

計算機概論與演算法 Introduction to Computers and Algorithms

1. (40%, 2 points for each problem) Please define the following terms and explain the content, purpose, and application of each term and give an illustrative example if possible. If possible, define the term in mathematical equation. If it is an acronym, please write the full name. For example: SSD: Solid-State Drive: A solid-state drive (SSD) is a storage device that typically uses flash memory to store data, instructions, and information. Flash memory contains no moving parts, making it more durable and shock resistant than other types of media. SSDs offer higher input/output rates and lower latency, but are slightly more expensive for the same capacity. For this reason, manufacturers typically offer SSDs as an option instead of hard disks in their laptops, tablets, and desktops.

(1) NP complete (2) palindrome (3) SVM: Support Vector Machine (4) NTFS file system (5) thread in operating system (6) GPU (7) AI (8) HTTPS (9) HTTP cookie (10) DNS: Domain Name System (11) OOP (12) Turing test (13) VPN (14) TCP/IP (15) SQL (16) DHCP: Dynamic Host Configuration Protocol (17) hash function (18) MST: Minimum Spanning Tree (19) black-red tree (20) heap data structure

2. (8%) Please draw the binary tree for the expression “ $(A * (E / (B - F))) * (A + B) / D$ ” and write prefix and postfix forms.

3. (6%) Please draw the binary search tree after successively inserting keys 3, 9, 8, 6, 5, 4, 1, 2, 7 into an initially empty tree.

4. (8%) Please write the four conditions for deadlock in operating system.

5. (6%) Please write decimal -19.375 in two’s complement.

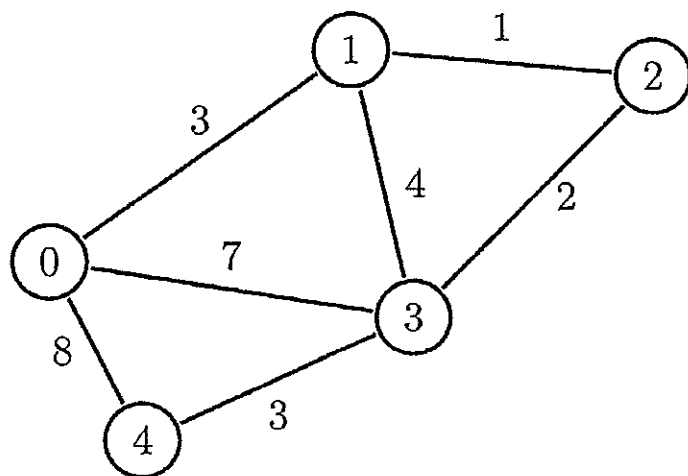
6. (6%) Please write the recursive pseudo code Hanoi(from, to, temp, N) to solve Tower of Hanoi problem.

7. (6%) Please write full name of GPT in ChatGPT. What are the differences, advantages, and disadvantages of GPT compared with Convolutional Neural Network (CNN)?

8. (6%) A von Neumann architecture consists of which 4 main components?

9. (8%) Please write full name of OSI model, list the 7 layers and explain their functions in detail.

10. (6%) Please write search order of Breadth-First Search (BFS) from Node 1.



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