



COMSATS University Islamabad
Islamabad Campus

Department of Computer Science

Design and Analysis of Algorithm

Quiz 1 (September 24, 2025)

CLO-1: Demonstrate fundamental concepts of algorithm along with an algorithmic approach to a given problem.

Time: 20 minutes

Registration #: _____

Class: BS(CS)- 5B _____

Total Marks: 10

Name: _____

Section: _____

Question 1

Marks = 10

You are a software engineer at ABC. A year ago, your manager announced that your next software product would comprise of 10 modules. Your manager assigns you the module that computes greatest common divisor of two numbers. You design the following procedure:

Step 1 Assign the value of $\min\{m,n\}$ to t .

Step 2 Divide m by t . If the remainder is 0, go to Step 3; otherwise, go to Step 4.

Step 3 Divide n by t . If the remainder is 0, return t and stop; otherwise, go to Step 4.

Step 4 Decrease t by 1 and go to Step 2.

- a) Which properties of an algorithm – *input, output, precision, determinism, finiteness, correctness, generality* – does this procedure have? Justify your answer.

ANSWER IN THIS BOX Marks = 3.5

Property	Yes/No	Justification
Input [0.5]		
Output [0.5]		
Precision [0.5]		
Determinism [0.5]		
Finiteness [0.5]		
Correctness [0.5]		
Generality [0.5]		

- b) Rewrite the above procedure in pseudo code form that incorporates the improvement so that it works for all valid inputs.

ANSWER IN THIS BOX Marks = 1.5

Question 2

ALGORITHM *M_Euclid_recursive*(*m*, *n*)
// Input: Two non-negative integers *m* and *n*, not both zero.
// Output: Greatest Common Divisor of *m* and *n*

1. **if** *m* = 0 **then**
2. $ans \leftarrow n$
3. **else if** *m* > *n* **then**
4. $ans \leftarrow M_Euclid(n, m)$
5. **else**
6. $nLess \leftarrow n - m$
7. $ans \leftarrow M_Euclid(m, nLess)$
8. **return** *ans*

Convert above recursive algorithm into iterative algorithm.

ANSWER IN THIS BOX