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**Sheet #6**

**6.1) Best -fit Algorithm**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 12 | 5 | 19 | 13 | 7 | 8 | 16 |
| 14 | 12 | 5 | 19 | 13 | 7 | 8 | 2 |
| 9 | 3 | 5 | 19 | 13 | 7 | 8 | 2 |
| 7 | 3 | 5 | 19 | 13 | 0 | 8 | 2 |
| 10 | 3 | 5 | 19 | 3 | 0 | 8 | 2 |

**Worst -fit Algorithm**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 12 | 5 | 19 | 13 | 7 | 8 | 16 |
| 14 | 12 | 5 | 5 | 13 | 7 | 8 | 16 |
| 9 | 12 | 5 | 5 | 13 | 7 | 8 | 7 |
| 7 | 12 | 5 | 5 | 6 | 7 | 8 | 7 |
| 10 | 2 | 5 | 5 | 6 | 7 | 8 | 7 |

**First -fit Algorithm**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 12 | 5 | 19 | 13 | 7 | 8 | 16 |
| 14 | 12 | 5 | 5 | 13 | 7 | 8 | 16 |
| 9 | 3 | 5 | 5 | 13 | 7 | 8 | 16 |
| 7 | 3 | 5 | 5 | 6 | 7 | 8 | 16 |
| 10 | 3 | 5 | 5 | 6 | 7 | 8 | 6 |

**Next -fit Algorithm**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 12 | 5 | 19 | 13 | 7 | 8 | 16 |
| 14 | 12 | 5 | 5 | 13 | 7 | 8 | 16 |
| 9 | 12 | 5 | 5 | 4 | 7 | 8 | 16 |
| 7 | 12 | 5 | 5 | 4 | 0 | 8 | 16 |
| 10 | 12 | 5 | 5 | 4 | 0 | 8 | 6 |

**6.2)**

**A)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **512** | | | | | | |
| **A** | **64** | | **128** | | **256** | |
| **A** | **B** | **32** | **128** | | **256** | |
| **A** | **B** | **32** | **C** | **64** | **256** | |
| **A** | **B** | **32** | **C** | **64** | **D** | **128** |
| **A** | **B** | **E** | **C** | **64** | **D** | **128** |
| **A** | **B** | **E** | **C** | **64** | **D** | **F** |

**A picture containing text, light, bird, sitting

Description automatically generated**

**B)**

A -> 64-59 =5 KiB E->32-28=4 KiB

B->32-27=5 KiB F->128-98=30 KiB

C->64-44=20 KiB

D->128-115=13 KiB \* Total internal fragmentation=5+5+20+13+4+30 =**77 KiB**

**C)** G will not be allocated because as you can see from the figure, the memory space left from D can only be merged with the space occupied by F due to the structure we have.

-And the 64 KiB space can only be merged with the space occupied by C

\*\* Therefore, we can see that G will not be allocated

**6.3) FIFO**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |
| Frame 1 | |  | - | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 2 | 2 |
| Page Faults | |  | \* | \* | \* | \* | \* |  |  | \* |  |  | **6** |
|  | | |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Frame 1 | |  | - | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Frame 2 | |  | - | - | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| Page Faults | |  | \* | \* | \* | \* | \* |  |  | \* |  |  | **6** | |
|  | | |

**BO**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Frame 1 | |  | - | 2 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 2 |
| Page Faults | |  | \* | \* | \* | \* |  |  |  | \* |  |  | **5** |
|  | | |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Frame 1 | |  | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Frame 2 | |  | - | - | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Page Faults | |  | \* | \* | \* | \* |  |  |  |  |  |  | **4** | |

**LRU**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 2 |
| Frame 1 | |  | - | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 1 | 1 |
| Page Faults | |  | \* | \* | \* | \* | \* |  |  | \* | \* |  | **7** |
|  | | |
| Reference string | |  | **1** | **2** | **3** | **4** | **1** | **1** | **4** | **2** | **1** | **2** |
| Frame 0 |  | 1 | 1 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Frame 1 | |  | - | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Frame 2 | |  | - | - | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| Page Faults | |  | \* | \* | \* | \* | \* |  |  | \* |  |  | **6** | |