Assignment 1: Smart Traffic Signal System using FIFO

Scenario

You are developing a simple **smart traffic intersection**.

There are two processes:

The **Traffic Sensor Process** continuously generates traffic information, while the **Traffic Controller Process** receives it through a named FIFO and decides how the traffic signal should behave.

Process 1 — Traffic Sensor

The sensor generates data such as:

NORTH 25
SOUTH 10
EAST 35
WEST 5
where the number represents the number of vehicles detected.

Send the information through:

/tmp/traffic_fifo
Example:

NORTH 25

Process 2 — Traffic Controller

The controller receives the data and determines the busiest direction.

For example:

Traffic detected:
North : 25
South : 10
East : 35
West : 5
GREEN → EAST

Make it more interesting

Ask students to implement rules such as:

Vehicles > 30 → Green for 60 seconds
Vehicles 15–30 → Green for 40 seconds
Vehicles < 15 → Green for 20 seconds
The controller should continuously display:

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==============================
 SMART TRAFFIC CONTROLLER
==============================
North : 25
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South : 10
East : 35
West : 5
Current Signal : EAST
Green Time   : 60 seconds
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Learning objectives

Students learn:

- mkfifo()
- open()
- read()
- write()
- close()
- FIFO synchronization
- Process communication
- Blocking behavior of FIFO
- Structured data communication between processes
