Republic of the Philippines
Tarlac State University
COLLEGE OF COMPUTER STUDIES
Tarlac City, Tarlac
Tel. No. (045) 6068173

A case study
In partial fulfillment of the requirements
for the course Operating Systems

Implementation of the Page Replacement Algorithms (FIFO, LRU and Optimal Algorithm)

Operating Systems Case Study

Submitted by:

Macarilay, Mark Jayson C.

BSCS-3B

Submitted to:

Ma’am Jo Anne G. Cura

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I. DOCUMENTATION

1. User Interface

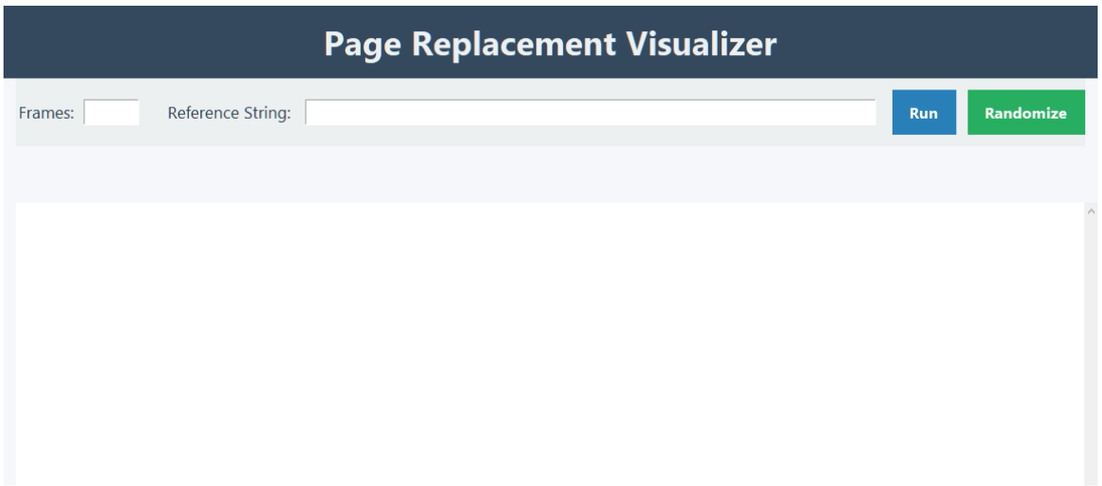

Figure 1. User Interface

Figure 1 shows the User Interface of the application, which includes textboxes for entering the number of frames and the reference string. It also features "Run" and "Randomize" buttons, which are used to execute the visualizer after getting the number of frames.

