

Q.2

A very naive implementation would, for each column, do a for loop on the previous columns and subtract as many times as needed (at most n) the column with the same "low" index. Subtracting two columns costs n with a dense matrix representation.

for each column at most n columns are subtracted
 m \times m \times m \times m
one loop on the previous column cost of a subtraction

A naive algorithm would be in: $O(n^4)$

We haven't even tried to implement such an algorithm...