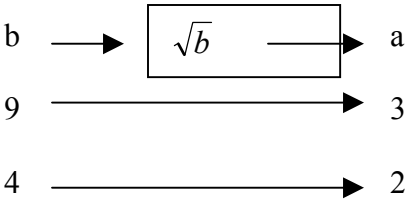
INTRODUCTION TO JAVA

Variables & Constants

Concept Of Algorithm: An algorithm defines the steps used to solve a problem. (It shows the steps of producing the desired outputs using the inputs.)

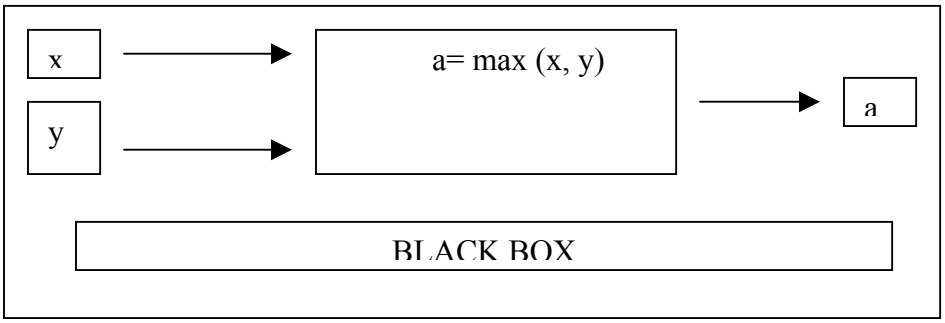
a= $\sqrt{b}$



- ✓ An algorithm must have an input(s) & output(s).
- ✓ It must be correct.
- ✓ It must stop.
- ✓ It must be unambiguous (clear).

a= max (x, y)

