CS3204 Operating Systems - Fall 2000
Instructor: Dr. Craig A. Struble
Homework 4

Assigned: Thursday, Oct. 26, 2000   **Due:** Thursday, Nov. 2, 2000

1. *[6 pts.]* Exercise 1 in Nutt, Chapter 11.

2. *[5 pts.]* Exercise 3 in Nutt, Chapter 11. Your answer must be written concisely and in complete sentences.

3. *[10 pts.]* Suppose there is a process P split up into 9 modules. The memory usage of each module is contained in the following table.

Module	Memory
A	33
B	27
C	17
D	30
E	20
F	42
G	5
H	14
I	10

Suppose that the modules depend on each other in the following way: A depends on B and F, B depends on C and D, D depends on E, F depends on G and H, and G depends on I.

1. How much memory is required to execute P using single contiguous memory?

2. Using the overlay memory management technique:

   (a) Draw a block diagram showing the memory usage of process P, using the most space efficient memory layout for the modules.

   (b) How much memory is required to execute P?

   (c) Assume that main memory is exactly the size needed to execute P. Give a list of overlays in memory when internal fragmentation arises.

   (d) How much memory is unused due to fragmentation?

4. *[4 pts.]* Suppose a pure paging memory management technique is being used to allocate byte addressable primary memory. The page and block sizes are 512 bytes.

   1. How many pages are needed for a process with a 41967 byte address space?

   2. If a process accesses virtual address $\langle 3927, 492 \rangle$, what compiled address was accessed?

5. *[5 pts.]* Which kind of fragmentation is more problematic in pure paging systems and why?