國立雲林科技大學 115 學年度 碩士班招生考試試題

系所：資工系

科目：計算機概論(1)

(Note: Your answers may be written in Chinese or English.)

1. Please describe the concept of a process by using the concept of a program. Describe the states of a process as well. (10%)

2. What conditions, which hold simultaneously in a system, will enable a deadlock situation? (5%)

3. A file's attributes vary from one operating system to another. Please list typical OS attributes. (5%)

4. The information in a file can be accessed in several ways. Please describe what kinds of access methods that are frequently used. (5%)

5. IEEE 754 floating-point conversion (7%)
   The representation of a single precision floating-point number in IEEE 754 standard contains one sign bit ***s***, 23 significand bits, and 8 exponent bits ***E***, as Figure 1 shows, and takes the value of $(-1)^s \times (1 + significand) \times 2^{(E-127)}$. What is the decimal value of the following representation? (10%)

   11000000011000000000000000000000

s	exponent	significand

Figure 1

6. Clock cycle time calculation (6%)
   The pipeline of the Figure 2 has the propagation times: 45 ns for the operands to be read from memory into registers R1, R2 and R4, 45 ns for the signal to propagate through the multiplier, 5 ns for the transfer into R3, and 20 ns to add the two numbers, and 5 ns for the transfer into R5. What is the minimum clock cycle time that can be used for this circuit?

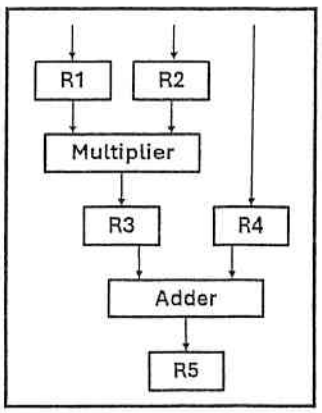

Figure 2

7. Short-Answer Questions: Terminology Definitions (Total 12%, 3% per question)
   (a) Benchmark suites:
   (b) Locality of Reference:
   (c) WAR:
   (d) Software pipelining:

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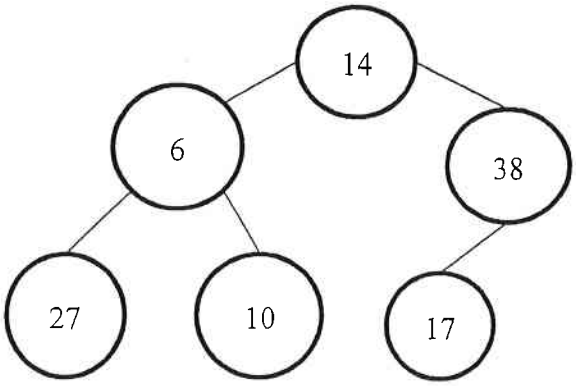
8. Given the following numbers: 90, 70, 45, 65, and 15, apply the Straight insertion sort algorithm to sort these numbers in ascending order **step by step**. (10%)

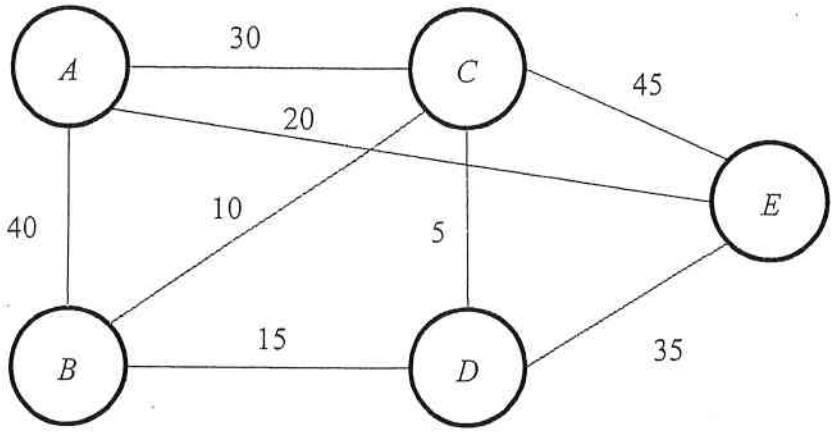
9. Consider the following binary tree. (Total 10%, 5% per question)



(a) Construct the heap of it **step by step**.

(b) Based on the heap you have just constructed in Question 9(a), apply the Heap sort algorithm to this heap **step by step**.

10. For the following graph, find a minimum spanning tree of it by the Kruskal's algorithm **step by step**. (10%)



11. Please write a function in C, C++, or Java that accepts two integer parameters, n and m, and calculates the greatest common divisor (GCD) of n and m. (10%)

12. Compute A^{-1} if $A = \begin{bmatrix} 1 & 1 & 1 \\ -1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$ using the Gauss-Jordan reduction. (10%)