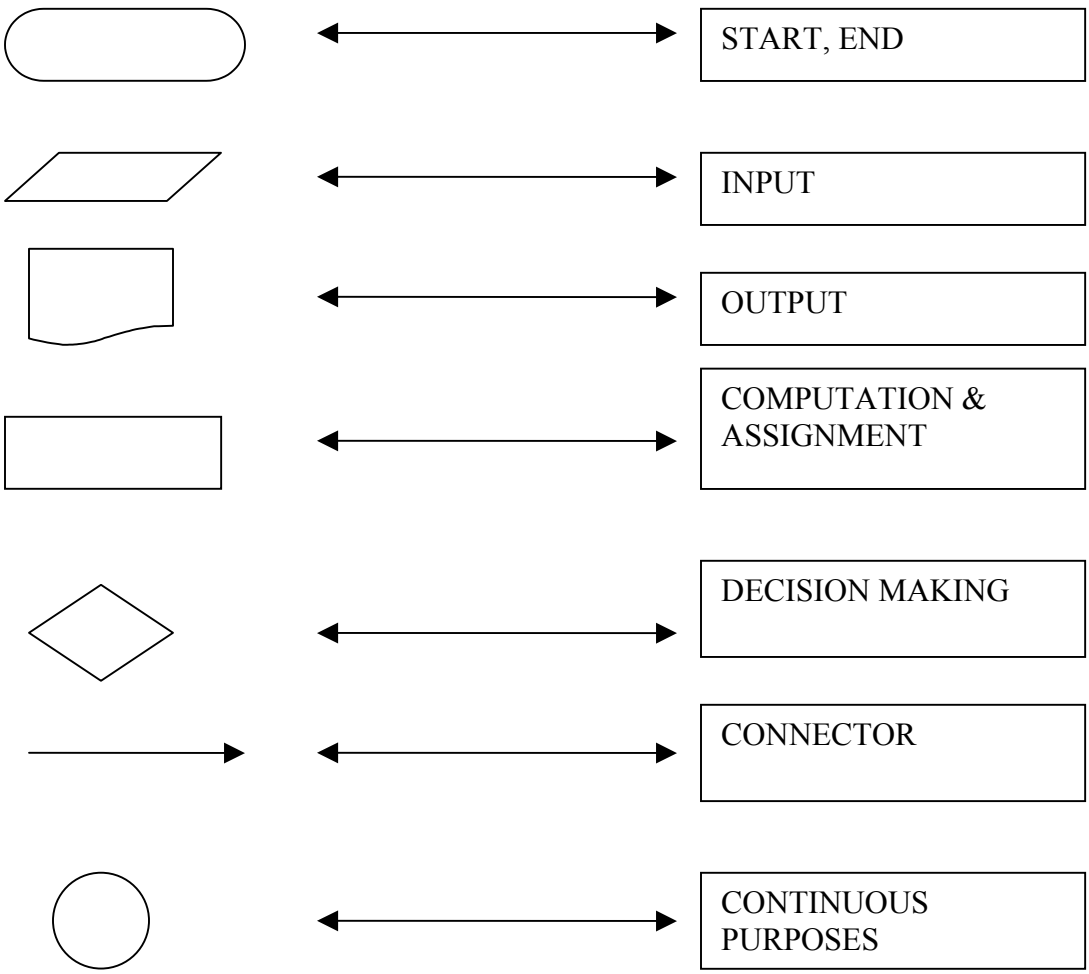
x	y	a
5	10	10
2	0	2



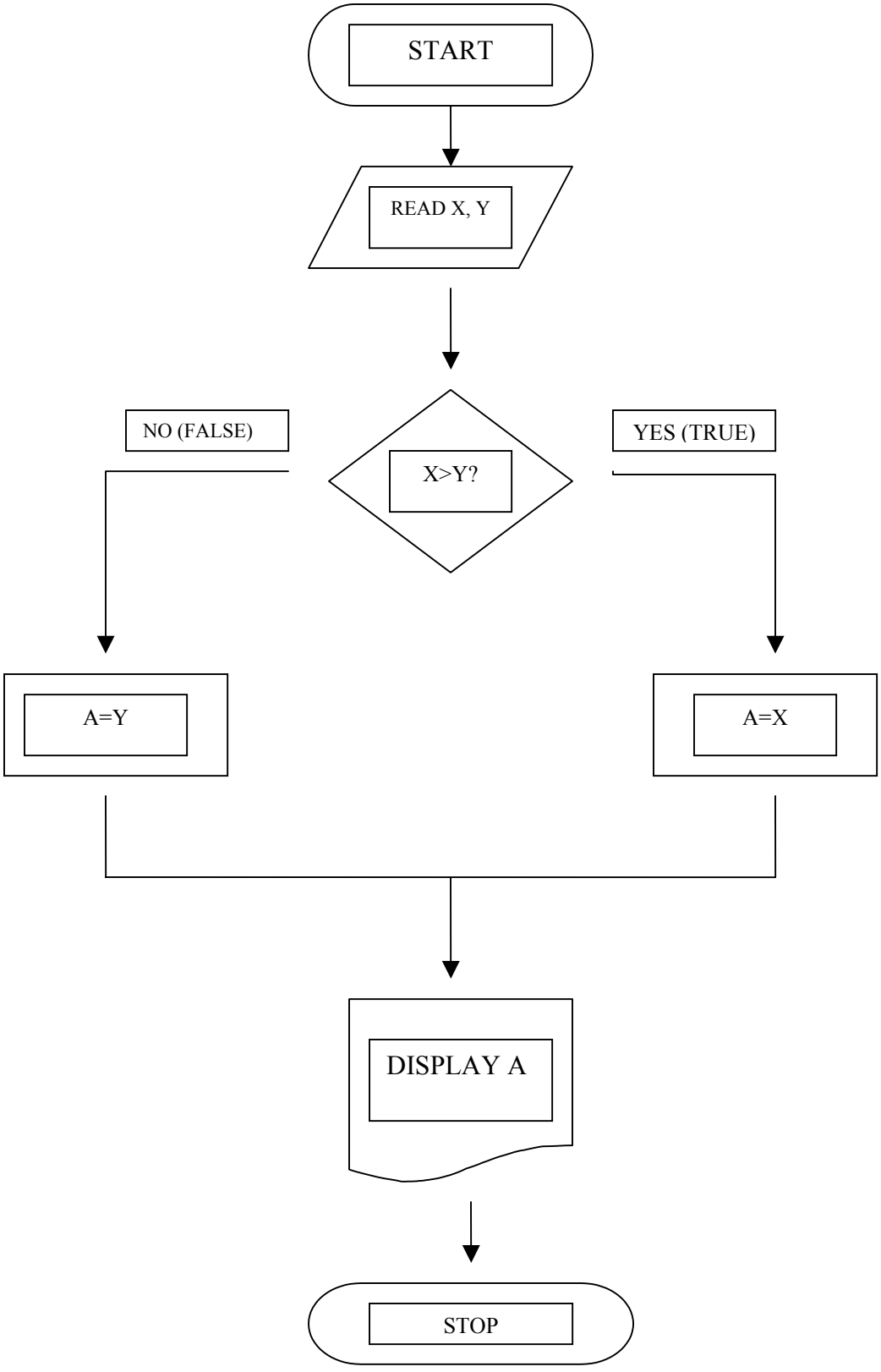
Problem:

Find the maximum of two numbers. Algorithm in the form of a flowchart.

