



Sindh Madressatul Islam University (SMIU)

Program: BSCS (Even)

Subject: Design and Analysis of Algorithms

Instructor: Mustafa Ali Bamboat

Assignment – 1

Due Date: 12-Oct-2023 (4th Week)

Q1. Write pseudocode of the following:

- i. Factorial using loop
- ii. Factorial using recursion
- iii. Pythagorean Theorem $c = \sqrt{a^2 + b^2}$
- iv. Fibonacci sequence

[2 marks]

Q2. Calculate the worst-case in terms of Theta θ (running time and memory access) on the pseudocodes given in question 1.

[2 marks]

Q3.

- a) Explain the given pseudocode, run manually if you have provided a set of P where $P = \{(4,11), (9,10), (7,7), (11,5), (2,5), (4,4), (13,3), (5,1), (7,13), (12,2), (14,10), (15,7)\}$

Pseudocode

1. *For* $i \leftarrow 1$ *to* n
2. *do* $maximal \leftarrow true$
3. *For* $j \leftarrow 1$ *to* n
4. *do*
5. *if* $(c[i].x \leq c[j].x) \text{ and } (c[i].y \leq c[j].y) \text{ and } (i \neq j)$
6. *then*
7. $maximal \leftarrow false$
8. *break*
9. *end if*
10. *end for*
11. *if* $(maximal = true)$
12. *then*
13. *Output* $c[i].x, c[i].y$
14. *end for*

- b) Calculate the worst-case time (running time and memory access) of question 3.a.

[6 marks]