

考 試 科 目	計算機概論 51523	所 別	數位內容碩士學位學程 資訊技術組	考 試 時 間	2 月 27 日 (六) 第三節
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以下問題可用中文或英文回答。

1. (10 points; 2 points for each) True or False. Please write O (for true) or X (for false) as an answer to each of the following statements.

- (1) TCP (Transmission Control Protocol) is a core protocol of the Internet Protocol Suite, because it provides the fast connectionless service by exchanging packets without acknowledgements or guaranteed delivery.
- (2) Data structures *queue* and *stack* behave in the same way, because they both are used to hold a collection of data items and allow data items to be inserted into as well as removed from a collection in an arbitrary order.
- (3) The performance of a computer program depends on various components, such as the algorithm, the programming language, the compiler, the operating system, the hardware, etc.
- (4) For solving a problem, the divide-and-conquer approach first divides the given problem into sub-problems, conquers or solves each sub-problem, and then combines solutions for sub-problems into a solution for the given problem.
- (5) Typically speaking, there are five steps to transform a C program stored in a file into a program running in memory: Preprocessing, Assembling, Compiling, Linking, and Loading.

2. (30 points; 3 points for each) Single Selection. Please select one of the choices for each of the following questions.

- (1) Which one of the following binary numbers is equivalent of the Octal value 111?  
(a) 1100110; (b) 1001101; (c) 1001001; (d) 1001100
- (2) What is the smallest integer represented by 8 bits in two's complement format?  
(a) -127; (b) -128; (c) -255; (d) -256
- (3) What is the largest integer represented by 8 bits in two's complement format?  
(a) 127; (b) 128; (c) 255; (d) 256
- (4) Which one of the following sorting algorithms is the most efficient one in the worst case?  
(a) Selection sort; (b) Quick sort; (c) Merge sort; (d) Insertion sort
- (5) Which the following expressions will be TRUE if A and C are both TRUE and B is FALSE?  
(a) A XOR (B XOR C); (b) B XOR A; (c) B OR (NOT A AND C); (d) C AND B
- (6) Which one of the following techniques is the most similar to the technique of web proxy?  
(a) Cache; (b) Virtual machine; (c) Multi-core processors; (d) Cloud computing
- (7) Which one of the following methods is the best way to select a pivot key for quick sort?  
(a) Mode; (b) The largest number; (c) The smallest number; (d) Median
- (8) Which one of the following programs is NOT a compiler?  
(a) GNU Compiler Collection; (b) Firefox; (c) Javac; (d) Psyco
- (9) Which one of the following programming languages is NOT an object-oriented programming language?  
(a) Java; (b) Fortran; (c) C#; (d) Python

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(10) Why the IP address, 140.119.70.256, is INCORRECT?

- (a) It has too few parts;
- (b) It contains an invalid value;
- (c) The numbers should add up to an even number;
- (d) The last number should end with 254.

3. (25 points; 5 points for each) **Term Explanations.** Describe the technical terms in detail.

- (1) CPU (Central Processing Unit)
- (2) VPN (Virtual Private Network)
- (3) DNS (Domain Name System)
- (4) SaaS (Software as a Service)
- (5) PaaS (Platform as a Service)

4. (15 points) What are the three characteristics of object-oriented programming? Please also describe each of the characteristics in detail.

5. (10 points) Model-View-Controller (MVC) is a popular software architectural pattern for implementing web applications. Please describe the concepts of the design pattern in detail.

6. (10 points; 5 points for each) **Digitization.**

- (1) What is the difference between the following two digital image files: Bitmap and Vector Images?
- (2) Calculate the file size of a greyscale digital image in pixel 1024x768. (1KB = 1024 bytes)

備註

- 一、作答於試題上者, 不予計分。
- 二、試題請隨卷繳交。