

3.events (itemNo, SensorNo, SensorType, Time)

```
SELECT events.itemNo, events.SensorNo, events.Time
FROM events MATCH_RECOGNIZE (
  PARTITION BY itemNO ORDER BY Time
  MEASURES e1.SensorNo as e1no,
            e2.SensorNo as e2no,
            e3.SensorNo as e3no,
            e4.SensorNo as e4no,
  ONE ROW PER MATCH
  AFTER MATCH SKIP PAST LAST ROW
  PATTERN (e1 e2*e3+e4)
  DEFINE
    e2 as (e2no = e1no),
    e3 as (e3no <>e1no),
    e4 as (e4no = e1no and e4.time - e1.time <=1 )) as E;
```

4. Do problem 11.2 from the ADS textbook.

We parse the pixel's coordinate (11,00) as x-pixel=11 y-pixel = 00. Then the z value could be obtained by interleaving the bits. In this example, we will shuffle the bits in order of "x,y,x,y" where x is x-value, y is y-value. Therefore, we have z-pixel:

```
z-pixel = Shuffle("x,y,x,y", x, y)
z-pixel = Shuffle("x,y,x,y", 11, 00)
z-pixel = 1010 = (10)10
```

The Hilbert value of the same pixel can be obtained by mapping the pixel to the curve of order 2. Therefore, we have Hilbert value of the pixel is 15

6.

Write an SQL query that constructs the SalesCube for the following table as the sum of the Sales in every subcuboid:

```
SELECT Model, Color, Year, Dealer,
       Sum (Sales) as SalesCube
From cars
Groupby CUBE(Model, Color, Year, Dealer);
```

7.

```
Sort one element: 4
Sort two elements: 3+2+1 = 6
Sort three elements: 4
Sort four elements: 1
In total: 15
```