1. Your company is building a distributed operating system and you are asked to develop a scheme for dealing with the deadlock problem. What schemes can be used and why? (10%)

2. Sketch a truth table and logic gates of a binary adder for a 2-bit addition. (10%) And, explain how it works for 11_2+01_2. (5%)

3. What's the e-commerce? (5%) Describe the differences between a traditional commerce and an e-commerce, and the problems in the current e-commerce. (10%)

4. What's EDP (Electronic Data Processing)? (5%) What's difference between On-line Processing System and Real-Time Processing System? (5%)

5. Please define *Hash* searching. And, how do you resolve the **collision** problem? (5%) Give examples to illustrate your answers. (5%)

6. Assume the following operand notation: (20%)
   Rx refers to register *x* in register mode.
   #n refers to the number n in immediate mode.
   (n) refers to the number n used in direct mode.
   (Rx) refers to register *x* in register deferred mode, i.e. as an address.
   n(Rx) refers to register *x* and immediate n in displacement mode.
   @(Rx) refers to register Rx in indirect mode, i.e. as an address of an address.
   Given that register R7 contains 100 and that memory location 100 contains 1000, describe as precisely as you can what the value is in the destination (Rx) at the end of each following LDW (Load a Word) instruction:

```
LDW    R1, #100
LDW    R2, (100)
LDW    R3, (R7)
LDW    R4, @(R7)
LDW    R5, 100(R7)
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7. Show five interrupt types. (5%) How does the operating system deal with an interrupt? (5%)

8. ABC Computer Company releases the ABC2 computer. It is just like the ABC1, but contains an improve divider which doubles the performance of the divide instructions. If divides make up 10% of the ABC2 execution time, what is the speed-up with ABC2? (10%)