TECHNO INTERNATIONAL BATANAGAR

Assignment

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SEMESTER :5
PAPER: OPERATING SYSTEM

17 What do you mean by deadlock ? Write down all the necessary condition of deadlock

A set of process is in a state of deadlock if every process in the set is in some wait queue corresponding to a resource and is waiting for an event to occur than can be caused by that process in set-

Conditions for deadlock.

1. Mutual exclusion
2. Hold and wait
3. No preemption.
4. Circular wait-

Q18 Consider the snapshot and answer :

i) what is the content of need matrix

NEED = MAX - ALLOCATION

= 753 - 010 = 743

= 322 - 200 = 122

= 902 - 302 = 600

= 222 - 211 = 011

= 433 - 002 = 431

ii) Is the system is safe state ?

Safety Algorithm :-

Work = Available = 332, Finish = 00000

for i = 1, Need = 122 < Work = 210

Work = 200 + 332 = 532, Finish = 01000

for i = 3, Need = 011 < Work = 532

Work 532 + 211 = 743 = Work = 743

Work = 743 + 010 = 753, Finish = 1100

Teacher's Signature.....

for i = 2, need = 600 < work = 753,
work = 753 + 302 = 1055, Finish = 11010
for i = 4, need = 431 < work = 1055
work = 1055 + 002 = 1057, Finish = 1111
Its in safe state, safe sequence : P_1, P_3, P_0, P_2, P_4

(11) If a request from process P7 arrives for (102), can this request be granted immediately ?

Request = 102 < need = 122
and
Request = 102 < Available = 332
Therefore request can be granted immediately

Q10. write the difference between logical and physical address.

	LOGICAL	PHYSICAL
1.	logical address is generated by CPU	1. Physical address is a location in memory.
2.	logical address space is set of all logical address generated by CPU	2. Physical address space is set of all physical address mapped to corresponding logical address.
3.	User can view the logical address of a program.	3. User can never view physical address of a program.

Q20 What do you mean by Dynamic loading?

Dynamic loading is a mechanism by which a computer program can run at run-time load a library with memory, retrive the address of function and variables contained in the library, execute those functions or access those variables and unload the library from memory.

Q21 What is Dynamic linking?

Dynamic linking consists of compiling and linking code into a form that is loadable by programs at run time as well as link time.

Q22 What is Firstfit, Bestfit, Worst fit memory allocation technique.

First fit:- In first fit algorithm first free partition large enough to accomodate the process is selected.

Best fit :- The best fit allocates smallest partition large enough to accomodate the process.

Worst fit :- It allocates largest available free position to the process.

Q23 what do you mean by Fragmentation?

There are two types of fragmentation:

External Fragmentation:- A situation where total size of scattered holes is large enough to hold a process for execution but process cannot be loaded as the hole is not contagious

Internal Fragmentation:- A situation where few bytes would be free if a process were allocated to a hole, and cost of tracking these few bytes is high. In such cases, extra bit of hole is allocated to a process.

Q24. write a note on paging

~~The logical address space of a~~

Q24 write a note on paging

The logical address space of a process is divided into some fixed size block called pages. Physical memory is divided into equal sized blocks called frames.

Q25 what a note on segmentation.

A process is divided into segments the chunks that a program is divided in which are not necessarily all the same sizes are called segments. segmentation gives user's views of process which paging does not give.

Teacher's Signature.....

Q25 what is virtual memory?

