**CPP程式設計題**

|  |
| --- |
| **命題者︰PWC** |
| **題目名稱(中文/英文)：矩形加密(Square Encode)** |
| **主要測試觀念：** ASCII code運用   |  |  | | --- | --- | | **Basics** | **Functions** | | * C++ BASICS 1 * FLOW OF CONTROL * FUNCTION BASICS * PARAMETERS AND OVERLOADING * ARRAYS * STRUCTURES AND CLASSES * CONSTRUCTORS AND OTHER TOOLS * OPERATOR OVERLOADING, FRIENDS,AND REFERENCES   ■ STRINGS   * POINTERS AND DYNAMIC ARRAYS | * SEPARATE COMPILATION AND NAMESPACES * STREAMS AND FILE I/O * RECURSION * INHERITANCE * POLYMORPHISM AND VIRTUAL FUNCTIONS * TEMPLATES * LINKED DATA STRUCTURES * EXCEPTION HANDLING * STANDARD TEMPLATE LIBRARY * PATTERNS AND UML | |
| 題目說明：  Encode a string into a 7\*7 block of values by the following steps:   1. Split a string into several parts. Each part has 14 characters. 2. Split each part to first 7 characters(A\_set) and last 7 characters(B\_set). 3. A\_set can create a 7\*7 table by ASCII code for each character place from bottom to top, MSB at left and LSB at right. 4. B\_set can create a 7\*7 table by ASCII code for each character place from left to right, MSB at top and LSB at bottom. 5. Combine A\_set table and B\_set table to create a 7\*7 block of values by A\_set \* 2 + B\_set, e.g. block[0][0] = A\_set[0][0] \* 2 + B\_set[0][0]. 6. If the last part does not have 14 characters, fill ‘/0’ into the remaining spaces (which ASCII code is 0).   Example: Encode string ”0123456789abcd”. Split the string into “0123456” (A\_set) and “789abcd” (B\_set).  Transform all characters into ASCII codes and place by the rule for each set respectively:   |  |  |  |  | | --- | --- | --- | --- | | A\_set | | B\_set | | | ASCII code | char |  | ASCII code | | 0110110  0110101  0110100  0110011  0110010  0110001  0110000 | ‘6’  ‘5’  ‘4’  ‘3’  ‘2’  ‘1’  ‘0’ | 0001111  1111111  1110000  0110000  1000001  1000110  1011010 | |  | | char | ‘7’ ‘8’ ‘9’ ‘a’ ‘b’ ‘c’ ‘d’ |   Finally, create a block which values are A\_set \* 2 + B\_set for each position. The result is shown as below:  0221331 1331313 1330200 0330022 1220021 1220112 1231010  輸入說明：Input a string without whitespace.(string length > 0)  輸出說明：Output several blocks of values.  IO範例 :   |  |  |  | | --- | --- | --- | |  | Sample Input | Sample Output | | 第一組測資與輸出 | A  hello,world!  0123456789abcd  12345671234567a | 0000000 0000000 0000000 0000000 0000000 0000000 2000002  3331222 1313300 2302222 3212200 3213200 3300202 3202100  0221331 1331313 1330200 0330022 1220021 1220112 1231010  0220222 1331331 1331313  0220200 0221133 0330031 1230103 0000000 0000000 0000000 0000000 0000000 0000000 2200002 | |
| * 易，僅需用到基礎程式設計語法與結構   ◼ 中，需用到多項程式設計語法與結構   * 難，需用到多項程式結構或較為複雜之資料型態或結構 |
| **解題時間：30**分鐘。 |
| **其他註記：**All characters in the input string can get its value of ASCII code. No need to add exception handling. |