

國立屏東教育大學 100 學年度研究所碩士班入學考試

計算機概論試題

(資訊科學系碩士班資訊科學組)

- ※請注意：1.本試題共二頁。
2.答案須寫在答案卷上，否則不予計分。

一、選擇題（單選題，每題 5 分，共 50 分，每題答錯倒扣 3 分）

1. At what “stage” of analysis is the meaning of the word ball in the following sentence determined?
A. Syntactic analysis B. Semantic analysis C. Contextual analysis
2. Which of the following is not a role of a typical operating system?
A. Control the allocation of the machine’s resources
B. Control access to the machine
C. Maintain records regarding files stored in mass storage
D. Assist the computer user in the task of processing digital photographs
3. If a stack contained the entries w, x, y, z (from top to bottom), which of the following would be the contents after two entries were removed and the entry r was inserted?
A. w, x, r B. y, z, r C. r, y, z D. r, w, x
4. Which of the following mass storage system does not require physical motion?
A. Magnetic tape B. Magnetic disk C. DVDs D. Flash drives
5. Which of the following systems is least efficient when encoding numeric values?
A. Two’s complement notation B. Excess notation
C. ASCII D. Floating-point notation
6. The precise time complexity of which of the following problems has not yet been established by researchers?
A. Sorting a list
B. Searching through a list for a particular entry
C. The traveling salesman problem
D. Listing all possible subcommittees within a given committee
7. Which of the following is not a means of obtaining a form of multitasking?
A. Pipelining B. Time sharing C. Virtual memory D. Multiple processors
8. Which layer of the TCP/IP hierarchy presents incoming messages to the computer user?
A. Application B. Transport C. Network D. Link

9. When searching within the list “Lewis, Maurice, Nathan, Oliver, Pat, Quincy, Roger, Stan, Tom”, which of the following entries will be found most quickly using the sequential search algorithm?
A. Lewis B. Pat C. Tom
10. Which of the following is not a means of connecting networks?
A. Switch B. Server C. Router D. Bridge

二、問答題 (共 50 分)

1. Convert the following expression into:

$$X = \frac{A - B + C * (D * E - F)}{G + H * K}$$

- (1) Prefix. (5 分)
- (2) Postfix. (5 分)
2. Write an algorithm to output the height of a binary tree. (10 分)
3. Write an algorithm to count the number of nodes in a binary tree. (10 分)
4. Create the max heap for the following input list: (25, 18, 72, 3, 50, 42, 36, 54, 12, 8). (10 分)
5. Suppose we have a processor with a base CPI (Clock cycles per instruction) of 1.0 and a clock rate 10 GHz (1 GHz = 10^9 Hz). Assume the main memory access time of 80 ns (1 ns = 10^{-9} seconds) and the secondary cache access time of 4 ns. Suppose the miss rate per instruction at the primary cache is 4%. After the secondary cache is added, the miss rate to main memory is reduced to 1%.
- (1) What is the total CPI of executing an instruction for the processor with one level of caching? (5 分)
- (2) What is the total CPI of executing an instruction for the processor with two levels of caching? (5 分)