

Group Members:

- Kaiyu Liu (1195058, [liukai@kean.edu](mailto:liukai@kean.edu))
- Fan Yu (1195235, [yufa@kean.edu](mailto:yufa@kean.edu))
- Yiyang Hu (1194116, [huyiya@kean.edu](mailto:huyiya@kean.edu))
- Lei Xia (1195180, [xial@kean.edu](mailto:xial@kean.edu))

Abstract:

**Virtual Memory Explorer:** Virtual memory is a computer operating system technique that extends available memory by using a portion of the hard disk, allowing programs to access a larger address space than physical memory. This enables concurrent execution of multiple programs. The project results demonstrate changes in memory states during process creation, deletion, and page replacement.

Method:

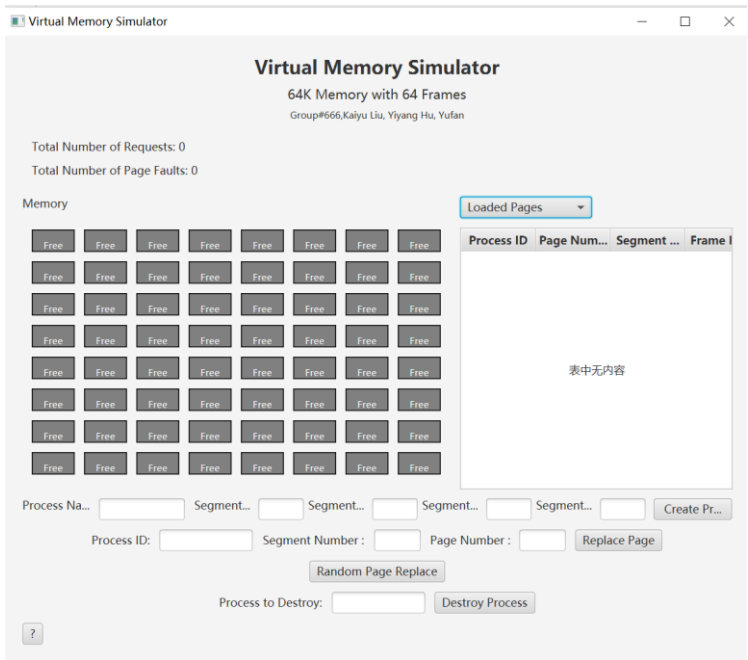
Technology Stack

- **Backend:** Java
- **Frontend GUI:** JavaFX

User Interfaces

Graphical User Interface (GUI):

- 1)Real-time visual feedback
- 2)Dual-interface system for CLI and GUI interaction



Virtual Memory Explorer

Project Overview

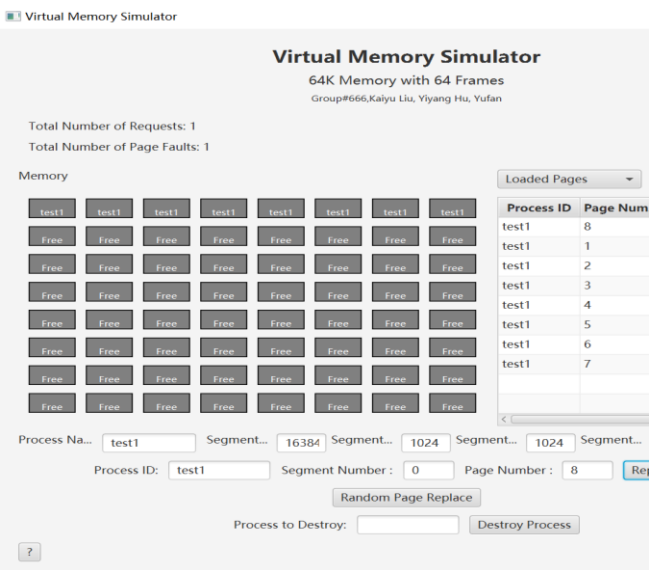
Overall Structure

1. **Simulation Environment Setup:**
  - Physical Memory Representation
  - Virtual Memory Space
  - Page loading and replacement
2. **Page Replacement Algorithms:**
  - FIFO, LRU,

Explanation:

- As shown in above figure:
1. Users can create processes and load pages from the segment into frames.
  2. Users can specify the deletion of a particular process, and the operating system (OS) will automatically release the frames.
  3. Users can specify the replacement of pages within a particular process according to page replacement algorithms
- After each user operation to add, delete, or modify a process, the user interface's representation of processes and the allocation of frames in memory will dynamically change based on the corresponding logic.

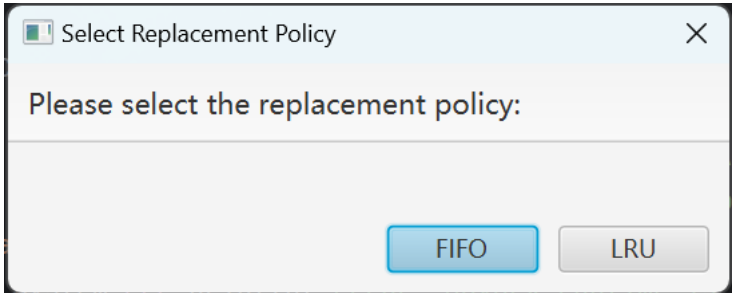
Result:



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Like mentioned in the explanation, after user operations, changes occur in both memory and processes.

User get's to choose Page Replacement Policy at the beginning.



Conclusion:

Project Goals and Objectives

1. **Educational Understanding:**
  - Comprehensive tool for virtual memory management understanding
  - Interactive learning experiences GUI
2. **Real-world Simulation:**
  - Visualization of dynamic operations
  - User interaction for parameter adjustments

Features

- **User Interfaces:**
  - Dual interface: CLI and GUI
  - Real-time visual feedback
- **Simulation Environment:**
  - Setup: PCB, OS, Memory, Frame
  - Algorithms: FIFO, LRU