一、(a). Please give the model of a LR parser. (5%)

   (b). Please give the definition of LR(0) and LR(1) item and their physical meanings. (5%)

   (c). Please find the LR(0) states and its parsing table for the following "dangling-else" grammar.

   S' --> S

   S --> i S e S

   S --> iS

   S --> a   (15%)

二、Short-circuit code method is one of methods of translating boolean expression.

   (a). Please translate the following high level language statement into quadruple code.

   WHILE (A AND B OR NOT C) { X = Y }

   (note : you can use any kind of quadruple code, but the meaning should explain clearly.)   (10%)

   (b). The grammar in (a) can be as the following form:

   while-loop --> WHILE exp { statements }

   Please give a translation schema that can generate the code given in (a).

   (hint: (1) the grammar should be changed, and new grammartical symbol should be added.
   (2) exp and statements are considered as terminals.
   (3) you can assume that you can get some information when exp or statements is recognized.) (10%)

三、(a). Please describe the work to be done by a personal computer from the power is turned on to the prompt of MS_DOS is on the screen. (3%)

   (b). Which part of the work in (a) can be considered as a loader. (2%)

四、(a). Give an example for trap, hardware interrupt, and software interrupt respectively. (5%)

   (b). What kind of the information is needed for a disk controller to finish DMA (Direct Memory Access) operation. (5%)

五、(a). Under the environment of the client-server architecture, explain why the *thread* concept is so important. (5%)

   (b). Illustrate the differences between user-level and kernel-level threads. (5%)

六、(a). Explain the effects of the length of time slice on response and turnaround times. (5%)

(b). On concurrent atomic transactions, explain the differences between a serial schedule and a conflict serializable schedule. (5%)

七、Consider a demand-paging system with the following time-measured utilizations:

CPU utilization	20%
Paging disk	97%
Other I/O devices	5%

Which (if any) of the following will (probably) improve CPU utilization? Explain your answer.

a. Install a slower CPU.

b. Install a bigger paging disk.

c. Increase the degree of multiprogramming.

d. Decrease the degree of multiprogramming.

e. Install more main memory.

f. Install a faster hard disk, or multiple controllers with multiple hard disks.

g. Add prepaging to the page fetch algorithms.

h. Increase the page size
(10%)

八、(a). Explain how the data structure of a *hash table* is used for a file directory. You must at least specify the input and output of the hash function. (5%)

(b). Can the Trojan Horse attack work in a system protected by capabilities ? (5%)