

淡江大學 101 學年度碩士班招生考試試題

66-1

系別：資訊工程學系

科目：資訊概論

考試日期：2月26日(星期日) 第4節

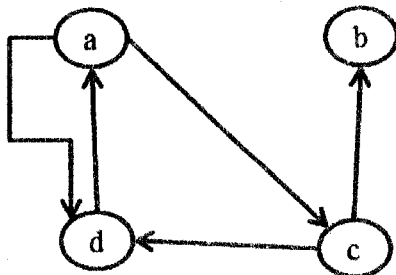
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本試題雙面印刷

1. Chang the following IP address in IPv4 from binary notation to dotted-decimal notation. (10%)

- (1) 01111110 11110001 01100111 01111111
- (2) 10111111 11001100 11100000 00000101
- (3) 11110001 00001110 11100111 00000011
- (4) 11111101 00000000 11100011 10001111

2. Please find the adjacency-matrix for the given directed graph. On the given directed graph, compute the transitive closure by using Floyd-Warshall algorithm. Please briefly illustrate your solution. (20%)



3. Multiple-Choice Questions (10%)

- (1) Which physical topology uses a hub or switch? (a) bus (b) ring (c) star (d) all of the above.
- (2) The _____ layer of the TCP/IP protocol suite is responsible for source-to-destination delivery of the entire message. (a) transport (b) network (c) data-link (d) session.
- (3) _____ is a protocol for file transfer. (a) FTP (b) SMTP (c) TELNET (d) HTTP.
- (4) The _____ layer of the TCP/IP protocol suite is responsible for node-to-node delivery of a frame between two adjacent nodes. (a) transport (b) network (c) data-link (d) session.
- (5) Which of the given problems are not in the Class P? (a) A problem with complexity $1000n^2+99n$. (b) A problem with complexity n^5 . (c) A problem with complexity $3n$. (d) A problem with complexity $n!$.

4. Create an ER diagram to design a relational database that stores data about the courses taught at a university, the professors who teach those courses, and the students who takes the courses. (10%)

5. Suppose that you adopts the HEAPSORT algorithm to sort the array $A = [5, 13, 2, 25, 7, 17, 20, 8, 4]$ in decreasing order.

- (1) Draw the max-heap tree that you build in the beginning. (10%)

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66-2

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- (2) Illustrate the sorting process using HEAPSORT by showing the changing process of your max-heap tree. (10%)
6. Please reduce the Boolean expression $xz+x'y+yz$ by using the Karnaugh map, where x , y , and z are Boolean variables. (5%) Then draw the logic circuit diagram for your reduced Boolean expression. (5%)
7. Consider the RSA public key ($n=187$, $e=13$), please find the value of the private key d by using the extended Euclid algorithm. (10%)
8. Answer the following questions.
- (1) A computer uses isolated I/O addressing. Its memory has 1024 words. If each I/O controller has 16 registers, how many controllers can be accessed by this computer. (5%)
- (2) A computer uses memory-mapped I/O addressing. The address bus uses 10 bits. If memory is made up of 1000 words, how many 4-register I/O controllers can be accessed by this computer. (5%)