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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 2 | 1 | 5 | 6 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 2 | 1 | 2 | 3 | 6 |
| F1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 |
| F2 |  | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 3 | 3 |
| F3 |  |  | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F4 |  |  |  | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
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FIFO

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|  | 1 | 2 | 3 | 4 | 2 | 1 | 5 | 6 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 2 | 1 | 2 | 3 | 6 |
| F1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 7 | 7 | 7 | 1 | 1 | 1 | 1 |
| F2 |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| F3 |  |  | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| F4 |  |  |  | 4 | 4 | 4 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
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Optimal

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | 1 | 2 | 3 | 4 | 2 | 1 | 5 | 6 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 2 | 1 | 2 | 3 | 6 |
| F1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F2 |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| F3 |  |  | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| F4 |  |  |  | 4 | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 1 | 1 | 1 | 1 |
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LRU

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|  | 1 | 2 | 3 | 4 | 2 | 1 | 5 | 6 | 2 | 1 | 2 | 3 | 7 | 6 | 3 | 2 | 1 | 2 | 3 | 6 |
| F1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 |
| F2 |  | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 3 | 3 |
| F3 |  |  | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| F4 |  |  |  | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| FIFO | 1 | 12 | 123 | 1234 | 1234 | 1234 | 2345 | 3456 | 4562 | 5621 | 5621 | 6213 | 2137 | 1376 | 1376 | 3762 | 7621 | 7621 | 6213 | 6213 |
| Ref bit | 1 | 12 | 123 | 1234 | 1234 | 1234 | 5 | 56 | 562 | 5621 | 5621 | 3 | 37 | 376 | 376 | 3762 | 1 | 12 | 123 | 1236 |
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Second chance