**SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY**

**COMPUTER SCIENCE & INFORMATION TECHNOLOGY DEPARTMENT**

**Spring 2025**

**Theory of Automata & Formal Languages (CS-224)**

**Assignment # 1**

Semester: IV Batch: 2023F

Announced Date: 13/03/2025 Due Date: 11/04/2025

Total Marks: 3 Marks Obtained:

Instructor Name: Dr. Syed Muhammad Atif

| **CLO #** | **Course Learning Outcomes (CLOs)** | **PLO Mapping** | **Bloom’s Taxonomy** |
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| CLO 1 | **Design** Finite Automata (FA), Regular Expression (RE), Push Down Automata (PDA), Context-Free Grammar (CFG), Chomsky Normal Forms (CNF) and Derivation Trees. | PLO\_2 (Knowledge for Computing Problem) | C3 (Apply) |

Q1**.** Construct the Deterministic Finite Automata (DAF) for the following classical problem/puzzle known as goat, lion and grass problem:

A man travels with lion, goat and grass. He wants to cross a river from east to west. A boat is available, but only large enough for the man plus one possession. He has following restrictions:

1) Lion eats goat if left alone together

2) Goat eats grass if left alone together

1. How can the man cross the river without loss.
2. Find the all the possible solutions with minimal moves.