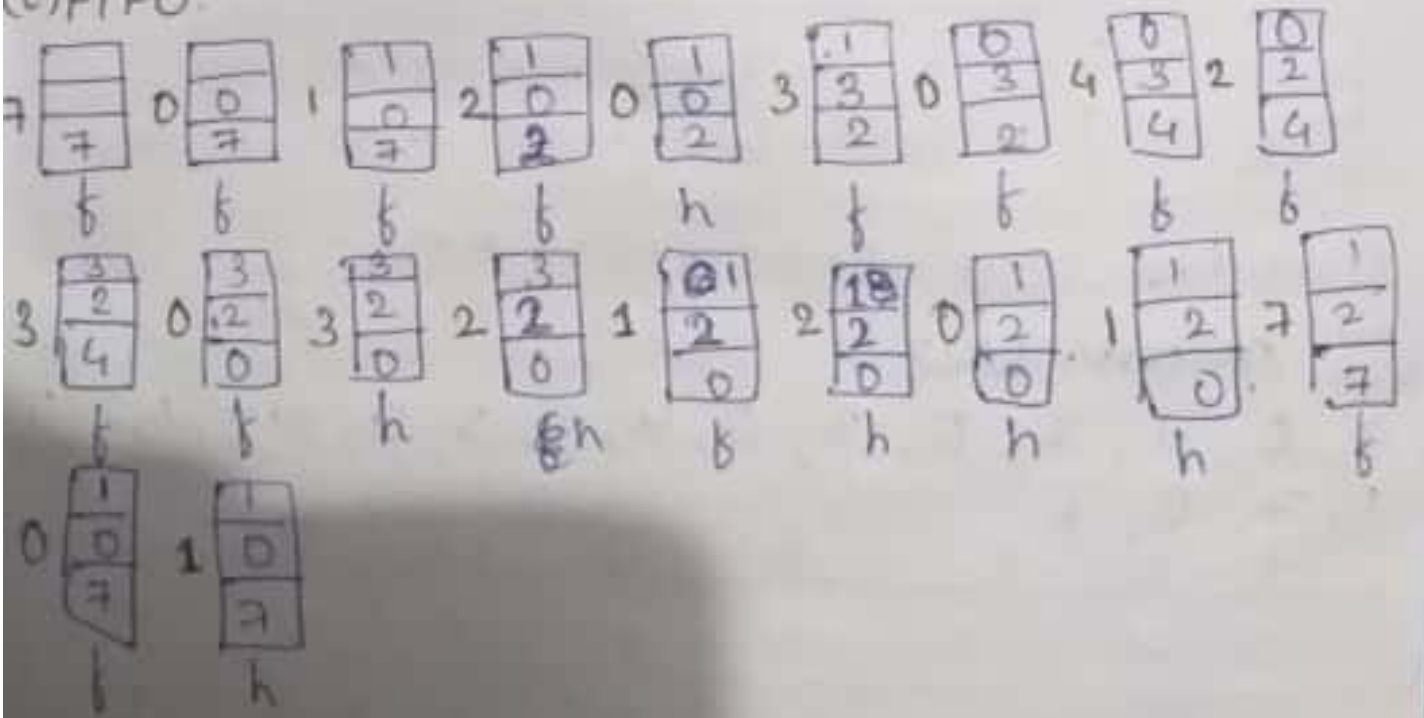
Virtual memory is a technique capable of overcoming abouve limitations of paged or segmented memory systems and allows execution of processes that may not be entirely in memory VM presents to user a larger main memory than the real phys. ical memory

Q27. What do you mean by demand paging? Describe it.

It is a combined system of paging & swapping. Each page is mantained on paging device. Main memory page frames are the places where pages are copied to, once the location of pages are referenced A page is loaded into main memory from secondary storage only when it is accessed during execution of the program.

Q28 Consider the following reference string
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

(i) FIFO



PAGE FAULT: 13 PAGE FAULT RATE = $\frac{13}{20}$.

(ii) Optimal page replacement

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

7	0	1	2	0	3	0	4
		1	1	1	3	3	3
	0	0	0	0	0	0	4
7	7	7	2	2	2	2	2
f	f	f	f	h	f	h	f

2	3	0	3	2	1	2	0
3	3	3	3	3	1	1	1
4	4	0	0	0	0	0	0
2	2	2	2	2	2	2	2
h	h	f	h	h	f	h	h

1	7	0	1
1	1	1	1
0	0	0	0
2	7	7	7
h	f	h	h

PAGE FAULT: 9 PAGE FAULT RATE: $\frac{9}{20}$

(iii) ~~Optimal~~ LRU.

