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DEPT - CSE
SEM - 5

OS Assignment 2

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

Conditions for deadlock :-

i) Mutual Exclusion
ii) Hold - wait
iii) No ~~prep~~ pre-emption
iv) circular wait

18) i) NEED = MAX - ALLOCATION

7	5	3	-	0	1	0	=	743
3	2	2	-	2	0	0	=	122
9	0	2	-	3	0	2	=	600
2	2	2	-	2	1	1	=	011
4	3	3	-	0	0	2	=	431

ii) 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, finish = 01010

for i = 0, need = 743 ≤ work = 743
work = 743 + 010 = 753, Finish = 11000
for i = 2, need = 600 < work = 753
work = 753 + 302 = 1055, Finish = 11210
for i = 4, need = 431 < work = 1055
work = 1055 + 002 = 1057, finish = 11111
Its in safe state. Safe sequence : P_1, P_3, P_0, P_2, P_4

18) Request = 1 0 2 < need = 122
and
Request = 1 0 2 < available = 332
Therefore request can granted immediately

19)

Logical Address	Physical Address
→ Logical Address is generated by CPU	→ Physical address is a location in memory
→ User can view the logical address of a program	→ user can never view physical address of a program.

20) Dynamic loading is a mechanism by which a computer program can run, at run-time load a library into memory, retrieve the addresses of function and variables contained in the library, execut those functions or access those variables, and unload the library from memory

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

22) First fit :- 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 portion to the process

23) There are two types of Fragmentation

i) External Fragmentation :-

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

ii) 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.

24) 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. Allocation of main memory to processes for execution requires first mapping of pages to frames. Every process has got a page table which contains the base address of each frame in physical memory

25) A process is divided into segments. The chunks that a program is divided into which are not necessarily all the same sizes are called segments. Segmentation gives user views of process which paging does not give.

26) Virtual memory is technique capable of overcoming above limitations of pages or segmented memory system and allows executions of process that may not be entirely in memory. VM represents to user a larger main memory than the real physical memory.

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

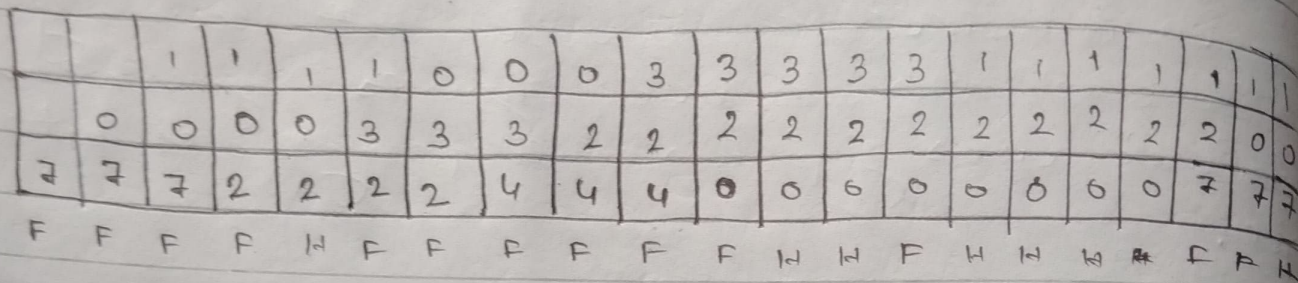
28) Consider the following reference string
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

a) FIFO

			2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
		1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4	4	7	7	7
7	7	7	7	7	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2
F	F	F	F	H	F	H	F	H	H	F	H	H	F	F	H	H	F	H	H

