2. b) Here the issue is not the computer system, but the test program. This program is not the best test to check the speed of a system. The appropriate test would need to start many parallel processes to check the effect of the new elevator algorithm.

4. c) With 8K pages, 13 bits are needed for the offset, since 213 = 8192 = 8K. That will leave 3 bits for the page number.

d) Page = decimal virtual address/page size

Offset = decimal virtual address – (Page \* page size)

**20000:** page = 20000/8192 = 2.44 = 2 pages

Offset = 20000 – (2\*8192) = 20000 – 16384 = 3616

20000 = (2, 2616)

**32768:** page = 32768/8192 = 4 pages

offset = 32768 – (4\*8192) = 32768 – 32768 = 0

32768 = (4, 0)

**54000:** page = 54000/8192 = 6.59 = 6 pages

offset = 54000 – (6\*8192) = 54000 – 49152 = 4488

5400 = (6, 4488)

**60000:** page = 60000/8192 = 7.32 = 7 pages

offset = 60000 – (7\*8192) = 60000 – 57344 = 2656

60000 = (7, 2656)

5. d) 22658 address in virtual memory will correspond to the entry 22658/4096 which is the 5th entry. In the page table, entry 5 points to 3 in physical address space. Offset will be 22658 % 4096 = 2178. The virtual address 22658 will point to 3\*4096 + 2178 = 14466