

Computer skills

~~Problem solving~~

Problem solving - part 1 -

Input → Processing → out put
Data also information

Data type

Integers

number without fractional part.

can be (+) or (-) ∴ 1, 2, -8
or (zero)

Real number

number with fractional part. ∴ 1.0, 1.8, 9.8

string

sequence of characters, such as:

1. Digits: 0-9

2. Letters: A-Z | a-z

3. special symbols: @, ', ?, ,

* If the string:

one character → ' ', single quote.

more than one character → " ", Double quotes.

Booleans

It can be either TRUE or FALSE.

Variable and constant:

variable → can be changed.

constant → can't be changed. For reading just.

assignment statement:

left variable → = → right Value → Data type (integer, string, boolean, Real)

A → another variable (A = X)

Expression * $g = A + 5$

بلاي هون ← بيتخزن صغين هادي من العكس

يعني الvariable يكون لاه أكثر من سكر ليتخزن فيه

حبال right side

~~Test~~

Lecture 2 problem solving

Arithmetic operators:

addition +

subtraction -

multiplication *

Division /

power ^ ($n^1 = n$) ($n^0 = 1$)

باقى القسمة modulus

* طلة خالص

الاصم < الصا
 $5 \text{ mod } 6 = 5$

Relational operators

Greater than >

Less than <

Greater than and equal >=

Less than and equal <=

equal ==

Doesn't equal <>

→ Evaluate the following expressions:

$$\bullet X = 3 \cdot 6 + 9 \bmod (6 * (3 + 2)) / 2 + 2^{(3-2)} * 2$$

$$= 3 \cdot 6 + 9 \bmod (6 * 5) / 2 + 2 * 2$$

$$= 3 \cdot 6 + 9 \bmod 30 / 2 + 2 * 2$$

$$= \boxed{3 \cdot 6 + 9 / 2 + 4}$$

$$= 3 \cdot 6 + 9 \bmod 15 + 4$$

$$= 3 \cdot 6 + 9 + 4$$

$$= 16.6$$

$$\bullet Y = 6 * 3 - (4 + 2)^2 + 10 \bmod 3^{1^2} - 8$$

$$Y = 6 * 3 - 6^2 + 10 \bmod 3^{1^2} - 8$$

$$= 6 * 3 - 6^2 + 10 \bmod 9 - 8$$

$$= 18 - 36 + 10 \bmod 9 - 8$$

$$= \frac{18 - 36}{6} + 1 - 8 = -1 \#$$

$$7 - 8$$

$$\bullet Z = (2 + 1)^{((4 + 8) / 4)} + 1$$

$$= 3^3 + 1$$

$$= 27 + 1 = 28 \#$$

$$\bullet X = 2 + 3 > 1 \text{ and } 5 < > 9 / 3 \text{ or } 5 + 4 = 8$$

$$= 2 + 3 > 1 \text{ and } 5 < > 3 \text{ or } 5 + 4 = 8$$

$$= 5 > 1 \text{ and } 5 < > 3 \text{ or } 9 = 8$$

~~or~~ T and T or F

T or F → True #

$y = 3 > 9$ or $(5+1) < 2$ and NOT $((7-3) < 2$ or NOT F)

$y = 3 > 9$ or $6 < 2$ and NOT $(y < 2$ or NOT F)

$y = 3 > 9$ or $6 < 2$ and NOT (F or T)

$y = 3 > 9$ or $6 < 2$ and NOT T

~~$y = 3 > 9$~~

$y = F$ or T and F

$y = F$ or $F = F \rightarrow$ answer \rightarrow False

Lecture 3:

Pseudocode:

set of English like statements used to help in solving the problem.

write a pseudocode to find the average of three numbers (A, B, C)

1 Begin

2 Input A, B, C

3 $Sum = A + B + C$

4 $Avg = Sum / 3$

5 print Avg

6 End

input: read, get, input

processing: compute, calculate, =

output: output, display, print

Flow chart: Is a structure graph which shows the steps of the algorithm.



Begin / end
start / stop



processing (=)



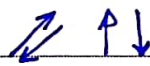
Decision



input/output
(print)



connector



Flowlines

* Flow chart constructs:

1. sequence \rightarrow الترتيب الحسابي

2. selection \rightarrow الاختيارية

3. Looping \rightarrow الدوران

Lecture 41

selections → performs an action only if a condition is true.

IF... Then *

(statement(s)) will be executed if the condition is true)

IF condition Then
statement(s)
END IF

IF condition Then statement(s)
شرط متروكة جعل
تنفذ

ممنوع من skip عن Then كأنها متنى موجودة.

