University of Sargodha

BS 5th Term Examination 2016

Subject: Computer Science **Paper: Operating System (CMP:3621)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part (Compulsory)

Q. No. 1 Write short answers of the following in 2-3 lines each. (16*2)

i. What is system call to create child process?
ii. Define context switch.
iii. Thread Control Block
iv. Multi-threading
v. Virtual machine
vi. Time Sharing Systems
vii. Kernel
viii. Define livelock. What is difference between deadlock and livelock?
ix. What is semaphore? What is its use?
x. Mutual exclusion
xi. Define Starvation
xii. Define monitor. What does it consists of?
xiii. Multi-threading
xiv. "page" and "frame"
xv. Time Sharing Systems
xvi. "reference bit" and "dirty bit"

Subjective Part (4*12)

Q. No. 2. Discuss the critical section problem. Solve the dining philosopher's problem. (12)

Q. No. 3. Write a note on the following with block code. (I) Reader Writer Problem (II) Bounded Buffer Problem (12)

Q.No.4. Compare the main memory organization schemes of contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues: (12)
i. external fragmentation ii. internal fragmentation iii. ability to share code across processes

Q. No.5. Consider a file system that uses a modified contiguous-allocation scheme with support for extents. A file is a collection of extents, with each extent corresponding to a contiguous set of blocks. A key issue in such systems is the degree of variability in the size of the extents. What are the advantages and disadvantages of the following schemes? (12)
a. All extents are of the same size, and the size is predetermined.
b. Extents can be of any size and are allocated dynamically.
c. Extents can be of a few fixed sizes, and these sizes are predetermined.

Q. No. 6. Consider a system where free space is kept in a free-space list.
a. Suppose that the pointer to the free-space list is lost. Can the system reconstruct the free-space list? Explain your answer.
b. Consider a file system similar to the one used by UNIX with indexed allocation. How many disk I/O operations might be required to read the contents of a small local file at/a/b/c1 Assume that none of the disk blocks is currently being cached.
c. Suggest a scheme to ensure that the pointer is never lost as a result of memory failure.

Q.No. 7 (a) Why doesn't D{kt,, N) (E{kd. N)(m)) provide authentication of the sender? To what uses can such an encryption be put? (6)
(b) Buffer-overflow attacks can be avoided by adopting a better programming methodology or by using special hardware support. Discuss these solutions. (6)