Q1

(1) The advantage is that data warehouse has fast Query Response which could save users' time. In addition, the data warehouse is usually requires less storage space that database.

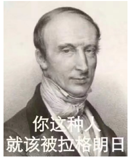
The disadvantage is that selective Materialization Decision Problem is NP-hard, the main objective is either the minization of a cost function or a constraint, a constraint can be user oriented or system oriented.

(2) According to the "Selection of Views to Materialize in a Data warehouse" Himanshu Gupta, Inner-Level Greedy Algorithm (the paper I searched online)

Given G, a view graph with indexes, and S, the space constraint.

```
Begin
    $M = \phi$          /* M = Set of structures selected so far */
    while ( $S(M) < S$ )
        $C = \phi$;   /* Best set containing a view and some of its indexes
        for each view $v_i$ not in M
            $IG = \{v_i\}$;   /* IG = set of $v_i$ and some of its indexes in a greedy manner
            while( $S(IG) < S$ )     /* Construct IG */
                Let $I_{ic}$ be the index of $v_i$ whose benefit per unit space
                $IG = IG \cup I_{ic}$
            end while
            if ( $B(IG,M) / S(IG) > B(C,M) / |C|$ / or $C = \phi$   /* $B(IG,M) = Gain(M \cup IG, S)$, which is the same meaning in lecture*/
                $C = IG$;
        end for
        $M = M \cup C$
    end while
    return M
```

Each stage can be thought of as consisting of two phrases. In the first phase. for each view v_i we can construct a set IG_i which initially contains only the view. Then one by one its indexes are added to IG_i in the order of their incremental benefits until the benefit per unit space of IG_i with respect to M, the set of structures selected till this stage, reach its maximum. That IG_i having the maximum benefit per unit space with respect to M is chosen as C. In the second phase, an index whose benefit per unit space is the maximum with respect to M is selected. The benefit per unit space of the selected index is compared with that of C. and the better one is selected for addition to M. (After done Q_1. my mindset changed a little bit, just feel like I am Lagranged)



$\boxed{Q_2}$