**CPP程式設計題**

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| **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 | 0000000 0000000 0000000 0000000 0000000 0000000 2000002 | | 第二組 | hello,world! | 3331222 1313300 2302222 3212200 3213200 3300202 3202100 | | 第三組 | 0123456789abcd | 0221331 1331313 1330200 0330022 1220021 1220112 1231010 | | 第四組 | 12345671234567a | 0220222 1331331 1331313 0220200 0221133 0330031 1230103 0000000 0000000 0000000 0000000 0000000 0000000 2200002 | | … |  |  | |
| **附屬資料︰**  🗹解答程式：SquareEncode.cpp(檔名)  🗹測試資料：input1.txt, output1.txt, input2.txt, output2.txt, input3.txt, output3.txt |
| * 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. |