Library Code in CPP

You can use a library code for LP in CPP (code is here). The explanation to understand the code is as follows:

Input to simplex is,

> m = number of inequality,
> n = number of variable,
> $A \rightarrow$ equation matrix,
> $b \rightarrow$ solution vector (this will contain the value of variables after assignment),
> $Ret \rightarrow$ optimal ans.

Some issues:

— Matrix will be of $(m+1) * (n+1)$ dimension.

— **(m+1) rows**: m number of inequalities, and the last row of the matrix will contain the info about the Objective function.

— **(n+1) columns:** n variables + CONSTRAINT.
Each row represents an equation of the form,
$c_0 x_0 + c_1{}^* x_1 + c_2{}^* x_2 \ldots\ldots\ldots + c_{n-1} {}^* x_{n-1} + \text{CONSTANT} <= 0$, if equation not in this form convert it.
So, the row corresponding to this equation will look like
$[c_0 \; c_1 \; c_2 \; \ldots\ldots \; c_{n-1} \quad \text{CONSTANT}]$, total n+1 values in each row.
E.g., $-x_2 <= 0$, the corresponding row will be,
[0 0 -1 0 0 0.... 0 0]

— For objective function:
$w_0 x_0 + w_1 x_1 + \ldots\ldots\ldots + w_{n-1} x_{n-1} + 0$,
put it as a last row, [$w_0 \; w_1 \; w_2 \; \ldots.. \; w_{n-1} \; 0$]

— Given function is for maximizing objective function. But our goal is minimization. So, negate the objective function it will give you -ve maximum. Again negate the results you will get the positive minimum.
So, our objective function going to the matrix is $-w_0 x_0 - w_1 x_1 - \ldots\ldots\ldots - w_{n-1} x_{n-1} - 0$
last row, [$-w_0 \; -w_1 \; -w_2 \; \ldots.. \; -w_{n-1} \; 0$]