

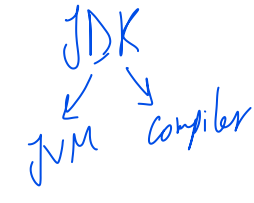
Java → High-Level
 → English Like

Binary code → 01101

Assembly → Low-level
 → Commands
 → English-like

Assembler → translate commands

Platform dependent



English
 .java

compile
 javac

file name .java

byte code
 .class

run
 java

className

output

Errors:

- * Syntax (compile)
- * Runtime
- * Logic

خطا في القواعد

خطا في التنفيذ

خطا في المنطق

Input
 Storage
 Process
 output

salary → variable
 byte, short, int, long
 float, double
 char, String

$$\text{annualSalary} = \text{salary} \times 12$$

mark
 23

fullMark
 25

$$\text{pct} = \frac{\text{mark}}{\text{fullMark}} \times 100$$

92

Arithmetic Operators

- ()
 *, /, %
- +, -

اولوية التنفيذ

$$2 + 3 \times 3 = 11$$

$$(2 + 3) \times 3 = 15$$

$$(3 / 3) \times 2 = 2$$

$$5 / 2 \Rightarrow 2$$

$$5.0 / 2 \Rightarrow 2.5$$

int x = 5;

int y = 2;

$$(\text{double}) x / y \Rightarrow 2.5$$

$$5 \% 2 \Rightarrow 1$$

$$11 \% 3 \Rightarrow 2$$

$$10 \% 2 \Rightarrow 0$$

Assignment Operator

$\text{int } x = 5;$
 $x = 3;$
 $x = (x + 5);$
 $x += 5;$
 $x -= 3;$
 $x *= 2;$

x
~~5~~
~~3~~
~~8~~
~~13~~
~~18~~
~~23~~
~~28~~
~~23~~
~~22~~

$x++;$
 $\text{cout}(x++); \Rightarrow 21$
 $\text{cout}(++x); \Rightarrow 23$
 $\text{cout}(x--); \Rightarrow 23$

Math Methods:

$\text{Math.pow}(5, 2) \Rightarrow 25$
 $\text{Math.sqrt}(25) \Rightarrow 5$
 $\text{Math.max}(5, 2) \Rightarrow 5$
 $\text{Math.min}(5, 2) \Rightarrow 2$
 $\text{Math.round}(19.6) \Rightarrow 20$
 \vdots
 $\}$

weight 68 height 182

$$\text{bmi} = \frac{\text{weight}}{(\text{height} / 100)^2}$$

\downarrow
 $20.52 \dots$

$\text{if}(\text{bool-expr}) \{$
 $\quad \text{true}$
 $\}$
 always

$\text{if}(\text{bool-expr}) \{$
 $\quad \text{true}$
 $\}$
 $\text{else } \{$
 $\quad \text{false}$
 $\}$
 always

Relational Operators

$>, >=, <, <=$

$=, !=$

$x = 5;$
 x
~~5~~

$x == 3$
 false

$x != 3$
 true

$\text{if}(\text{bool-expr}) \{$
 $\quad \text{true}$
 $\}$
 $\text{else if}(\text{bool-expr}) \{$
 $\quad \text{F, T}$
 $\}$
 $\text{else if}(\text{bool-expr}) \{$
 $\quad \text{F, F, T}$
 $\}$
 $\text{else } \{$
 $\quad \text{all false}$
 $\}$
 always

mark fullMark

$\text{pct} = \frac{\text{mark}}{\text{fullMark}} * 100$
 $\begin{cases} > 85 \rightarrow \text{Excellent} \\ > 75 \rightarrow \text{V. Good} \\ > 65 \rightarrow \text{Good} \\ \geq 50 \rightarrow \text{Pass} \\ \rightarrow \text{Fail} \end{cases}$

12.11 weight height

$bmi = \frac{\text{weight}}{(\text{height}/100)^2}$

< 18.5	Underweight
< 25	Normal
< 30	overweight
	obese

Logical operators:

bool-expr && bool-expr
||
! bool-expr

day

1-5 \Rightarrow work-day
6, 7 \Rightarrow off-day
else \Rightarrow invalid

day

7, 1-4 \Rightarrow work-day
5, 6 \Rightarrow off-day
else \Rightarrow invalid

Enter temp. in Fahrenheit: 120
Enter wind speed: 15

12.11

Celsius = $\frac{5}{9} * (Fh - 32)$

cel > 40 or speed > 12 \Rightarrow bad weather
else \Rightarrow Good weather

23.1