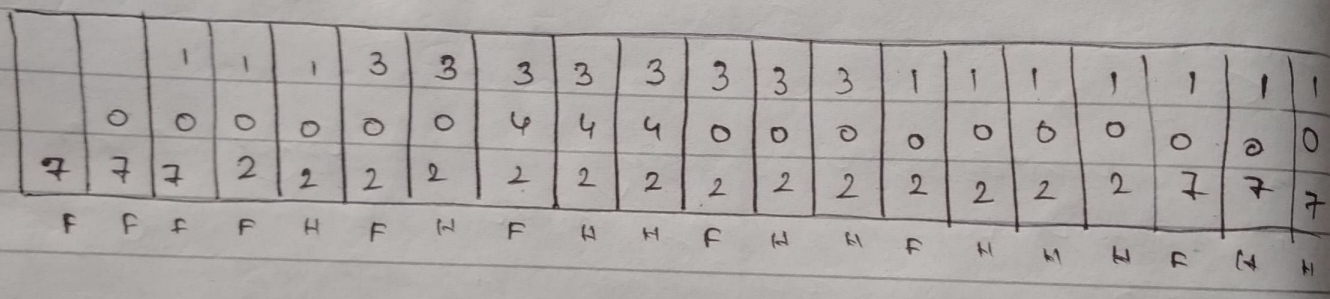
Page Fault = 10

i) FIFO



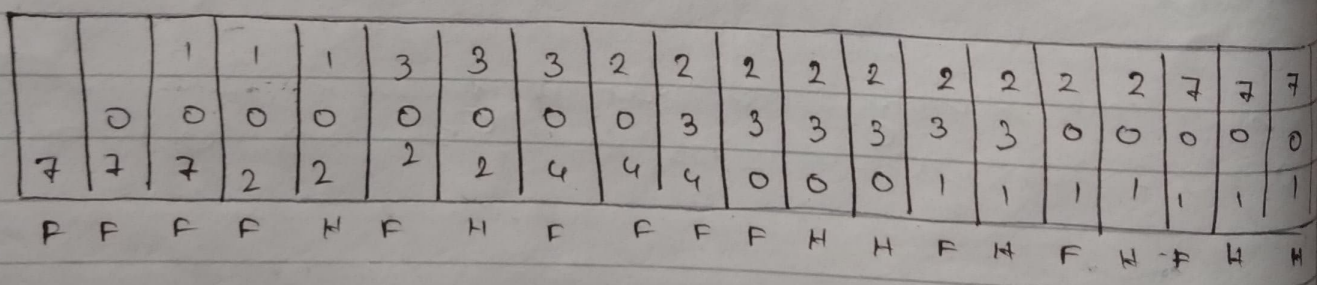
Page Fault : 13 Page Fault Rate = 13/20

ii) Optimal Page replacement



Page Fault : 9 Page Fault Rate = 9/20

iii) LRU



Page Fault = 12 Page Fault Rate = 12/20

29) In FIFO, generally on increasing the number of page frames to a process virtual memory, its execution becomes faster as less number of page faults occur. Sometimes the reverse happens, i.e more the number of page fault occurs. This is known as Belady's anomaly

30) When a process does not have enough frames ~~when~~ 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 is active use become a victim and hem page faults will occurs again and again. In this case, a process spends more time in paging than executing. This high paging actually is called threashing.

31) ~~Unix~~ 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.

32) Inode are special disk blocks they are created when the file system is created. The number of Inode limits is the total number of file / directories that can be stored in the files system. Inode contains, Administrative information number of direct blocks, single undirected blocks, double indirect block, triple indirect block.

33) Direct Memory Access (DMA) is a method that allows an input / output (I/O) devices to send or recieve 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.

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

→ Buffering :- A buffer is a memory area that stories data being transfered between two devices and or applications

→ Caching : A cache is a region of fast memory that holds a copy of data. Access to cache is faster and easier than origin files.

→ Spooling & device reservation :- A spool is a buffer that holds the output of a device such as printer that cannot accept interleaved data streames

→ Error Handling :- An OS that uses protected memory can guard against many kinds of hardware and appliance error.

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

3) AUTHENTICATION :-

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

PROGRAM THREATS :-

An attackers may use a program as a weapon to compromise the security of a system and get into it. The simplest technique is misconfigure a benign program to attack a system. More ~~Sophisco~~ sophisticated technique includes created malicious programs created for the whole purpose of attacking a system. There are two types of malicious program, viruses, trapdoor, logic bomb, trojan horse.

SYSTEM THREATS :-

These threads 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 programs throughout.