Homework 3

Write a C++ program to do the following operations that operate on a **polynomial** with three variables *x*, *y*, and *z*, stored as a generalized list as we see in Section 4.11.1.

1 Construct a generalized list to represent a polynomial, say *polyno*.

2 Implement the following functions:

2.1 $retCoeff(ex, ey, ez)$: Return the coefficient of the term in *polyno* whose three exponents match $ex, ey,$ and ez . If there is no match, simply reply to the user with "**no match**."

2.2 $Mulf(ex, ey, ez)$: Multiply *polyno* by $x^{ex} y^{ey} z^{ez}$, in other words, *polyno* becomes $polyno \cdot x^{ex} y^{ey} z^{ez}$.

Your program will read in the polynomial and construct the generalized list first. The input is given in the form of (coff ex ey ez) as follows:

polyno:

4 10 3 2
2 8 3 2
3 0 2 2
1 4 4 1

➔ $polyno = 4x^{10}y^3z^2 + 2x^8y^3z^2 + 3y^2z^2 + x^4y^4z$

Your program will then loop forever and allow users to continue to choose to perform either $retCoeff()$ or $Mulf()$ by prompting users to input $ex, ey,$ and ez .

For example, if a user chooses $retCoeff(8,3,2)$, it returns 2 (the coefficient) for *polyno*. Suppose that the user chooses $Mulf(0,1,2)$ the next time, your program should update *polyno* to $polyno = 4x^{10}y^4z^4 + 2x^8y^4z^4 + 3y^3z^4 + x^4y^5z^3$ (no need for printout). If the user then invokes $retCoeff(0,3,4)$, it should return 3.

Due date: Nov. 27, 2017.