所別：<u>網路學習科技研究所碩士班　不分組</u>科目：<u>計算機結構</u>

1. Describe each of the following terms: (30%)

   (1) Moore's Law
   (2) End-around carry
   (3) Big-Endian and Little-Endian Formats
   (4) Pseudo-ops
   (5) Locality principle
   (6) DMA

2. Convert the following numbers as indicated, using as few digits in the results as necessary. (20%)

   (1) $(-27)_{10}$ to excess 32 in binary
   (2) $(10110.101)_2$ to base 10
   (3) $(132.2)_4$ to base 16
   (4) Show the ten's complement representation for $(-305)_{10}$ using three BCD digits.

3. Write an ARC subroutine that performs a swap operation on the 32-bit operands x=25 and y=50, which are stored in memory. Use as few registers as you can. (10%)

4. A computer has 16 pages of virtual address space but only four physical page frames. Initially the physical memory is empty. A program references the virtual pages in the order 0 2 4 5 2 4 3 11 2 10. (10%)
   (a) Which references cause a page fault with the LRU page replacement policy?
   (b) Which references cause a page fault with the FIFO page replacement policy?

5. Compute hit ratio and effective access time for a program that executes from memory locations 48 to 95, and then loops 10 times from 15 to 31, as shown in the following Figure. The direct mapped cache has four 16-word slots, a hit time of 80 ns, and a miss time of 2500 ns. Load-through is used. The cache is initially empty. (15%)



Main Memory
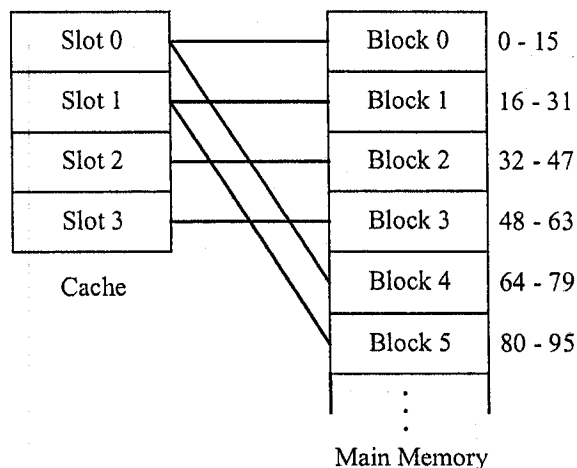
6. Construct a checksum and parity bits for ASCII characters 'A' through 'H' using combined LRC and VRC checking with even parity. (Hint: The ASCII 'A' is '1000001') (15%)