**CPP Problem Design Example**

|  |
| --- |
| **Subject: Matrix Multiplication** |
| **Contributor: 林宇恩,溫勇威,鍾賢廣** |
| **Main testing concept: Basic Function and Dynamic Array**   |  |  | | --- | --- | | **Basics** | **Functions** | | ■ C++ BASICS  ■ 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 | |
| **Description:**  Please write a program to calculate matrix multiplication.  The multiplication rule of the matrix is as follows. Here are two matrices A and B for example:      The number of columns of the A matrix must equal to the number of rows of the B matrix.  **Input:**  1. The first line is the size of A and B (row major).  2. The second line is the numbers of matrix A.  3. The third line is the numbers of matrix B.  **Output:**  Output the matrix obtained by multiplying A and B.  If A and B can not be multiplied, please print "Matrix multiplication failed.".  **Sample Input / Output：**   |  |  | | --- | --- | | Sample Input | Sample Output | | 3 2 2 3  1 2 3 4 5 6  6 5 4 3 2 1 | 12 9 6  30 23 16  48 37 26 | |
| **■ Easy, only basic programming syntax and structure are required.**  **□ Medium, multiple programming grammars and structures are required.**  **□ Hard, need to use multiple program structures or complex data types.** |
| **Expected solving time:**  20 minutes |
| **Other notes:** |