

國立屏東科技大學八十八學年度碩士班招生考試 計 算 機 概 論 試 題

1. (1) Please explain what "race condition" is? (3%)
 - (2) One solution to solve race conditions is the use of semaphores in an operation system. What is a semaphore? Describe its P, V operations? (5%)
 - (3) A binary semaphore is a semaphore whose integer can range only between 0 and 1. Show how a general semaphore can be implemented using binary semaphores? (7%)
2. (1) Please explain what a "deadlock" is? Give an example of deadlock, which is not related to a computer system environment? (3%)
 - (2) When a deadlock happens, the system must recover from the deadlock. Please give at least two ways for breaking a deadlock? (3%)
 - (3) What is the main difference between starvation and deadlock? (3%)
 - (4) Can a system detect that some of its processes are starving? If the answer is yes, explain how; if the answer is no, how the system can deal with starvation problem? (3%)
 - (5) Design an algorithm for crossing the river such that deadlock and starvation are not possible. (5%)
3. (1) Explain the concept of virtual memory? (3%)
 - (2) Virtual memory is commonly implemented by demand paging. Explain what the demand paging is, and its advantages and disadvantages? (4%)
 - (3) There are a large number of algorithms for implementing demand paging. Please give two popular ones. (3%)
 - (4) Suppose we have a demand paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or the replaced page is not dirty, and 20 milliseconds if the replaced page is dirty. Memory access time is 1 microsecond.
Now, assume that the page to be replaced is dirty 70 percent of the time, what is the maximum acceptable page fault rate for an effective access time of no more than 2 microseconds? (3%)
4. (1) Please indicate the advantages of DBMS (Database Management Systems), compared to traditional file systems? (4%)
 - (2) Give and explain the characteristics of three kinds of database models, and analyze their advantages and disadvantages? (3%)

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5. There are mainly three ways of parameter passing in implementing a subroutine call. Please use the following example to explain "call by value", "call by address", and "call by name". Give also the values of X after the main program is executed. (8%)

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MAIN( )                SUB(X, Y, Z)
{
    A = 2;              Y = Y + 1;
    B = 3;              Z = Z + X;
    SUB(A + B, A, A);   }
}

```

6. (1) Explain the 7-layer OSI (Open System Interconnection Reference Model) defined by ISO (International Standards Organization)? (5%)
 (2) What is the layer structure of Internet protocol? Describe the corresponding layer relationships between the Internet Protocol and the 7-layer OSI? (5%)
7. (1) Explain briefly what the E-Commerce is? (3%)
 (2) EDI (Electronic Data Interchange) is one kind of E-commerce. Explain what EDI is, and analyze the corresponding advantages? (4%)
8. (1) Ethernet is the most popular LAN used nowadays. Describe Ethernet in terms of its network topology and access control method, then analyze its advantages and disadvantages? (5%)
 (2) Explain what ATM is and why we need it? (4%)
 (3) Bill Gates has recently proposed the concept of "Digital Nervous System". Briefly describe this concept. (4%)