CS 347 QUIZ 6 (September 15, 2016)

Name: _____ ***Roll No.*** _____

1. Consider a system with paging-based memory management, whose architecture allows for a 4GB virtual address space for processes. The size of logical pages and physical frames is 4KB. The system has 64 GB of physical RAM. Each page table entry must store 6 bits of flags per page, in addition to the frame number. Assume that page table entries are rounded up to the nearest byte.

a. Given these specifications, calculate the amount of memory required to store all the page table entries of one process in contiguous memory.

b. If the OS uses hierarchical paging, what is the total size of the page table of a process, including outer and inner page tables?

2. Consider the scenario of the previous question. Suppose the OS used an inverted page table instead, with each inverted page table entry having the page number and a process identifier of 16 bits. What would be the size of the inverted page table in the system?

3. Consider the previous two questions. What is the minimum number of processes N in the system for which the memory consumed by all hierarchical page tables will be greater than the memory consumed with an inverted page table design?

4. Consider a system with a 6 bit virtual address space, and 16 byte pages/frames. Below is given the page table of a process.

Page number	Frame number
0	8
1	3
2	11
3	1

Translate the following virtual addresses to physical addresses. Note that all addresses are in decimal. You may write your answer in decimal or binary.

a. 20

b. 40