

每題 20 分:

1. Devise an algorithm to solve the Fibonacci's rabbit problem and prove formally that your algorithm is correct.
2. How the computer system does the concurrent execution?
3. Give some important general properties of problems and some general techniques for solving them.
4. Give some examples to show and to explain the usage of tree structures in computer science.
5. Use the following hypothetical computer to implement an iterative algorithm for computing the factorial of a positive integer n :
 - (.) One word size is 16 bits;
 - (.) Each memory location has an address of 12 bits;
 - (.) Use the two's-complement representation for signed numbers;
 - (.) The central processing unit consists of three registers; the accumulator with 16 bits; the condition code register with 2 bits; and the instruction address register with 12 bits;
 - (.) The instruction set is shown as in the following:

Operation-Code	Mnemonic	Instruction
1	LDA	load accumulator
2	STA	store accumulator
3	ADD	add
4	SUB	subtract
5	MUL	multiply
6	DIV	divide yielding integer quotient
7	MOD	divide yielding remainder
8	CMP	compare
9	JMP	unconditional jump
A	JLT	jump if less than
B	JEQ	jump if equal to
C	JGT	jump if greater than
D	IN	input
E	OUT	output
F	HALT	halt