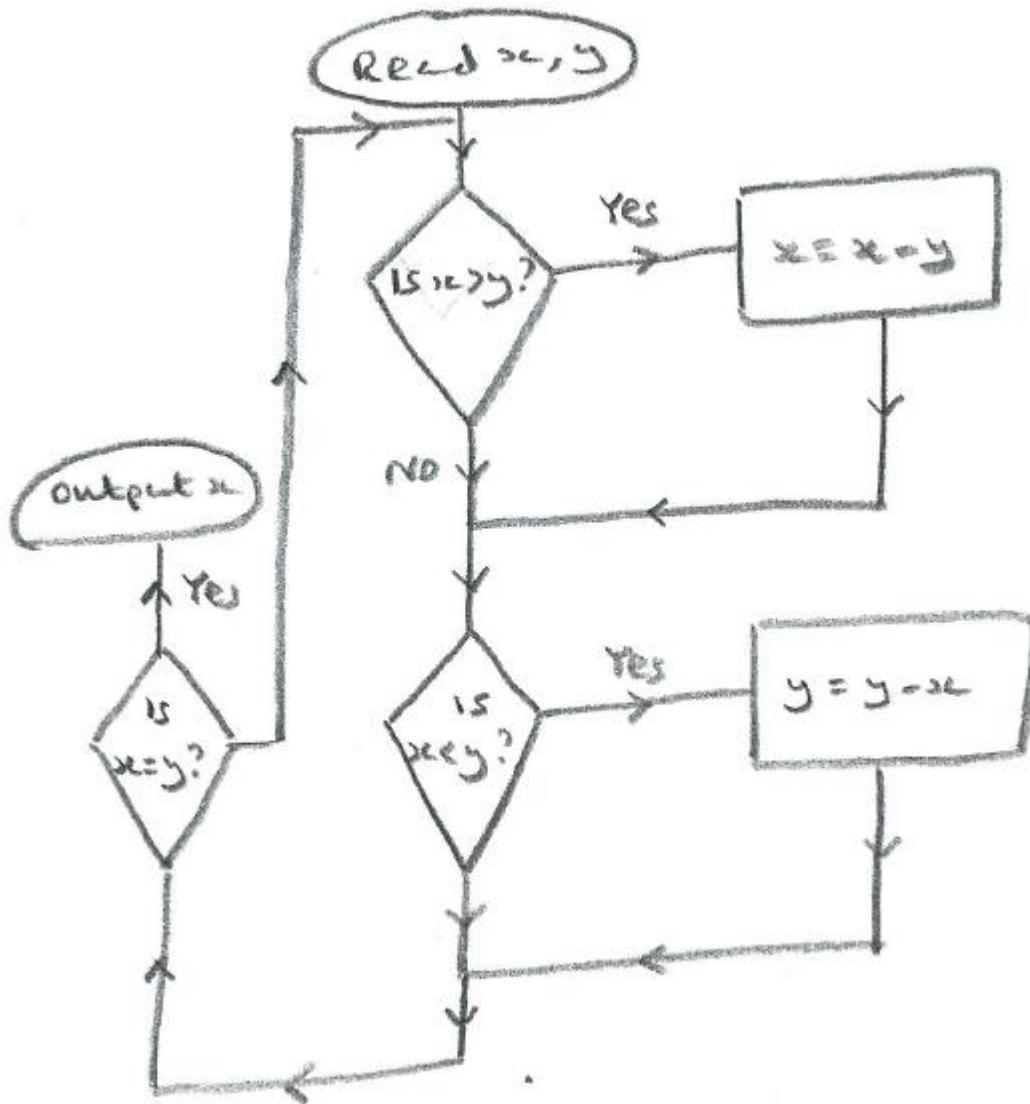


Algorithms – Q7 (20/11/23)

By performing traces, or otherwise, establish what the following algorithm achieves.



Solution

For example, initial values: $x = 20, y = 45$

Is $x > y$? No

Is $x < y$? Yes

$$y = y - x = 45 - 20 = 25 \quad [x = 20, y = 25]$$

Is $x = y$? No

Is $x > y$? No

Is $x < y$? Yes

$$y = y - x = 25 - 20 = 5 \quad [x = 20, y = 5]$$

Is $x = y$? No

Is $x > y$? Yes

$$x = x - y = 20 - 5 = 15 \quad [x = 15, y = 5]$$

Is $x = y$? No

Is $x > y$? Yes

$$x = x - y = 15 - 5 = 10 \quad [x = 10, y = 5]$$

Is $x = y$? No

Is $x > y$? Yes

$$x = x - y = 10 - 5 = 5 \quad [x = 5, y = 5]$$

Is $x = y$? Yes

Output $x = 5$

Flowchart finds HCF of two numbers (Euclid's method).