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UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

SUPPLEMENTARY EXAMINATION, *JULY 2016*

Title of Paper	:	**Operating Systems**
Course Number	:	**CS 442**
Time Allowed	:	**Three (3) Hours**
Instruction	:	**Answer any FIVE questions**

This exam paper should not be opened until permission has been granted by the invigilator.

1.

a) Describe the features of a resource manager (operating system). **[8]**

b) Differentiate between the monolithic and a layered operating systems. **[12]**

2.

a) Compare and contrast race conditions and critical regions. **[10]**

b) Discuss starvation in relation to busy waiting. **[10]**

3.

a) Briefly describe the four necessary conditions for a deadlock. **[8]**

b) Discuss the strategies for dealing with deadlocks. **[12]**

4.

a) Describe safe and unsafe states of processes. **[12]**

b) Discuss the implications of these two states with respect to the processes running to completion. **[8]**

5.

a) Describe three algorithms for linked list memory allocation management. **[6]**

b) Derive the expression for memory fraction occupied by "holes" (swap space). **[9]**

c) Hence or otherwise compute this fraction for a hole mean size of half. **[5]**

6.

a) Why is the buddy system said to be faster than many other search systems? **[6]**

b) Much as it is faster, why is it considered to be less efficient? **[6]**

c) Discuss the NRU and the clock page replacement algorithms. **[8]**