First of all let's see the shapes that used in a flowchart.



And here is an example for a simple flowchart & the solution of our problem.


START
READ X, Y
X>Y?
NO (FALSE)
YES (TRUE)
A=Y
A=X
DISPLAY A
STOP

This was a simple flowchart. And now time to trace our flowchart.

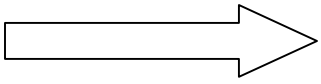
x	y		a
5	10	→	10
2	0	→	2

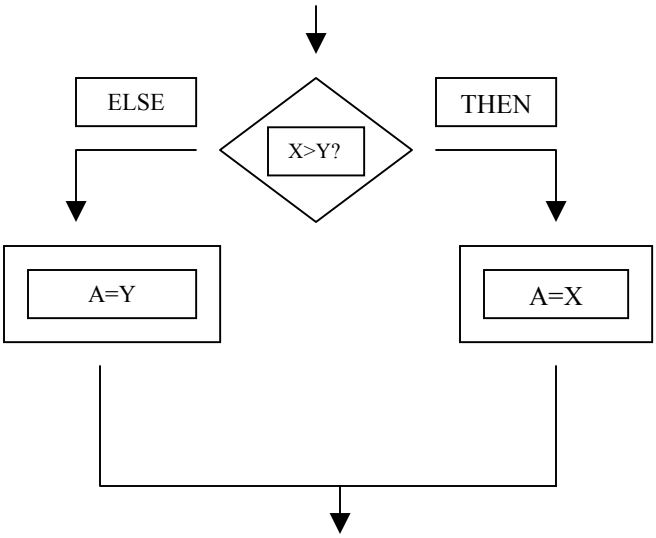
PSEUDO CODE

Start

Read x, y

```
If (x>y)        then
            a=x
Else
            a=y
End if
```





