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UNIVERSITI MALAYSIA PERLIS

Peperiksaan Akhir Semester Kedua  
Sidang Akademik 2018/2019

Mac 2019

**DKT221 – Operating System Principle**  
**[Prinsip Sistem Pengoperasian]**

Masa : 3 Jam

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Please make sure that this question paper has **NINE (9)** printed pages including this front page before you start the examination.

*[Sila pastikan kertas soalan ini mengandungi SEMBILAN (9) muka surat yang bercetak termasuk muka hadapan sebelum anda memulakan peperiksaan ini.]*

This question paper has **TWO (2)** Parts.

*[Kertas soalan ini mengandungi DUA (2) Bahagian.]*

**Part A:** This part has **FOUR(4)** questions. Answer **ALL** questions from this section.

*[Bahagian A: Bahagian ini mengandungi EMPAT (4) soalan. Jawab SEMUA soalan dari bahagian ini.]*

**Part B:** This part has **TWO (2)** questions. Answer **ONLY ONE (1)** questions from this section.

*[Bahagian B: Bahagian ini mengandungi DUA (2) soalan. Jawab HANYA SATU (1) soalan daripada bahagian ini]*

**SULIT**

Part A  
[Bahagian A]

Answer ALL questions in this section.  
[Jawab SEMUA soalan dalam bahagian ini.]

Question 1

[Soalan 1]

a) Define operating system.  
[Terangkan maksud sistem pengoperasian]

(4Marks/Markah)

b) Various security problems such as stealing occurs in a multiprogramming and time sharing environment when several users share the system simultaneously. State TWO (2) such problems.  
[Pelbagai masalah keselamatan seperti kehilangan berlaku dalam multi-pengaturcaraan dan persekitaran perkongsian masa, beberapa pengguna boleh berkongsi sistem secara serentak. Nyatakan DUA (2) masalah keselamatan yang boleh berlaku]

(4Marks/Markah)

c) A virtual machine (VM) is a software implementation of a computing environment in which an operating system or program can be installed and run. Explain the main advantage of using virtual-machine architecture for:  
[Mesin Maya adalah implementasi persisian dalam keadaan dimana sistem operasi dapat di masukkan dan dilaksanakan. Terangkan kelebihan utama penggunaan rekabentuk mesin secara maya kepada:-]

i) An operating-system designer  
[Pereka system pengoperasian]

(3Marks/Markah)

ii) A system user  
[Pengguna Sistem]

(3Marks/Markah)

d) Explain THREE (3) major activities of an operating system in memory management.  
[Terangkan TIGA (3) aktiviti utama sistem pengoperasian di dalam pengurusan memori]

(6 Marks/Markah)

### Question 2

[Soalan 2]

a) As a process executes, one job will change from one state to another state once it receives by the system. Draw a complete diagram to show all the states from begin to end.  
 [Apabila suatu proses berjalan, satu kerja dikatakan berubah dari satu keadaan kepada keadaan yang lain apabila ia diterima oleh sistem. Lukis satu gambarajah yang lengkap bagi semua keadaan dari mula hingga akhir.]

(4 Marks/Markah)

b) The goal of scheduling algorithm is to identify the process whose selection will result in the best possible system performance. Discuss how the following pairs of scheduling criteria conflict in certain settings.

[Matlamat algoritma penjadualan ialah untuk mengenalpasti pilihan proses untuk mendapatkan prestasi sistem yang terbaik. Bincangkan bagaimana kriteria penjadualan pasangan berlaku konflik pada tetapan tertentu]

i) CPU utilization and response time  
 [Penggunaan CPU dan masa tindakbalas]

(4Marks/Markah)

ii) I/O device utilization and CPU utilization  
 [Penggunaan peranti I/O dan Penggunaan CPU]

(4Marks/Markah)

c) Explain the process scheduling represented by time line.  
 [Jelaskan penjadualan proses yang diwakili oleh garis masa?]

(4Marks/Markah)

d) Multiprogramming or Multitasking enables more than a single process to apparently execute simultaneously. Justify how is this achieved on a uniprocessor.  
 [Sistem Pengaturcaraan pelbagai atau sistem pelbagai tugas membolehkan lebih daripada satu proses dilaksanakan serentak. Nyatakan kewajaran bagaimana keadaan ini dapat dicapai dalam sistem pemprosesan tunggal]

(4 Marks/Markah)

## Question 3

[Soalan 3]

a) By using a diagram, explain the purpose of the following multithreading model.  
 [Dengan menggunakan gambarajah yang sesuai, terangkan apakah maksud multithreading model berikut]

i) Many-to-One

[Banyak kepada satu]

(4Marks/Markah)

ii) One-to-One

[Satu kepada satu]

(4Marks/Markah)

iii) Many-to-Many

[Banyak kepada banyak]

(4Marks/Markah)

b) Base on the following set of processes in figure 1, with the length of the CPU-burst time given in milliseconds. The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0. Draw and explain gantt charts illustrating the execution of these processes using :

[Pertimbangkan set proses dalam rajah 1 dibawah, dengan menggunakan CPU-burst time yang diberikan. Anggapkan proses akan lengkap seperti turutan P1, P2, P3, P4, P5 dan semua masa 0. Lukiskan dan terangkan carta gant bagi menunjukkan perjalanan proses dengan menggunakan kaedah dibawah:]

i) First Come First Serve (FCFS)

[Pertama datang pertama layan]

(4Marks/Markah)

ii) Shortest Job First (SJF)

[Kerja pendek pertama]

(4Marks/Markah)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Figure 1  
 [Rajah 1]

....5/-

## Question 4

-5-

(DKT221)

[Soalan 4]

a) Explain how semaphores can be used by a server to limit the number of concurrent connections.

