

Seat No _____

GANPAT UNIVERSITY
M.Tech. Semester II Examination
April - June 2015
3IT202: Advanced Operating Systems

Max Time : 3 Hour]**[Total Marks : 60**

- Instructions:**
1. All questions are compulsory
 2. Figures to the right indicate full marks.
 3. Answer Both Sections in Separate Answer sheets.

SECTION-I**Q-1**

- [A] What is buffer cache and why it is required? Draw Buffer Header, Buffer pool structure and buffer on 5 hash queue. Describe the five scenarios the kernel may follow in getblk to allocate a buffer for a disk block.
- [B] What are the difference between incore inode and inode ? Discuss the suitable scenario of assigning 5 new inodes.

[OR]**Q-1**

- [A] How to read and write disk block ? Discuss with suitable algorithm. 5
- [B] Discuss the algorithm for allocating disk block. 5
- Q.2. [A] Write the close algorithm and draw the data structure for the scenario given 5 below: Process 1 :

```
fd1=open("/etc/passwd",O_RDONLY);
fd2=open("/etc/public",O_RDONLY);
fd3=open("/local",O_RDWR);
fd4= open("/etc/passwd",O_WRONLY);
close(fd1);close(fd3)
```

Process 2:

```
fd1=open("/etc/passwd",O_RDONLY);
fd2=open("/private",O_RDWR);
close(fd1); close(fd2);
```

- [B] What is special file? How to create the special files? What are the differences between regular files 5 and special files?

[OR]**Q-2**

- [A] Discuss the mount algorithm if process issues the system call : 5
- mount("/dev/dsk1", "/usr", 0)

- [B] Discuss the link algorithm if process issues the system call : 5
- Link("/usr/src/uts/sys", "/usr/include/sys")

Q-3

- [A] Draw system kernel block diagram. List the various data structures used by kernel. 5
- [B] Define the terms : 5
- (1) Pipe (2) Processor Execution Levels (3) Reference Count (4) dup (5) Super block

SECTION – II

Q-4

- [A] Trace the syscall algorithm for the following programme: 5

```
char name[] = "file";
main(){
    int fd;
    fd=create(name,0666);}
```

- [B] Under what condition kernel swaps process out? Discuss an example of mapping in-core images of process onto a swap device. 5

[OR]

Q-4

- [A] What is signal? What is life cycle of Signal? Why kernel handles the signal while returning from Kernel Running Mode to User Running mode. Draw the part of state diagram relating to checking signal and handling signal. 5

- [B] Which algorithm is used to change the size of a process? Discuss with suitable example. 5

Q.5

- [A] How kernel handles internal system timeouts? Show the instance of callout table after addition of new entry for function f(). Kernel arranges to invoke function f() after 5 clock ticks. Callout table before status is shown in table. 5

Function	Time to fire
A()	-2
B()	3
C()	10

- [B] What is demand paging? What are major data structures used by demand paging? Draw the relationship of data structure for demand paging. 5

[OR]

Q-5

- [A] Consider three tasks $T_1 = (4, 0.9)$, $T_2 = (5, 1.5)$, $T_3 = (7, 3.0)$ where first figure in task indicates deadline and second indicates execution time require by each job to finish its execution. Perform LST scheduling of jobs with above data. (Show scheduling up to clock tick 15) 5

- [B] What are periodic and aperiodic tasks? Give detail parameters to describe both tasks and also give example of both types of task. 5

Q.6

- [A] Draw the logical view of the parent and child processes and their relationship to other kernel data structure after completion of FORK () system call. Summarize the algorithmic steps. 5

- [B] Calculate and draw the scheduling priorities for 3 processes A,B,C under following assumptions. Use Fair Share Scheduler. 5

Suppose Process A is one group and Processes B and C are in another group. Kernel schedules Process A first. They are created simultaneously with initial priority 60, the highest user level priority is 60, the clock interrupts the system 60 times a second. Calculate delay of CPU usage, priority and group priority for [Zero] 0 to 5 time unit.

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