Installation and User Guide

Multi-Task Scheduler – Linux Process Scheduling Simulator

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1. Project Overview

The **Multi-Task Scheduler** is an educational simulator designed to reproduce the behavior of Linux process scheduling policies. It allows users to visualize process execution using **Gantt charts** and to compute key **performance metrics** (waiting time, turnaround time, etc.).

Supported Scheduling Policies

- **FIFO (First In, First Out)** – Non-preemptive
- **Round Robin** – Preemptive, with configurable time quantum
- **Preemptive Priority Scheduling** – Based on static priorities
- **Multilevel Queue (MLQ)** – With and without aging

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2. System Requirements

Before installing and running the simulator, ensure that the following requirements are met:

- Native **Linux** system or **WSL (Windows Subsystem for Linux)**
- **GCC** or **Clang** compiler
- **make** build tool
- Linux terminal environment

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3. Project Installation

Option 1: Clone Using Git

```
git clone https://github.com/os-scheduler-2025/OS-Scheduling-Engine
cd OS-Scheduling-Engine
```

Option 2: Download Without Git

Download the project as a **ZIP archive**, then extract its contents into your working directory.

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4. Project Compilation

From the root directory of the project, execute the following command:

```
make clean && make
```

This command compiles all source files, builds the required libraries, and generates the executable file named `ordonnanceur`.

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5. Process Configuration File

The simulator uses a text file to define the processes to be scheduled. Each line represents a single process.

File Format

```
process_name arrival_time execution_time priority
```

Example

```
Proc_A 0 12 1
Proc_B 1 6 3
Proc_C 2 8 2
Proc_D 4 3 4
```

- Empty lines are ignored.
- Lines starting with `#` are treated as comments.

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6. Execution and Usage

To launch the simulator, run the following command:

```
./ordonnanceur
```

Configuration Window

At startup, a configuration window is displayed:

- The loaded file name and the number of detected processes are shown.
- Select the desired scheduling policy from the dropdown menu.
- For **Round Robin** or **MLQ**, specify the time quantum (default value: **4**).
- Click **Start Simulation** to proceed.

Simulation Modes

A new window opens with two available options:

- **Load from File**: Applies the selected scheduling algorithm to the process file loaded at startup.
- **Manual Input**: Allows users to enter process data manually through a graphical interface.

Simulation Results

Once the simulation starts:

- The execution trace and numerical results are displayed in the terminal.
- A graphical **Gantt chart** illustrating process execution is displayed in a dedicated window.

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7. Uninstallation

No specific uninstallation procedure is required. To remove the project, simply delete its directory:

```
rm -rf OS-Scheduling-Engine/
```

End of Guide