# Consider a demand-paged computer system where the degree of

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1. Explanations

## Question

Consider a demand-paged computer system where the degree of multiprogramming is currently fixed at four. The system was recently measured to determine utilization of the CPU and the paging disk. Three alternative results are shown below. For each case, what is happening? Can the degree of multiprogramming be increased to increase the CPU a. utilization? Is the paging helping? b. CPU utilization 87 percent; disk utilization 3 percent c. CPU utilization 13 percent; disk utilization 3 percent

## Explanation

🏅 Verified

### Step 1

1 of 6

## The degree of multiprogramming

The degree of multiprogramming is the maximum number of processes that a single-processor system can accommodate efficiently.

### Step 2

2 of 6

## Thrashing

Thrashing is a condition or a situation when the system is spending a major portion of its time in servicing the page faults, but the actual processing done is very negligible.

### Step 3

3 of 6

## Part (a)

The disk utilization is much higher (97%) than the CPU Utilization (13%) this leads to trashing. So, the degree of multiprogramming cannot be increased but some of the processes should be suspended (which reduces degree of multiprogramming to allow increase in the utilization of the CPU.

Also, because processes are spending most of their time for paging the paging is not helping either.

### Step 4

## Part (b)

The CPU utilization is much higher (97%) than the disk Utilization (3%) this means CPUs is quit busy. There is no need to change the degree of multiprogramming.

At this stage, if degree of multiprogramming is increased, the CPU utilization decreases and thrashing may take place.

As the CPU is being kept busy, number of processes increases. Thus, paging is helping.

### Step 5

## Part (c)

The CPU utilization and the disk Utilization (13% and 3%) are both low.

Since CPU utilization is low, CPU is not working with enough capacity, hence the degree of multiprogramming should be increased for increasing utilization of CPU

As number of processes are less, paging is not having much effect

### Result

(a) Thrashing is occurring.

(b) CPU utilization is sufficiently high to leave things alone, and increase degree of multiprogramming.

(c) Increase the degree of multiprogramming.

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