Branch : CSE & IT Batch : Hinglish

Operating Systems

Memory Management

DPP 11

[MCQ]

1. Consider the following virtual addresses:
784, 224, 634, 734, 546, 978, 444, 299, 712, 526
If the page size is 150 bytes, then the reference string will be.
(a) 7, 2, 6, 7, 5, 9, 4, 2, 7, 5
(b) 7, 2, 6, 5, 9, 4, 6, 5
(c) 6, 1, 3, 4, 5, 9, 7, 6
(d) 5, 1, 4, 3, 6, 2, 1, 4, 3

[NAT]

2. Consider the following virtual addresses:
709, 540, 612, 311, 456, 908, 806, 708, 580, 250, 412,
If the page size of 200B, then what be the sum of length of corresponding reference string and number of unique pages in the reference string.

[MCQ]

3. Excessive paging activity results in _____.
(a) Compaction (b) Thrashing
(c) Segmentation (d) Paging

[MSQ]

4. Which of the following statements are correct?
(a) High thrashing can lead to deadlock.
(b) Lack of frames in main memory causes thrashing.
(c) Increasing memory frames can reduce page faults.
(d) High degree of multi programming can cause poor throughput.

[MCQ]

5. If the size of working set window (Δ) for a set of pages is 4. The following is the page reference string:
5, 4, 3, 1, 5, 4, 5, 3, 4, 5
What could be the minimum page demand of process at any time?
(a) 4 (b) 3
(c) 2 (d) 1

[MSQ]

6. Which of the following technique is/are used to handle thrashing and make system thrashing free?
(a) Decreasing page fault frequency
(b) working set model
(c) Compaction
(d) Page replacement policy

[MCQ]

7. Working set (t, k) at an instant of time t is
(a) The set of k reference with high frequency
(b) The set of k future reference that the OS will make in next t unit of terms.
(c) The k set of page that have been reference in the last t time units.
(d) None of these

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Answer Key

1. **(d)**
2. **(14)**
3. **(b)**
4. **(a, b, c, d)**
5. **(b)**
6. **(a, b)**
7. **(c)**

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Hints & Solutions

1. (d)

Page size is 150 bytes.

So,

0 – 149 : P_0

150 – 299 : P_1

300 – 449 : P_2

450 – 599 : P_3

600 – 749 : P_4

800 – 899 : P_5

900 – 1049 : P_6

So, the corresponding reference string will be;

5, 1, 4, 3, 6, 2, 1, 4, 3

Therefore option 'D' is correct.

2. (14)

Page size is 200 B

So, 0 – 199 : P_0

200 – 399 : P_1

400 – 599 : P_2

600 – 799 : P_3

800 – 999 : P_4

So, the corresponding reference string will be

3, 2, 3, 1, 2, 4, 3, 2, 1, 2

Length of reference string = 10

Number of unique pages in reference string

= < 1, 2, 3, 4 > = 4

So, 10 + 4 = 14

3. (b)

Excessive/ high paging activity result in thrashing. In multiprogramming, there can be a scenario when the system spends most of its time shuffling pages between the main memory and the secondary memory due to frequent page faults. This phenomenon is knowns as thrashing.

4. (a, b, c, d)

A → High thrashing can cause deadlock. Option 'A' correct.

B → Lack of frames/or less main memory space causes thrashing. Option 'B' 'C' correct.

D → High degree of multi programming cause thrashing and it leads to poor throughput. Option 'D' correct.

5. (b)

At time 0,

$\underbrace{5\ 4\ 3\ 1}_{\Delta=4}\ 5\ 4\ 5\ 3\ 4\ 5\ 5\ 5\ 2\ 3\ 4\ 5$

Demand of process = 4 page

At time 1,

$5\ \underbrace{4\ 3\ 1\ 5}_{\Delta=4}\ 4\ 5\ 3\ 4\ 5$

Demand of process = 4 page

At time 2,

$5\ 4\ \underbrace{3\ 1\ 5\ 4}_{\Delta=4}\ 5\ 3\ 4\ 5$

Demand of process = 4 page

At time 3,

$5\ 4\ 3\ \underbrace{1\ 5\ 4\ 5}_{\Delta=4}\ 3\ 4\ 5$

Demand of process = 3 page

At time 4,

$5\ 4\ 3\ 1\ \underbrace{5\ 4\ 5\ 3}_{\Delta=4}\ 4\ 5$

Demand of process = 3 page

At time 5,

$5\ 4\ 3\ 1\ 5\ \underbrace{4\ 5\ 3\ 4}_{\Delta=4}\ 5$

Demand of process = 3 page

At time 6,

$5\ 4\ 3\ 1\ 5\ 4\ \underbrace{5\ 3\ 4\ 5}_{\Delta=4}$

Demand of process = 3 page

So, minimum demand = 3

6. (a, b)

Thrashing is a situation in which the system is spending a major portion of its time servicing page faults rather than actually processing the request. This impacts system 's performance extensively.

Working set model and decreased page fault frequency can handle thrashing and make system thrashing free.

7. (c)

Working set (t, k) at an instant of time t is the k set of pages that have been referenced in the last t time units.

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