[Terangkan bagaimana semaphores boleh digunakan oleh pelayan untuk mengehadkan bilangan sambungan serentak]

(4Marks/Markah)

b) Explain FOUR (4) necessary conditions for deadlock problem.

[Terangkan EMPAT (4) syarat utama penyebab masalah kunci mati]

(4Marks/Markah)

c) A page fault occurs when an access to a page that has not been brought into main memory takes place. Perform an analysis on how many page faults occur for page replacement algorithm for the following reference string in Figure 2, for three page frames :

[Satu kesalahan halaman berlaku apabila akses ke laman yang belum dibawa masuk ke dalam ingatan utama berlaku. Lakukan analisis mengenai berapa banyak halaman kesilapan berlaku bagi algoritma penggantian halaman untuk rentetan rujukan berikut dalam Rajah 2, selama tiga bingkai halaman:]

i) First in first out (FIFO)

[Pertama masuk pertama keluar]

(6Marks/Markah)

ii) Optimum

[Optima]

(6Marks/Markah)

4, 5, 3, 4, 1, 2, 3, 4, 5, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2

**Figure 2**

[Rajah 2]

Answer ONLY ONE (1) questions from this section.  
[Jawab HANYA SATU (1) soalan daripada bahagian ini.]

Question 5

[Soalan 5]

a) Explain the characteristic of real-time system and give three examples of embedded real-time systems.

[Terangkan sifat-sifat sistem masa nyata dan nyatakan tiga contoh sistem masa nyata terbenam]

ATM

Mixture of hardware

Printer

Extreme Stability & safety (7Marks/Markah)

Cell phone

Large & complex

(b) Which of the following components of program state are shared across threads in a multithreaded process? Choose TWO (2) correct answers.

[Komponen yang manakah dikongsi oleh bebenang dalam proses "multithreaded"? Pilih DUA (2) jawapan yang betul.]

(i) Register values  
[Nilai register]

(ii) Heap memory  
[Memori Heap]

(iii) Global variables  
[Pembolehubah sejagat]

(iv) Stack memory  
[Memori Stack]

(4Marks/Markah)

c) Briefly explain the Zombie process in Linux operating system.  
[Terangkan secara ringkas proses Zombie didalam sistem pengoperasian Linux]

(4Marks/Markah)

d) The file manager handles all files on secondary storage media. List Five (5) task must be perform by file manager in file management system.  
[Pengurus fail mengendalikan semua fail pada media storan sekunder. Senarai Lima (5) tugas yang mesti dilaksanakan oleh pengurus fail dalam sistem pengurusan fail]

(5Marks/Markah)

F  
D  
S

....7/-

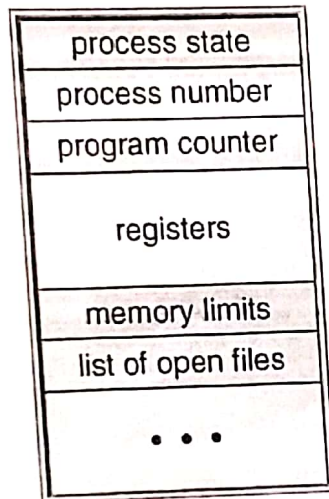
**Question 6**  
**[Soalan 6]**

a) Explain the different between deadlock and starvation.  
*[Terangkan perbezaan antara deadlock dan starvation]*

**(5 Marks/Markah)**

b) Explain with example FOUR (4) necessary conditions for deadlock problem.  
*[Jelaskan bersama contoh EMPAT (4) syarat utama penyebab masalah kunci mati]*

**(5 Marks/Markah)**



**Figure 3**  
*[Rajah 3]*

c) Interpret block diagram in Figure 3 and explain the function of the control system in the operating systems.  
*[Tafsirkan blok diagram dalam Rajah 3 dan jelaskan fungsi sistem kawalan tersebut dalam sistem pengoperasian]*

**(6 Marks/Markah)**

Pseudocode:

```

P:
// while decrementing would drive it negative, sleep.
sem.count--;
while (sem.count < 0) {
    add this process to semaphore queue
    thread_block();
// increment and wake other threads
sem.count++;
if (sem.count <= 0) {

```

**Figure 4**  
[Rajah 4]

d) Figure 4 shows that a pseudo-code of semaphore condition. Explain how the programme work.

*[Rajah 4 menunjukkan pseudo-code keadaan semaphore. Terangkan bagaimana program tersebut bekerja]*

**(4 Marks/Markah)**

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**SULIT**