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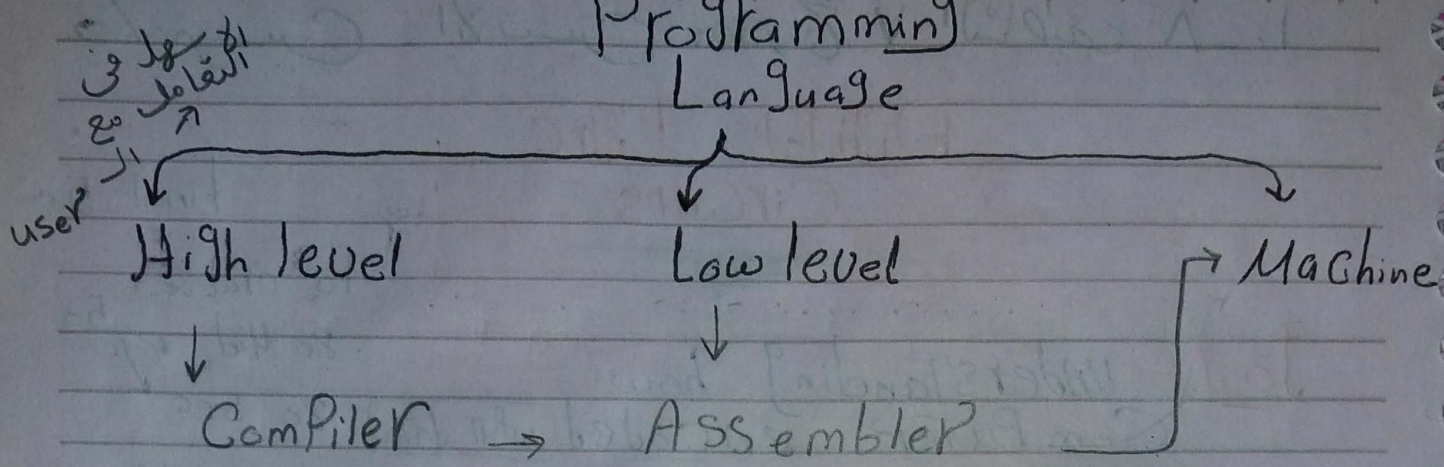
# Programming Language




ex: Java
PyThon
HTmL

## [1] Decimal number System.

ex: write The decimal number $(356)_{10}$ To Power of 10

$$(356)_{10} = 6\times10^{0} + 5\times10 + 3\times10^{2} = 356$$

## [2] Binary number System

ex: write The binary number $(11011)_2$ in Power of 2

$$(11011)_2 = 2^{0}\times1 + 2^{1}\times1 + 2^{2}\times0 + 2^{3}\times1 + 2^{4}\times1 =$$

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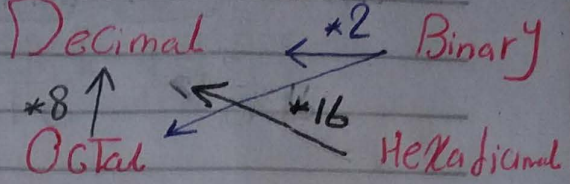


## 3 Octal number system

ex: write the Octal number $(53.12)_8$ in Power of 8 .

| ... | $8^4$ | $8^3$ | $8^2$ | $8^1$ | $8^0$ . | $8^{-1}$ | $8^{-2}$ | $8^{-3}$ | ... |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 5 | 3 . | 1 | 2 | |

$(53.12)_8 =$

## 4 Hexa dicimal number system

## Convert from Binary to Octal

Octal لأن 3 digit بيتحولوا لـ | Binary 3 | digit 3 لـ

Grouping each 3 digit in Binary Converted to 1 digit in Octal

$2^0$ $2^1$ $2^2$ | $2^3$

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Ex: $(101\ 011\ 101)_2$ To Octal

$101\ 011\ 101 = (5\ 3\ 5)_8$

* Convert From Octal To Binary

Each digit equal 3 digit in Binary ($2^3$ ... $2^1$)

Ex: $(341)_8$ To Binary.

$= (011\ 100\ 001)_2$

$(1)_8 = (001)_2$

$(3)_8 = (011)_2$

$(7)_8 = (111)_2$

* Convert From Binary To Hexa

Each 4 digits in Binary ($2^1$ ... $2^4$) encoded 1 digit in hexa

*

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Ex: Convert $(0001\ 0101\ 1001\ 0101)_2$ To Hexa

$(1\ 5\ 9\ 5)_{16}$

* Convert From Hexa To Binary

Ex: $(F\ 1\ B)_{16} = (1111\ 0001\ 1011)_2$ (F = 15, B = 11)

Convert From OCTal To Hexa.

① Convert from OCTal To binary

② Convert from binary To Hexa

Ex: $(3\ 7\ 1\ 2)_8 = (\quad)_{16}$

$(3\ 7\ 1\ 2)_8 = (011\ 111\ 001\ 010)_2 = (7\ C\ A)_{16}$

* Convert From Decimal To Binary

devidid by 2 ↓ integer الجزء الصحيح

multiply To 2 ↓ fraction الجزء الكسري

Ex: Convert from decimal nomber $(37.625)_2$ To Binary $(\quad)_2$

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integer الجزء الـ

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| base | | Remmender |
|---|---|---|
| 2 | 37 | 1 |
| | 18 | 0 |
| | 9 | 1 |
| | 4 | 0 |
| | 2 | 0 |
| | 1 | 1 |
| | 0 | |

طريقة كتابته

$(100101)$

Fraction الجزء الـ

$0.625 * 2 = 1.25$ → 1

$0.25 * 2 = 0.5$ → 0

$0.5 * 2 = 1.0$ → 1

طريقة كتابته

$(0.101)$

$\therefore (37.625) = (100101.101)_2$

* Convert $(0.95)_{10}$ To Binary

$0.95 * 2 = 1.90$ → 1

$0.9 * 2 = 1.8$ → 1

$0.8 * 2 = 1.6$ → 1

$0.6 * 2 = 1.2$ → 1

$0.2 * 2 = 0.4$ → 0

$0.4 * 2 = 0.8$ → 0

1.

حفل تقريب وقف عند خطوة معينة

$(0,111100)_2$

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# Convert from decimal to octal

* Convert $(123)_{10}$ to octal.

| | | | reminder |
|---|---|---|---|
| 8 | 123 | = | 3 |
| 8 | 15 | | 7 |
| 8 | 1 | | 1 |
| 8 | 0 | | |

$(123)_{10} = (173)_8$

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