

考試科目	程式設計與資料結構	系所別	數位內容碩士學位學程 資訊技術組	考試時間	2月3日(六) 第二節
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可用中文或英文回答。程式部份請標示所使用的程式語言。除了題目要求之外，程式碼的簡潔以及效率也為評分項目。

- (10%) Write a function to implement  $y=f(x^z)$ ,  $x$  is a float number and  $z$  is an integer number. You can ignore overflow and underflow.
- (10%) Write a program to solve following question. Print the numbers 1, ..., 100. For multiples of 3, print "Fizz" instead of the number. For multiples of 5, print "Buzz" instead of the number. For multiples of 3 and 5, print "FizzBuzz" instead of the number.
- (10%) Write a function to for reversing the words in a string  $s$ . Give a string containing a set of words separated by whitespace, we would like to transform it to a string in which the words appear in the reverse order. For example, "one for all" transforms to "all for one".
- (20%) Consider a ten floor building with three elevators, every floor has request buttons for up and down. (a) Design a system to control elevators to reduce the waiting time. (b) Explain your ideas.
- (10%) Explain the distinction between merge two sorted array and merge two sorted linked lists.
- (10%) (a) What is the binary search tree property? (b) Write a pseudo code to find the maximum in a binary search tree from a given node  $x$ .
- (10%) (a) Draw a graph based on the following adjacency matrix. (b) Draw a Minimum Spanning Trees based on the graph in (a), and explain the main idea.

	A	B	C	D	E	F	G
A	0	5	0	0	0	3	0
B	5	0	10	0	2	0	4
C	0	10	0	5	0	0	8
D	0	0	5	0	7	0	9
E	0	2	0	7	0	6	1
F	3	0	0	0	6	0	0
G	0	4	8	9	1	0	0

- (20%) Consider a large 3D sandbox cubic game, e.g., Minecraft. (a) Design a data structure for the cubic world storage/representation. (b) Explain your ideas and measure the efficiency of the proposed data structure.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。
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