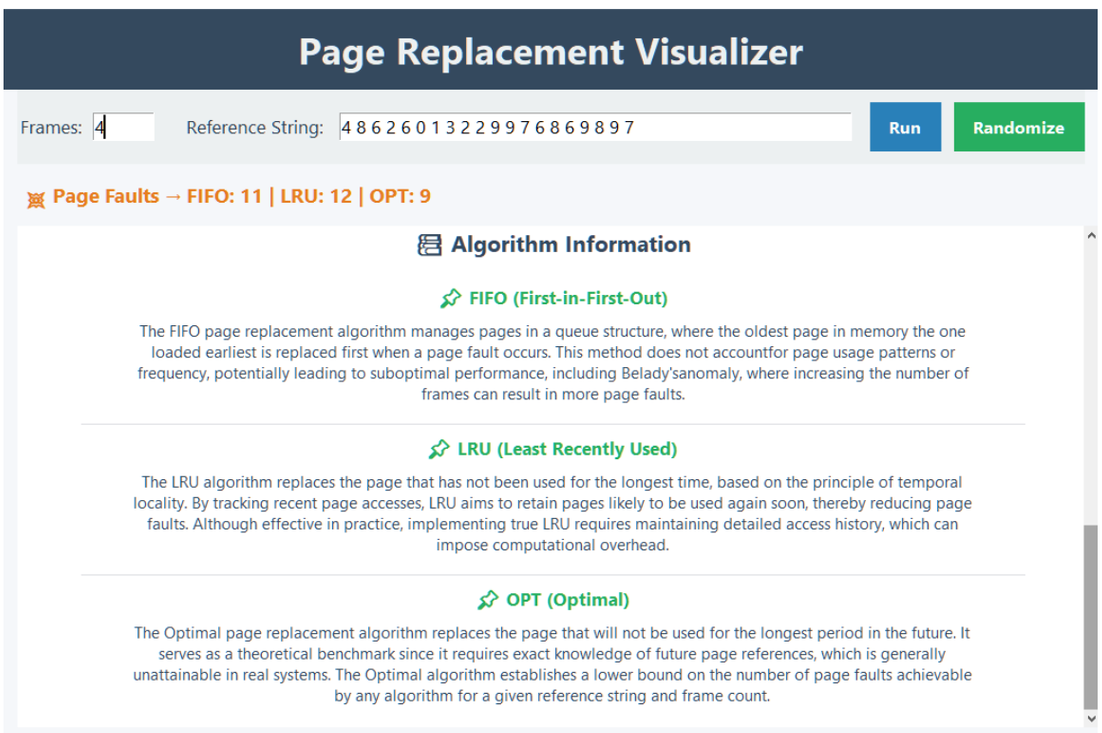

Figure 2. Algorithm Information

Figure 2 shows the Algorithm Information section, which displays details about each algorithm. This section appears after clicking either the "Run" or "Randomize" button.

2. Sample Output

2.1 First Sample Output

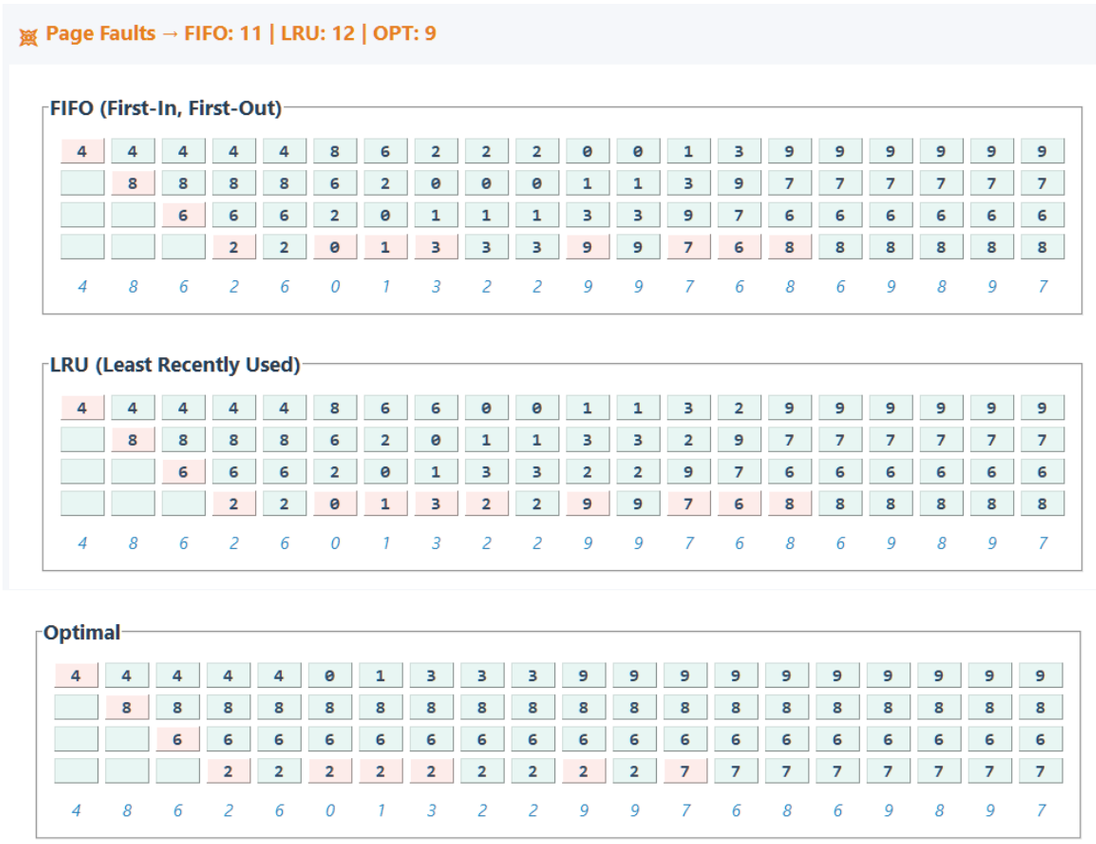

Figure 3. First Sample Output

Algorithm	Page Faults
First-In-First-Out (FIFO)	11
Least Recently Used (LRU)	12
Optimal (OPT)	9

Table 1. First Sample Results

With a reference string of 4, 8, 6, 2, 6, 0, 1, 3, 2, 2, 9, 9, 7, 6, 8, 6, 9, 8, 9, 7 and 4 page frames, the Optimal Algorithm produced the fewest page faults, totaling 9. The First-In-First-Out Algorithm had slightly more, with 11 page faults, while the Least Recently Used (LRU) Algorithm recorded the highest number at 12.