IF... Then... Else *

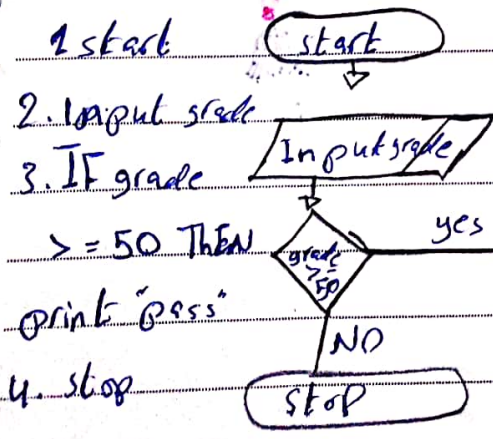
The IF statement can be of the form IF...Then...ELSE

The statement(s) after ELSE structure will be executed if IF the condition is False.

IF condition Then
statement(s)
ELSE
statement(s)
END IF

IF condition THEN statement(s) ELSE statement
T, F
تنفذ ما يليه Then, ELSE
تنفذ ما بعده ELSE

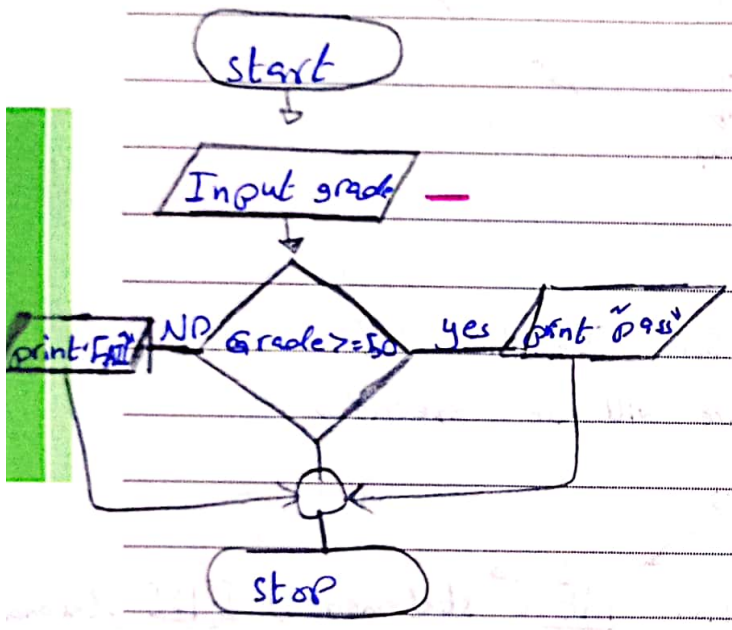
1. Find the output For the Following pseudo code. (given grade = 95 or grade = 35)
2. convert to the equivalent flowchart selection



output when grade = 95	output
95	pass
output when grade = 35	output
35	NO output

Example:

1. start
2. Input grade.
3. IF grade ≥ 50 Then print "pass" else print "FAIL"
4. stop



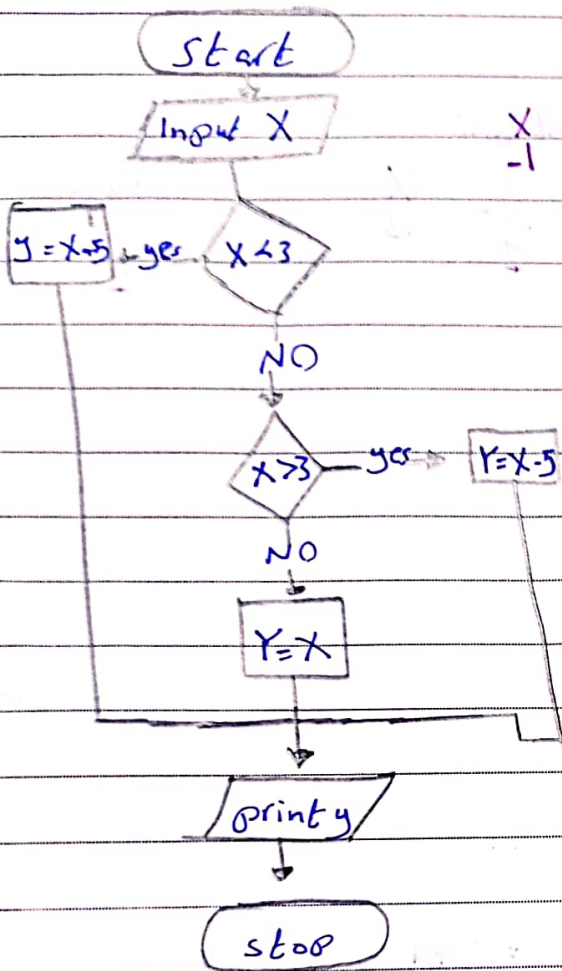
out put when grade = 95

grade	output
95	pass

out put when grade = 35

grade	output
35	pass Fail

Find the output for the following flowchart:



