input

Sd Code:

Write a program to swap the number

```
a = int(input("Enter the first number: "))
```

```
b = int(input("Enter the second number: "))
```

```
c = int(input("Enter the third number: "))
```

Swapping the value

```
a; b, c = c, b, a
```

Printing the value

```
print("Swapped number is: ", a, b, c)
```

Q1. WAP to input 3 numbers and swap them as first two variable with the sum of 182, 283 respectively.

Sol Code :

```
a = int(input("Enter your first number: "))
b = int(input("Enter your second number: "))
c = int(input("Enter your third number: "))
```

```
a, b = a+b, b+c
```

```
print("The swapped values are:", a, b)
```

* Predict the output

Q2. num1 = 4

num2 = num1 + 1

num1 = 2

```
print(num1, num2)
```

Output :

2, 5

Q3. num1, num2 = 2, 3

num3, num2 = num1, num3 + 1

```
print(num1, num2, num3)
```

Output :

2, 3, 2 } Error : num3 not defined

Q4. num1, num2 = 2, 6

num1, num2 = num2, num1 + 2

```
print(num1, num2)
```

Output

Q5 Calculate the no. of byte in the given number
1011011111111001

Calculate

as 1 byte = 8 bits

16 bits = 2 byte