Display a

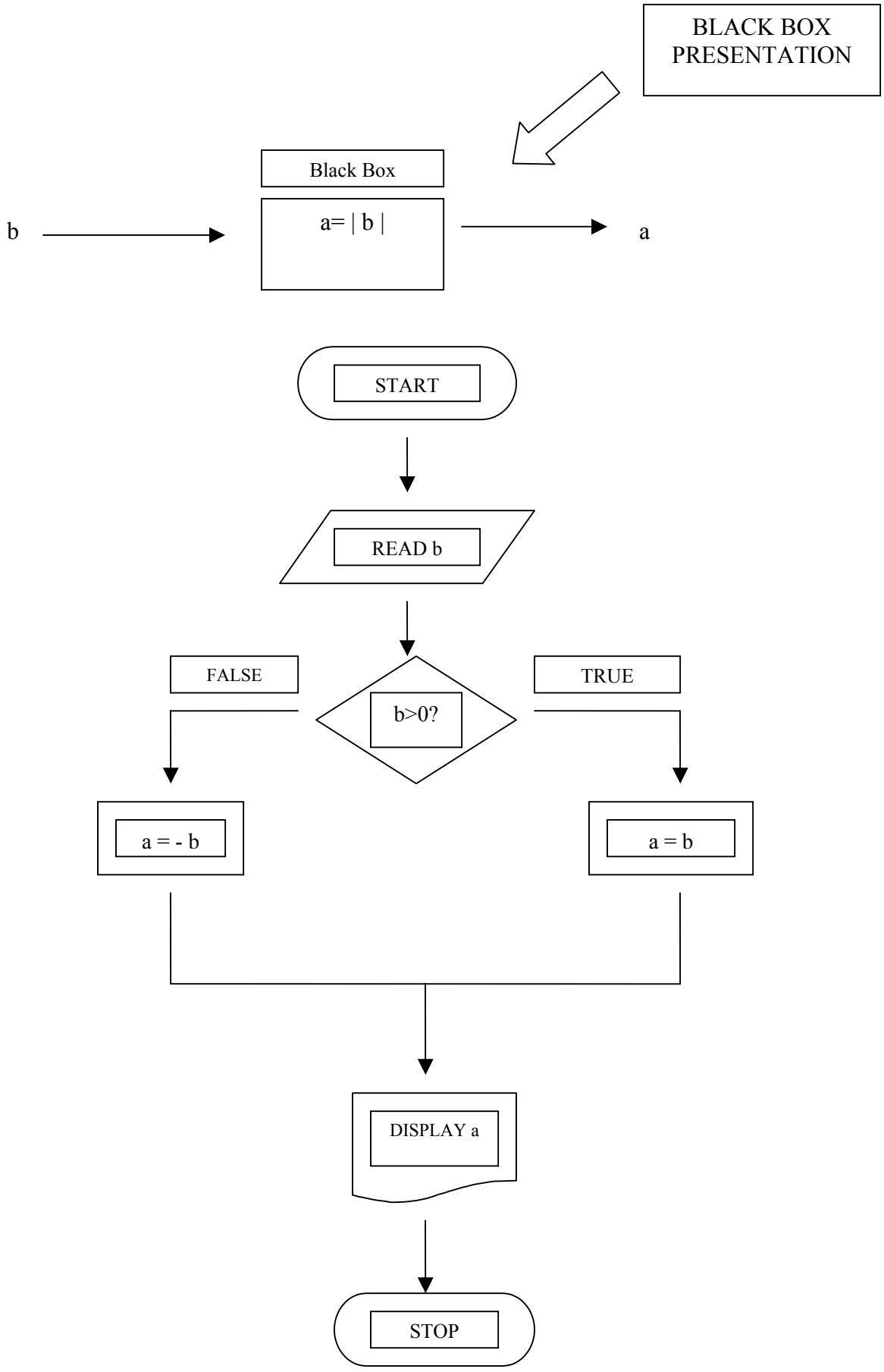
End

Let's pass to another problem.

Problem:

a= | b |

In this problem first we can draw a "Black Box" to understand it. Then we can draw our flowchart


BLACK BOX PRESENTATION
Black Box
a= | b |
b
a
START
READ b
FALSE
b>0?
TRUE
a = - b
a = b
DISPLAY a
STOP

Questions

1- Trace the algorithm $a = \sqrt{x^2 + y^2}$ for the given x , y values . (12 , 5) , (4 , 3) , (8 , 15)

2- Draw a flowchart which calculates sgn (A) = $\begin{cases} 1, A > 0 \\ 0, A = 0 \\ -1, A < 0 \end{cases}$ and trace it for the given values. –3, 21, 0

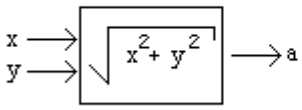
3- Trace the algorithm "a" is the minumum of the three numbers for given numbers (2,7,4) , (7,9,1) , (4,2,8)

4- Draw a flowcart for the problem; if "x>y" draw a star (*), else draw a dot(.).

