

# 大同大學 98 學年度研究所碩士班入學考試試題

考試科目：系統程式

所別：資訊工程研究所

第1/1頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. Explain and differentiate (make an example, if necessary) the following terms:  
12% (a) *Direct addressing* and *Indirect addressing mode*  
(b) *Program Counter* and *Location Counter*  
(c) *Program Block* and *Control Section*  
(d) *CISC* and *RISC*
2. (a) Briefly describe why and when do we need to use one-pass assembler and multi-pass assembler.  
8% (b) What is the main problem in trying to assemble a program in one-pass assembler?
3. (a) What are the major data structures used by a two-pass assembler?  
8% (b) What are the basic tasks to be performed by each pass of the two-pass assembler?
4. (a) What is the difference between "*Linking loader*" and "*Linkage editor*"? Draw the diagrams and explain it.  
8% (b) What is "*dynamic linking*"? Make an example to explain it.
5. (a) What main functions does a Macro Processor involve?  
8% (b) How should a programmer decide whether to use a *Macro* or a *Subroutine* to accomplish a given logical function?
6. Using the following BNF grammar to construct a parse tree for the statement below.  
10%  

```
<id-list> ::= id | <id-list>, id
<assign> ::= id := <exp>
<exp> ::= <term> | <exp> + <term> | <exp> - <term>
<term> ::= <factor> | <term> * <factor> | <term> DIV <factor>
<factor> ::= id | int | (<exp>)
```

*statement* → SEGAMA := ALPHA \* BETA + GAMMA DIV 10
7. Define the essential properties of the following types of operating systems:  
12% (a) Batch (b) Interactive (c) Time sharing (d) Real time
8. (a) What resources are used when a thread is created?  
8% (b) How do they differ from those used when a process is created?
9. Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources.  
8% (a) Is it possible to cause a deadlock in this system?  
(b) Show the situation to prove your answer on problem (a).
10. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order).  
8% (a) How would each of the *First-fit*, *Best-fit*, and *Worst-fit* algorithms place processes of 250K, 430K, 125K, and 410K (in order)?  
(b) Which algorithm makes the most efficient use of memory?
11. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:  
10%

<i>Process</i>	<i>Burst Time</i>	<i>Priority</i>
$P_1$	8	3
$P_2$	1	1
$P_3$	2	3
$P_4$	1	4
$P_5$	5	2

The processes are assumed to have arrived in the order  $P_1, P_2, P_3, P_4, P_5$ , all at time 0. Draw four Gantt charts illustrating the execution of these processes using *FCFS*, *SJF*, a *nonpreemptive priority* (a smaller priority number implies a higher priority), and *RR* (quantum = 1) scheduling.