UNIVERSITI MALAYA
UNIVERSITY OF MALAYA

PEPERIKSAAN IJAZAH SARJANA MUDA SAINS KOMPUTER / SARJANA MUDA TEKNOLOGI MAKLUMAT
EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE / BACHELOR OF INFORMATION TECHNOLOGY

SESI AKADEMIK 2015/2016 : SEMESTER I
ACADEMIC SESSION 2015/2016 : *SEMESTER I*

WXES2113 : Sistem Pengendalian
Operating System

Dis 2015/Jan 2016 Masa: 3 jam
Dec 2015/Jan 2016 *Time: 3 hours*

ARAHAN KEPADA CALON:
INSTRUCTIONS TO CANDIDATES:

Calon dikehendaki menjawab **SEMUA** soalan (50 markah).
*Answer **ALL** questions (50 marks).*

(Kertas soalan ini mengandungi 4 soalan dalam 4 halaman yang dicetak)
(This question paper consists of 4 questions on 4 printed pages)

1. Diberikan keadaan bagi satu sistem seperti berikut:

   Given the following state of a system:

   - Sistem tersebut mempunyai enam proses dan empat sumber.

     The system comprises of six processes and four resources.

   - P0-P5 mewakili set proses.

     P0-P5 denotes the set of processes.

   - R1-R4 mewakili set sumber.

     R1-R4 denotes the set of resources.

   - Jumlah sumber seperti berikut:

     Total resources:

R1	R2	R3	R4
15	6	9	10

Berdasarkan Rajah 1:

Based on Figure 1:

Allocation	R1	R2	R3	R4
P0	2	0	2	1
P1	0	1	1	1
P2	4	1	0	2
P3	1	0	0	1
P4	1	1	0	0
P5	1	0	1	1

(a)

Claim	R1	R2	R3	R4
P0	9	5	5	5
P1	2	2	3	3
P2	7	5	4	4
P3	3	3	3	2
P4	5	2	2	1
P5	4	4	4	4

(b)

Rajah 1: (a) Matriks Peruntukan. (b) Matriks Tuntutan.
Figure 1: (a) Allocation Matrix. (b) Claim Matrix.

a) Kirakan vektor Tersedia.

   Compute the Available vector.

   (2 markah/*marks*)

b) Kirakan Matriks Keperluan.

   Compute the Need Matrix.

   (2 markah/*marks*)

c) Adakah keadaan peruntukan sedia ada selamat? Kenapa? Sekiranya urutan proses adalah P3 - P4 - P5 - P2 - P1 - P0, tunjukkan bagaimana vektor Tersedia berubah apabila setiap proses tamat.

Is the current allocation state safe? Why? If the sequence of the process is P3 - P4 - P5 - P2 - P1 - P0, show how the Available vector changes as each process terminates.

(5 markah/*marks*)

d) Sekiranya permintaan sumber (3, 2, 3, 3) sampai daripada P5, bolehkah permintaan tersebut diberikan? Justifikasikan keputusan anda.

If the request of resources (3, 2, 3, 3) from P5 arrives, will it be corrected to grant the request? Justify your decision.

(6 markah/*marks*)

2. Berikut ialah teknik-teknik pengurusan memori. Jelaskan teknik-teknik tersebut dan bandingkan kekuatan dan kelemahan setiap satu.

Listed below are the memory management techniques. Describe the techniques and compare the strengths and weaknesses for each of them.

a) Segmentasi mudah.

Simple segmentation.

b) Penghalamanan memori maya.

Virtual memory paging.

(8 markah/*marks*)

3. Dalam skema pembahagian tetap, pembahagian memori bersebelahan adalah 150K, 500K, 200K, 300K dan 550K. Jika proses-proses yang memerlukan memori 210K, 450K, 135K dan 425K sampai dalam turutan tersebut, cari peruntukan memorinya menggunakan algoritma **'first-fit'** dan **'best-fit'.**

*In a fixed partitioning scheme, the adjacent memory partitions are 150K, 500K, 200K, 300K and 550K. If the processes requiring memories 210K, 450K, 135K and 425K arrive in this order, find the allocations for the **first-fit** and the **best-fit** algorithms.*

(12 markah/*marks*)

4. Dalam sistem berbilang pengaturcaraan, pelbagai proses wujud serentak dalam ingatan utama. Setiap proses berselang di antara menggunakan pemproses dan menunggu peristiwa berlaku, dan penunjuk kepada sistem berbilang pengaturcaraan ialah penjadualan.

   In a multiprogramming system, multiple processes exist concurrently in main memory. Each process alternates between using a processor and waiting for some events to occur, and the key to multiprogramming system is scheduling.

   a) Apakah perbezaan di antara penjadualan pintas dan tanpa pintas?

      What is the difference between preemptive and non-preemptive scheduling?

      (4 markah/*marks*)

   b) Dengan *round robin*, isu rekabentuk yang utama ialah panjang kuantum masa. Bincangkan kesan saiz kuantum masa.

      With round robin, the principal design issue is the length of the time quantum. Discuss the effect of size of time quantum.

      (3 markah/*marks*)

   c) Bandingkan dan bezakan antara dasar penjadualan *Shortest Process Next (SPN)* dan *Shortest Remaining Time (SRT)*.

      Compare and contrast between Shortest Process Next (SPN) and Shortest Remaining Time (SRT) scheduling policies.

      (4 markah/*marks*)

   d) Diberikan kerja-kerja di bawah yang akan diproses pada pemproses tunggal. Tunjukkan penjadualan dengan menggunakan dasar penjadualan *SPN* dan *SRT* dan hintungkan masa putaran kerja bagi setiap proses.

      Given the following jobs that are to be processed on a single processor. Show the schedule using the SPN and SRT scheduling policies and compute the turnaround time for each of the processes.

Proses *Process*	Masa Pemprosesan (ms) *Processing Time (ms)*	Masa Ketibaan (ms) *Arrival Time (ms)*
P1	4	0
P2	12	2
P3	8	6
P4	6	16
P5	10	20

      (4 markah/*marks*)

TAMAT
END