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

7	0	1	2	0	3	0	4
		1	1	1	3	3	3
	0	0	0	0	0	0	0
7	7	7	2	2	2	2	4
f	f	f	f	h	f	h	f

2	3	0	3	2	1	2	0
2	2	2	2	2	2	2	2
0	3	3	3	3	3	3	0
4	4	0	0	0	1	1	1
f	f	f	h	h	f	h	f

1	7	0	1
2	7	7	7
0	0	0	0
1	1	1	1
h	f	h	h

PAGE FAULT : 12 PAGE FAULT RATE : $\frac{12}{20}$

Q29. What do you mean by "Belady's anamo
Describe with example

In FIFO, generally on increasing the numbe
of page frames to a process's virtual me
ory, its execution becomes faster as les
number of page faults occur. Sometimes
the reverse happens, i.e more numbe
of page faults occur. This is known a
Belady's anamoly. Example: If a system
has 3 frames and reference string:
1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5

		3	3	3	2	2	2	2	2	4	4
	2	2	2	1	1	1	1	1	3	3	3
1	1	1	4	4	4	5	5	5	5	5	5
f	f	f	f	f	f	f	h	h	f	f	h

Page fault = 9

1	2	3	4	1	2	5	1	2	3	4	5
			4	4	4	4	4	4	3	3	3
		3	3	3	3	3	3	2	2	2	2
	2	2	2	2	2	2	1	1	1	1	5
1	1	1	1	1	1	5	5	5	5	4	4
f	f	f	f	h	h	f	f	f	f	f	f

Pagefault = 10

Q30. Write a note on Thrashing.

When a process does not have enough frames or when a process is executing with a minimum set of frames allocated to it which are in active use, there is always a possibility that the process will get a quick page fault quickly. The page in active use become a victim and hence page faults will occur again and again. In this case, a process spends more time in paging than executing. This high paging activity is called thrashing.

Q31. Write a note on File allocation table

File allocation table is a scheme, in which a file allocation table is maintained, which gathers all the disk block links. The table has one entry for each disk block and is indexed by block number. FAT needs to be cached in order to reduce the number of head seeks.

Q32. Write a note on Inode.

Inode are special disk blocks they are created when the file system is created. The number of Inode limits is the total number of files/directories that can be stored in the file system.

Inode contains administrative information number of direct blocks, single indirect block, double indirect block, triple indirect block

Q33. Write a note on DMA

Direct memory access (DMA) is a method that allows an input/output (I/O) device to send or receive data directly to or from the main memory, bypassing the CPU to speed up memory operations. The process is managed by a chip called DMA controller (DMAC). A defined portion of memory is used to send data directly from a peripheral to the motherboard without involving the microprocessor

Q34. What are the services provided by Kernel I/O Subsystem. Describe it

1. I/O Scheduling: To schedule a set of I/O requests means to determine a good order in which to execute them.

2. Buffering: A buffer is a memory area that stores data being transferred between two devices and an application.

3. Caching: A cache is a region of fast memory that holds a copy of data. Access to cache is faster & easier than original file

4. Spooling & device Reservation: A spool is a buffer that holds the output of a device, such as a printer that cannot accept interleaved data streams

5. Error handling: An OS that uses protected memory can guard against many kinds of hardware and application errors

6. I/O Protection : Errors and the issues of protection are closely related. A user process may attempt to issue illegal I/O instructions to disrupt the normal function of a system

Q25. Write a note on authentication, Program threats and System threats.

AUTHENTICATION.

The user can be authenticated to a machine based on any combination of : password, ATM or smart card and Iris scan, fingerprint or etc. A password is a combination of symbols created for the sole purpose of providing authentication

PROGRAM THREATS

An attacker may use a program as a weapon to compromise the security of a system and get into it. The simplest technique is to misconfigure a benign program to attack a system. More sophisticated technique includes created malicious programs created for the whole purpose of attacking a system. There are two types of malicious program, virus & trapdoor, logic bomb, Trojan Horse, Bacteria & worm

SYSTEM THREATS

These threats involve the abuse of a system services. They strive to create a situation in which OS resources and user files are misused. They are also used as a medium to launch program threats.