

大同大學 九十三年 學年度研究所碩士班入學考試試題

考試科目：計算機概論

所別：資訊經營研究所

第 1/2 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1-4: 2%, 5-18: 4%, 19-21: 8%, 22: 12%

1. In ASCII, the code for an upper case "A" is 1000001. What is the ASCII code for a lower case "z"?
2. What is the rationale for creating the Unicode encoding system when we already have well-established systems?
3. Consider the following grammar:
 $\langle \text{asg} \rangle ::= \text{id} := \langle \text{exp} \rangle;$
 $\langle \text{exp} \rangle ::= \text{id} * \langle \text{exp} \rangle \mid \text{id} * \langle \text{term} \rangle \mid \text{id} / \langle \text{exp} \rangle \mid \text{id} / \langle \text{term} \rangle$
 $\langle \text{term} \rangle ::= \text{id} + \langle \text{term} \rangle \mid \text{id} + \langle \text{term} \rangle \mid (\langle \text{exp} \rangle) \mid \text{id}$
Assume that the scanner will report token type id when it sees a valid Pascal identifier. Which of the following strings are valid sentences in the language generated by this grammar?
(a) ALPHA := B * C - D;
(b) BETA := B + C / D;
(c) GAMMA := B + (C * D + E);
(d) DELTA := B / (C * D);
4. There is a macro ex1 in C language defined as below. What's the value of *formula*(3+5, 8-3, 2+6) after macro expansion?
 $\#define \text{formula}(x, y, z) \ x * y - z$
5. What is the 2's complement 16-bit binary representation of the decimal number -100? And what's the hexadecimal representation?
6. Explain the relationship between OOP and visual programming.
7. Describe the differences between ASP.NET and ASP.
8. What are the differences among three kinds of parameter passing of functions? Describe by following examples, *swap1*(int a, int b), *swap2*(int* a, int* b), and *swap3*(int& a, int& b).
9. What are the prefix and infix order of the postfix expression *abc*+de*/* ?
10. Describe the objectives of each layer of OSI 7 layers model for network communication.
11. What is peer-to-peer connection, and what is "bit torrent"?
12. What are meant by multitasking and multithreading?
13. What are the characteristics that distinguish an MIS, a DSS, and an EIS from one another?
14. How is a data warehouse different from a database? How are they similar?
15. Briefly describe the following advanced database systems and applications: object-oriented databases, spatial databases, text databases, and multimedia databases.
16. Explain the terms GSM, GPRS, MMS, and i-mode.
17. What is the best way to multiply a chain of matrices with dimensions that are 7*5, 5*12, 12*8, and 8*6?

<背面繼續>

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第 2/2 頁

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18. Let T be a binary tree with height h and n nodes (including external nodes). Show that

$$\log(n+1) - 1 \leq h \leq (n-1)/2$$

19. Write a C function that returns the greatest common divisor of two integers. The prototype is as follow.

`int gcd(int x, int y)`

20. Write a C function to compute the sum of each row and column of a two-dimensional array. The prototype is as follow. Assume there are two predefined macros ROW and COL to limit the maximum number of rows and columns. m and n are the numbers of rows and columns of the two-dimensional array. `sum_of_rows` and `sum_of_cols` are two one-dimensional arrays to store the sum of each row and column.

`void get_sum_of_rows_and_cols(int ary[][COL], int m, int n, int sum_of_rows[], int sum_of_cols[])`

21. Design an algorithm `postorderNext(v)` to return the node visited after node v in a postorder traversal of a binary tree T .

22. Among following sorting algorithms: bubble, selection, insertion, merge, quick, bucket, radix, which ones are stable and why are they stable and what are their running time complexity? Then please make an example of best & worst cases, and analyze the running time complexity for each of other algorithms.