

1. Internal fragmentation is memory that is not available at the end of a page because memory is allocated per page and a process can only allocate memory in page-sized chunks. When the page frame size is too large. This means the number of frames available is reduced. This also means that more space is wasted because of the internal frame. If the page frame size is too small, more pages will be used, resulting in more space for the page table.
2. To prevent data leakage, the operating system must clear the memory or disk before reusing the memory. If sensitive data is stored in the memory or disk and the memory or disk is not erased correctly before being reused, data leakage may occur. If the data is not erased correctly, someone may recover the data from memory or disk. By zero out memory or disk contents, the operating system can ensure that data is correctly erased and not recoverable. In addition, emptying memory can help prevent data corruption.
3. Paging reduces the amount of memory required for address translation. Paging allows for smaller and more efficient address Spaces. Paging makes it easy to share address Spaces between processes. Paging can be implemented to improve system performance.

4.

LRU

| | A | C | B | D | B | A | E | F | B | F | A | G | E | F | A |
|---|---|---|---|---|-----|-----|---|-----|-----|-----|-----|---|---|-----|-----|
| 1 | A | | | | | hit | | | | | hit | | | | hit |
| 2 | | C | | | | | E | | | | | G | | | |
| 3 | | | B | | hit | | | | hit | | | | E | | |
| 4 | | | | D | | | | hit | | hit | | | | Hit | |

MIN

| | A | C | B | D | B | A | E | F | B | F | A | G | E | F | A |
|---|---|---|---|---|-----|-----|---|---|-----|-----|-----|---|-----|-----|---|
| 1 | A | | | | | hit | | | | | hit | | | | A |
| 2 | | C | | | | | E | | | | | | hit | | |
| 3 | | | B | | hit | | | | hit | | | G | | | |
| 4 | | | | D | | | | F | | hit | | | | Hit | |

Clock 1 = used, 0 = unused, Clock hand = bolded

| | A | C | B | D | B | A | E | F | B | F | A | G | E | F | A |
|---|----------------------|----------|----------|----------|----------|------------------------|--------|----------|------------------------|----------|--------|----------|----------|----------|------------------------|
| 1 | A 1 | 1 | 1 | 1 | 1 | hit 1 | E 1 | 1 | 1 | 1 | 1 | 0 | hit 1 | 1 | 1 |
| 2 | | C 1 | 1 | 1 | 1 | 1 | 0 | F 1 | 1 | hit 1 | 1 | 0 | 0 | hit 1 | 1 |
| 3 | | | B | 1 | hit 1 | 1 | 0 | 0 | hit 1 | 1 | 0 | G 1 | 1 | 1 | 1 |
| 4 | | | | D 1 | 1 | 1 | 0 | 0 | 0 | 0 | A 1 | 1 | 1 | 1 | hit 1 |