STIK2043  CONFIDENTIAL

UUM
Universiti Utara Malaysia

FINAL EXAM
SECOND SEMESTER SESSION 2011/2012

COURSE CODE / NAME : STIK2043/ OPERATING SYSTEM
DATE : 06 JUNE 2012 (WEDNESDAY)
TIME : 9.00 A.M – 11.30 A.M (2 ½ Hours)
VENUE : DMS

INSTRUCTION :

1. Answer ALL questions in this exam sheet only.
2. You are allowed to use scientific calculator
3. This booklet contains TWO (2) sections in TEN (10) printed pages (not including this page)
   a. Section A: EIGTHEEN (18) questions
   b. Section B: FOUR (4) questions
4. You are NOT ALLOWED to remove the exam paper from the examination hall

MATRIC NO: ________________________________  ________________________________
          (with word)                        (with number)

IDENTIFICATION CARD NO.:  ________________________________

LECTURER: __________________________________________

GROUP :  □  TABLE NO. :  ________________________________

DO NOT OPEN THIS EXAMINATION PAPER
UNTIL INSTRUCTED

CONFIDENTIAL
STIK2043 OPERATING SYSTEM

SECTION A (60 MARKS)

1. Describe the following operating system components.
   a. Device Manager (2 Marks)
   b. Network Manager (2 Marks)

2. The following questions are based on the following Linux command output.
   
   -rwxr-xr-x 1 root ahmad 486 2011-10-16 12:10 createuser.sh
   
   a. Who’s the owner of the file? (2 Marks)
   b. What is the group permission description? (2 Marks)
   c. What is the command to change the permission of the file to allow for group to write to the file? (2 Marks)
3. State the advantages and disadvantages between best-fit and first-fit allocation method in memory allocation technique. (4 Marks)

4. Describe TWO (2) types of special register in relocatable dynamic partition. (4 Marks)

5. What is the main purpose of compaction in memory allocation technique and why it is needed? (2 Marks)

6. Describe THREE (3) benefits of multithreading in process management. (3 Marks)
7. Describe the relationship of following processor scheduler bound job to CPU cycles and Input/output cycles.
   
   a. Input/output bound job

   b. CPU-bound job

8. Describe process how multilevel processor scheduling deals with the case of aging process.


10. State **FOUR (4)** criteria of a good process scheduling policy.
11. Round robin scheduling heavily depend on its quantum time. What happen if:
   
   a. Quantum time is too large
   
   b. Quantum time is too small

12. Describe THREE (3) benefits of multiprocessing system.

13. Test-and-Set locking mechanism allows process to enter its critical section safely. However there are TWO (2) drawback of using Test-and-Set. Describe them.

14. List the THREE (3) tasks of input/output device traffic controller.
15. Provide **ONE (1)** advantage for each of the following disk seek algorithm: 

   a. FCFS 

   b. Shortest Seek Time First (SSTF) 

   c. C-SCAN (Circular SCAN) 

16. Describe **THREE (3)** characteristics of sequential record organization in file management. 

17. What are the **TWOG (2)** advantages of storing data in noncontiguous storage? 

18. Describe the following intentional unauthorized computer attack: 
   a. Denial of service (DoS) attacks
b. Browsing (2 Marks)

c. Trap doors (2 Marks)
1. The following questions (1a and 1b) are based on the following requested pages:

**Requested pages: A B C B D C A C B A C with 3 page frames**

a. Fill in the table below with FIFO (First In First Out) page replacement policy operation and calculate the number of page fault.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
<th>D</th>
<th>C</th>
<th>A</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
</table>

Page fault = ____________

b. Fill in the table below with LRU(Least Recently Used) page replacement policy operation and calculate the number of page fault.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
<th>D</th>
<th>C</th>
<th>A</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
</table>

Page fault = ____________

2. Apply the following job scheduling algorithms in questions (a) and (b) that follow:

a. Fill in the table with Pre-emptive Shortest Job First (SJF) for exit, turnaround and wait time and draw Gantt chart based on the table and calculate average waiting time.

<table>
<thead>
<tr>
<th>Process</th>
<th>Arrival</th>
<th>CPU Burst</th>
<th>Exit</th>
<th>Turnaround</th>
<th>Wait</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0.0</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>2.0</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>4.0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>5.0</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Gantt chart:
SJF (pre-emptive)

Average waiting time =

b. Fill in the table with Pre-emptive Round Robin algorithm for exit, turnaround and wait time and draw Gantt chart based on the table and calculate average waiting time. Round Robin, quantum = 2

<table>
<thead>
<tr>
<th>Process</th>
<th>CPU Burst</th>
<th>Exit</th>
<th>Turnaround</th>
<th>Wait</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gantt chart:

RR, q=2

Average waiting time =

3. The following questions are based on the event-action table.

<table>
<thead>
<tr>
<th>Event</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Process 1 (P1) request and allocated scanner (R1)</td>
</tr>
<tr>
<td>2</td>
<td>Process 1 (P1) release scanner (R1)</td>
</tr>
<tr>
<td>3</td>
<td>Process 2 (P2) request printer (R2)</td>
</tr>
<tr>
<td>4</td>
<td>Process 3 (P3) is using printer (R2)</td>
</tr>
<tr>
<td>5</td>
<td>Process 3 (P3) request and allocated scanner (R1)</td>
</tr>
<tr>
<td>6</td>
<td>Process 1 (P1) request and allocated for camera (R3)</td>
</tr>
<tr>
<td>7</td>
<td>Process 2 (P2) request for camera (R3)</td>
</tr>
<tr>
<td>8</td>
<td>Process 3 (P3) request for camera (R3)</td>
</tr>
</tbody>
</table>
a. Draw a directed graph based on the event (6 Marks)

b. Is the system deadlocked at event number 7? Provide your reason. (2 Marks)

c. Is the system in deadlock condition in the last events? Provide your reason. (2 Marks)
4. The following questions are related to Linux shell scripting.

   a. Write a script to determine whether a given file exist or not, file name is supplied as a command line argument. The script must also check for sufficient number of command line argument.

      (5 Marks)

   b. Write a script to print the sum of all given numbers, For example, if the given numbers 1, 2, and 3, their sum will be $1+2+3 = 6$.

      (5 Marks)

END OF QUESTIONS