5- Draw a Black Box equation for a=|x| * |y|

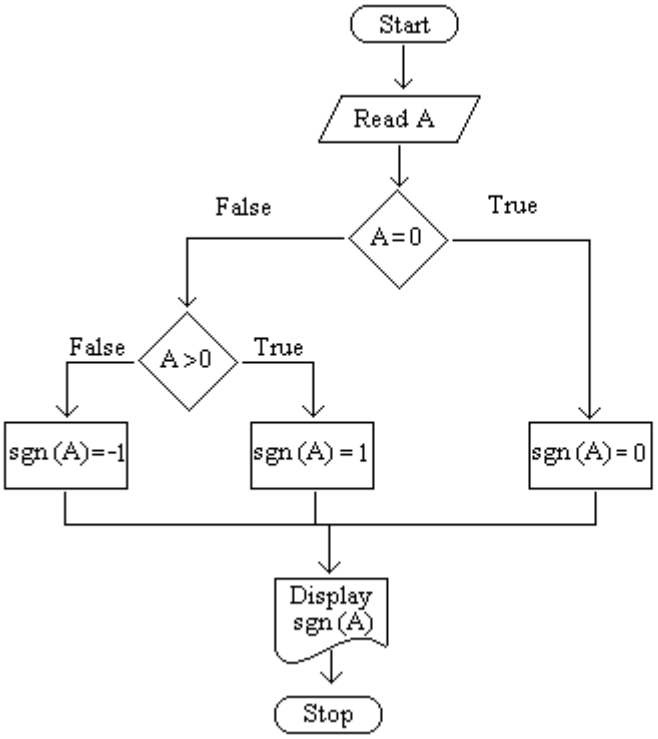
Answers

1-



	x	y	a
1)	12	5	13
2)	4	3	5
3)	8	15	17

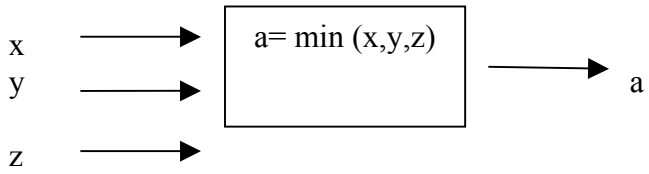
2-



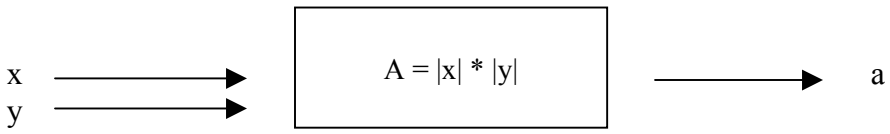
	A	sgn(A)
1)	-3	-1
2)	21	1
3)	0	0

3-

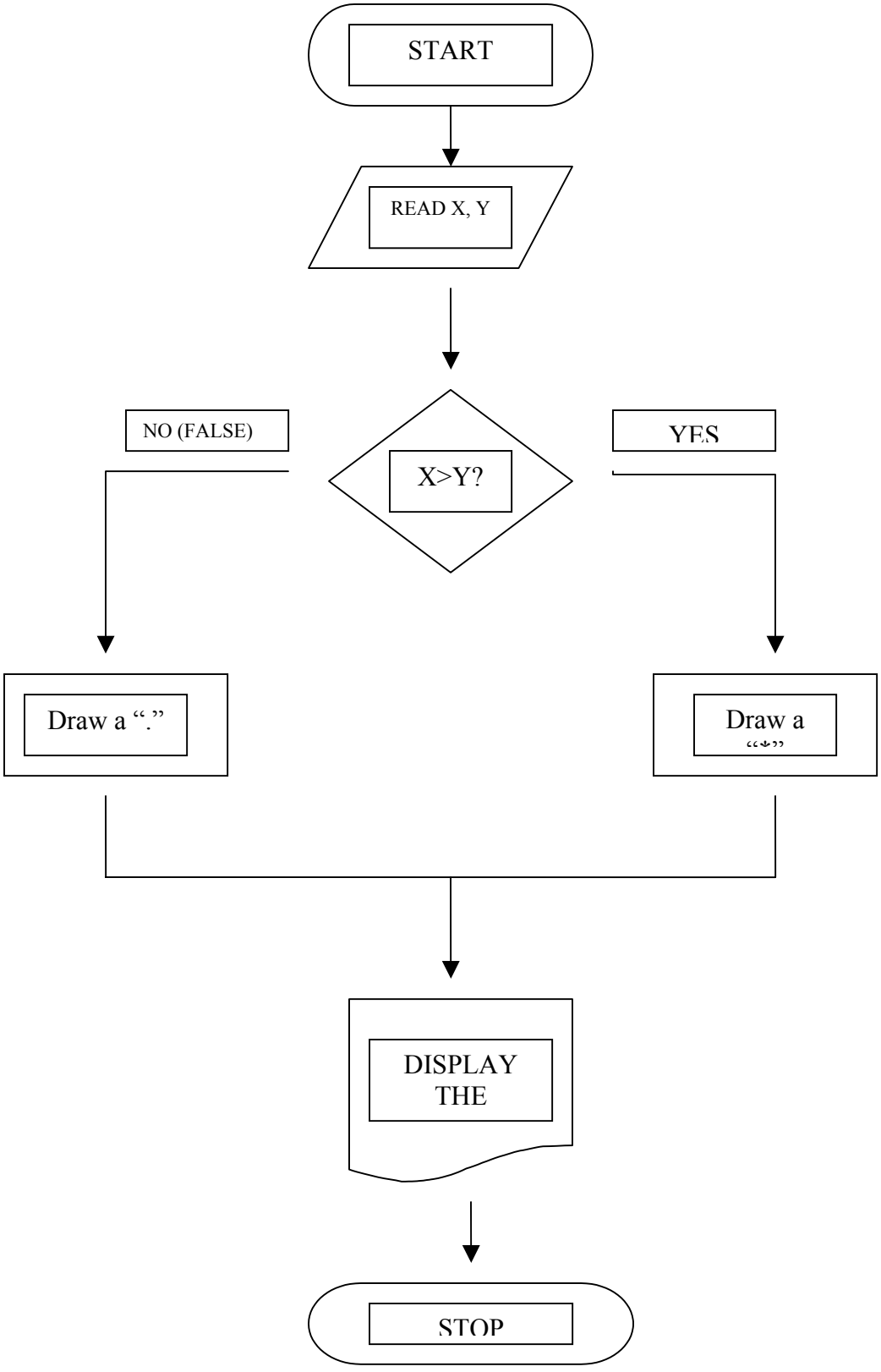
x	y	z	a
2	7	4	2
7	9	1	1
4	2	8	2



5-



4-


START
READ X, Y
X>Y?
NO (FALSE)
YES
Draw a "."
Draw a
DISPLAY
THE
STOP