**CPP程式設計題**

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| **命題者︰PWC** |
| **題目名稱(中文/英文)：矩形解密(Square Decode)** |
| **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：**  Decode a 7\*7 block of values to a string by the following steps:   1. Each block of values represents 14 characters. 2. Each value in the block can be divided into MSB and LSB, where MSB is the result of the value divided by 2, and LSB is the remainder of dividing the value by 2. 3. **Combine all MSBs in a block can get a 7\*7 table called A\_set, and combine all LSB bits in a block can get a 7\*7 table called B\_set. Each set represents 7 characters.** 4. **A\_set** can be decoded by ASCII code for each row from bottom to top. ASCII code MSB at left and LSB at right 5. **B\_set** can be decoded by ASCII code for each column from left to right. ASCII code MSB at top and LSB at bottom 6. **If an ASCII code is 0, do not output this character. (Because it is padding of ’\0’ from encoding.)**   Example: Decode the block below: 0221331 1331313 1330200 0330022 1220021 1220112 1231010  The above block can be separated as below: A\_set B\_set 0110110 0001111 0110101 1111111 0110100 1110000 0110011 0110000 0110010 1000001 0110001 1000110 0110000 1011010  Finally, decode the block by ASCII code: 0110000 -> 0 (from A\_set) 0110001 -> 1 (from A\_set) 0110010 -> 2 (from A\_set) 0110011 -> 3 (from A\_set) 0110100 -> 4 (from A\_set) 0110101 -> 5 (from A\_set) 0110110 -> 6 (from A\_set) 0110111 -> 7 (from B\_set) 0111000 -> 8 (from B\_set) 0111001 -> 9 (from B\_set) 1100001 -> a (from B\_set) 1100010 -> b (from B\_set) 1100011 -> c (from B\_set) 1100100 -> d (from B\_set)  So the output string should be “0123456789abcd”.  **輸入說明：**The first line of input contains a number N, where N is the number of blocks. Each block has 7\*7 values, and all values are between 0 to 3.  **輸出說明：**Output a string that is decoded from blocks.  **IO範例 :**   |  |  |  | | --- | --- | --- | |  | **Sample Input** | **Sample Output** | | 第一組測資與輸出 | 1 0000000 0000000 0000000 0000000 0000000 0000000 2000002 | A | | 第二組 | 1 3331222 1313300 2302222 3212200 3213200 3300202 3202100 | hello,world! | | 第三組 | 1 0221331 1331313 1330200 0330022 1220021 1220112 1231010 | 0123456789abcd | | 第四組 | 2 0220222 1331331 1331313 0220200 0221133 0330031 1230103 0000000 0000000 0000000 0000000 0000000 0000000 2200002 | 12345671234567a | | … |  |  | |
| **附屬資料︰**  🗹解答程式：SquareDecode.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：ASCII code doesn’t need exception handling.** |