output when $X = -1$

X	y	output
-1	+6	+6

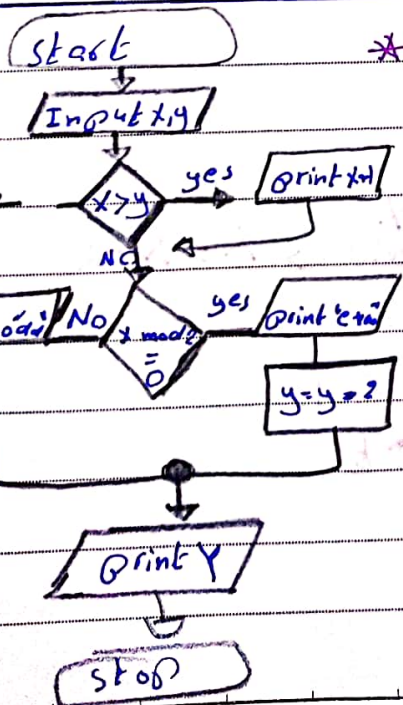
* Type: selection.

output when $X = 3$

X	y	output
3	3	3

output when $X = 7$

X	y	output
7	2	2



* type: selection

1. convert the following flowchart to the equivalent pseudocode

1. start

2. Input X, y

3. IF $X > y$ THEN print $X+1$

4. IF $X \text{ mod } 2 = 0$ THEN print $X+1$

Else print odd

5. print y

6. stop

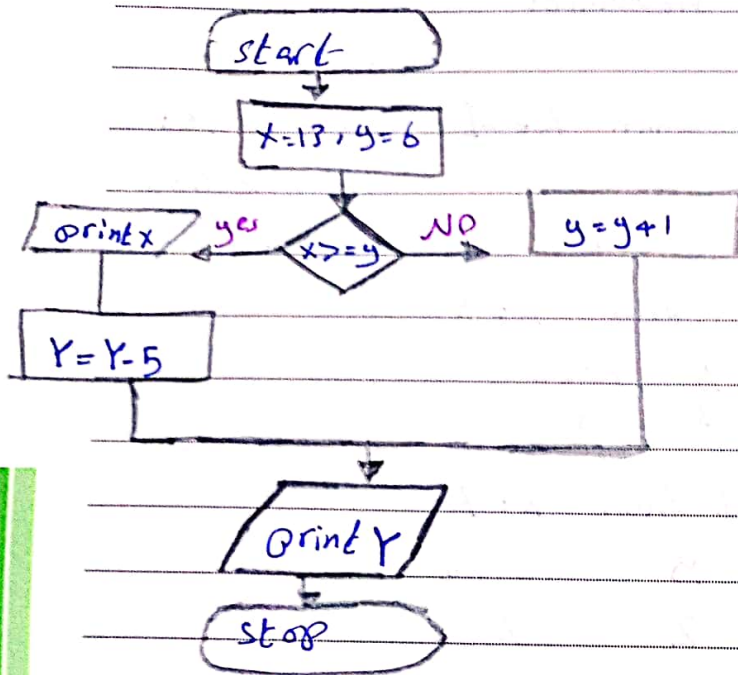
2. Find the output for the

following flowchart assume that

the inputs are: 2, 8

X	y
2	8
	6

output
even
6



out put

X	y	X	out put
13	6	13	13
	1		1

Types selection

1. start

2. X=13, Y=6

3. IF $X \geq y$ THEN print X ELSE $y = y + 1$
 \downarrow
 $y = y - 5$

4. print Y

5. stop



→ Increment x by 10 $10x$ $\rightarrow X = 10 \rightarrow X = X + 10$

→ decrement m by 3 $m - 3$ $\rightarrow m = m - 3$

→ divide z by 10 $z / 10$ $\rightarrow Z = Z / 10$

→ multiply t by 4 $4 * t$ $\rightarrow t = 4 * t$

دروس مهم للبرمجة