

# EECS 343: Homework 2

## Memory Management and Virtual Memory

Fall 2014

### Important Dates

**Out:** October 20, 2014.

**Due:** October 27, 2014 (11:59PM CST).

**Submitting your assignment:** Please use the course submission site. There is a link to it from the class site.  
**Submit only ASCII text files.**

### Problems

1. Consider a swapping system in which memory consists of the following hole sizes in memory order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB, 9 KB, 12 KB, and 15 KB. Which hole is taken for successive segment requests of

- (a) 12 KB
- (b) 10 KB
- (c) 8 KB

for First Fit? Now repeat the question for Best Fit, Worst Fit, and Next Fit.

2. What is the difference between a physical address and a virtual address?
3. A computer has four page frames. The time of loading, time of last access and the  $R$  and  $M$  bits for each page are as shown below (the times are in clock ticks):

Page	Loaded	Last ref.	R	M
0	126	280	1	0
1	230	265	0	1
2	140	270	0	0
3	110	285	1	1

For each of these algorithms, Which page will be replaced?

- (a) NRU:
- (b) FIFO:
- (c) LRU:

(d) Second Chance:

4. You are given the following data about a virtual machine system:

- (a) The TLB can hold 1024 entries and can be accessed in 1 clock cycle (1 nsec)
- (b) A page table entry can be found in 100 clock cycles or 100 nsec
- (c) The average page replacement time is 6 msec

If page references are handled by the TLB 99% of the time and only 0.01% lead to a page fault, what is the effective address-translation time?

5. When segmentation and paging are both being used, as in MULTICS, first the segment descriptor must be looked up, then the page descriptor. Does the TLB also work this way, with two levels of lookup?