Data Structures and Algorithms

Lab 1 – C++ Primer

1. Write a function to determine whether a given valid year is one leap year or not.

   Hint: One leap year is a year which either is divisible by 4, but is not divisible by 100 or is divisible by 400.
2. Write a function to do the matrix multiplication of a pair of matrices with arbitrary dimension sizes by two ways:
   a. Static memory allocation
   b. Dynamic memory allocation

   Hint: A[a][b] * B[b][c] = C[a][c]
3. Write a function compute the power of one integer with the positive exponent by two ways:
   a. Repetition
   b. Recursion
4. Write functions which:
   a. Compare two strings for equality. If they are equal, zero is returned, otherwise the difference in value between the first two non-matching characters.
   b. Find the first occurrence of a specific character in a given string. Return a pointer to the occurrence in the string, or zero if it is not found.
   c. Take two strings as arguments. If the first exists in the second as a substring, return a pointer to the first occurrence, otherwise zero.
5. Write a ***candidate*** data structure which stores ***id***, ***name*** *(char *)*, ***math***, ***physics***, ***chemistry*** grades for HCMUT university entrance qualification, implements ***constructor***, ***destructor*** and method ***total grade*** (to sum up math, physics, chemistry grades). Afterwards, input the information of one given candidate and use the method to output the result. Assume that ***id***, ***name*** are *public* members and ***math***, ***physics***, ***chemistry*** are *private* members.