2.2 Second Sample Output

Figure 4. Second Sample Output

Algorithm	Page Faults
First-In-First-Out (FIFO)	11
Least Recently Used (LRU)	12
Optimal (OPT)	10

Table 2. Second Sample Results

With a reference string of 4, 9, 2, 2, 6, 7, 8, 7, 0, 0, 6, 8, 6, 2, 1, 7, 0, 2, 7, 5 and 4 page frames, the Optimal Algorithm had the fewest page faults with a total of 10. The FIFO Algorithm followed with 11 page faults, while the Least Recently Used (LRU) Algorithm had the most, totaling 12 page faults.

2.3 Third Sample Output

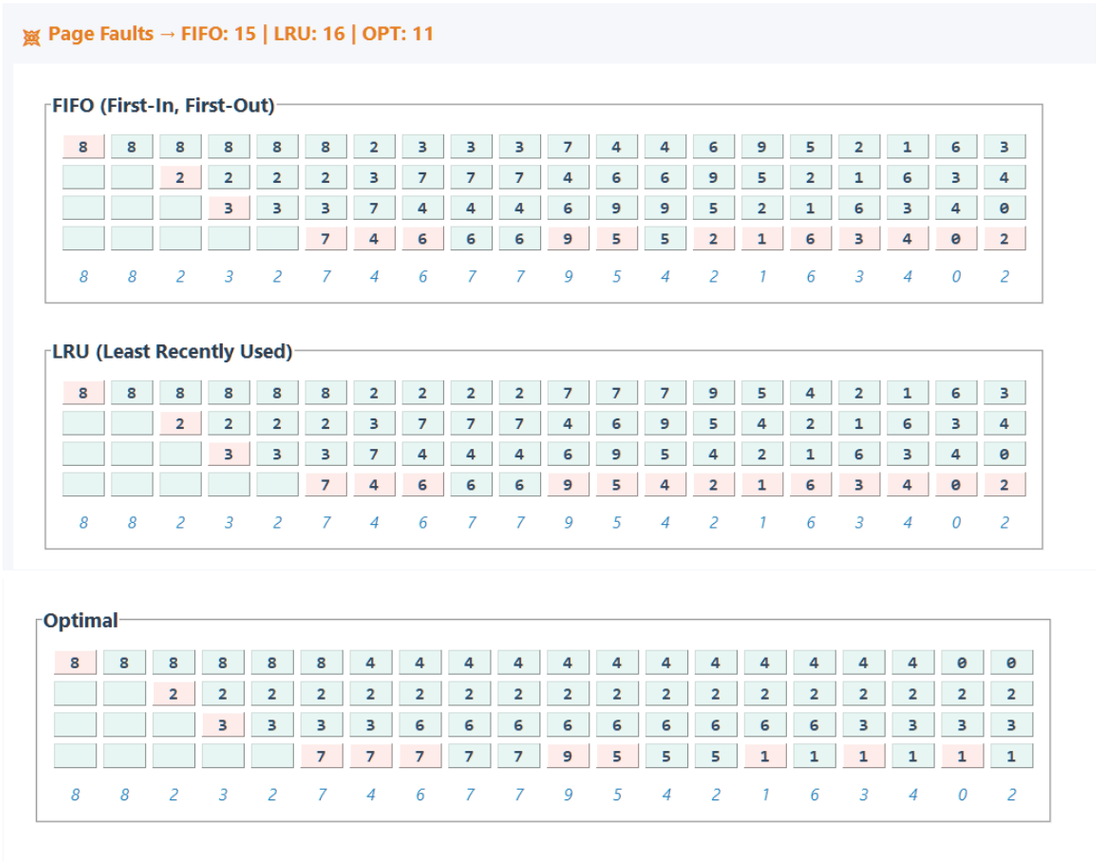

Figure 5. Third Sample Output

Algorithm	Page Faults
First-In-First-Out (FIFO)	15
Optimal (OPT)	16
Least Recently Used (LRU)	11

Table 3. Third Sample Results

For the last set of inputs, with the reference string 8, 8, 2, 3, 2, 7, 4, 6, 7, 7, 9, 5, 4, 2, 1, 6, 3, 4, 0, 2 and 4 page frames, the Optimal Algorithm resulted in the fewest page faults with 11. FIFO had 15 page faults, while LRU had the most with 16.