0393

Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree
in
Information Technology

Mid Term Examination
Year 3, Semester 1 (2011)

Operating Systems (302)

Duration: 1 Hour

Instruction to Candidates:

- This paper has 3 questions. Answer All Questions.
- Total Marks 20.
- This paper contains 6 pages with Cover Pager.
- Calculators are allowed.

Question One (05 marks)

1. **(1 mark)** Briefly describe one main purpose of operating systems.

Answer:

2. **(1 mark)** What is the difference between online and offline operation in simple batch system?

Answer:

3. **(1 mark)** To a programmer, a system call looks like any other call to a library procedure. Is it important that a programmer know which library procedures result in system calls? Under what circumstances.

Answer:

4. **(1 mark)** What is the advantage of using micro-kernel architectures?

Answer:

5. **(1 mark)** What is the main problem in symmetric multiprocessing system?

Answer:

Question Two (08 marks)

1. **(1 mark)** Explain why a thread is different from a process.

Answer:

2. **(2 marks)** Briefly describe the purpose of the following system calls and library functions.
    a) *pipe(2)*
    b) *signal(2)*
    c) *pthread_create(3)*
    d) *pthread_exit (3)*

Answer:

3. **(1 mark)** Briefly describe why user level threads are much faster than kernel level threads in terms creation time.

Answer:

4. **(1 mark)** An operating system typically has two modes of operations: kernel and user modes. Briefly describe the main purpose for using the two modes of operations.

Answer:

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3. **(1 mark)** Briefly describe why user level threads are much faster than kernel level threads in terms creation time.

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4. **(1 mark)** An operating system typically has two modes of operations: kernel and user modes. Briefly describe the main purpose for using the two modes of operations.

Answer:

5. **(2 marks)** Consider the following program. What would be the output in Line A? Justify your answer.

```
int value = 30;

int main()
{
        pid_t pid;
        pid = fork();
        if (pid == 0)
                value = value + 15;
        else if (pid > 0) {
                value = value -15;
        wait (NULL);
        }
        printf("Value= %d \n", value); //Line A
}
```

Answer:

6. **(1 mark)** Briefly describe why inter process communication is slower than the inter thread communication.

Answer:

Question Three (07 marks)

1. **(1 mark)** Briefly describe the use of long-term scheduler. Should the scheduler be implemented in a timesharing system? Justify your answer.

Answer:

2. **(1 mark)** Briefly discuss why reducing response time decreases the CPU utilization.

Answer:

3. **(5 marks)** Given the following set of processes with their arrival times and burst times.

Process	Arrival time in milliseconds	Burst time in milliseconds
A	0	7
B	1	5
C	5	4
D	11	3

Draw a Gantt chart for round-robin (quantum = 3 milliseconds) scheduling considering the **context switching** time as 0.1 milliseconds. Compute the average waiting time.

Answer: