

Oracle SQL Pattern Matching Made Easy

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MATCH_RECOGNIZE

- Added in Oracle 12cR1
- Enhanced analysis of row sequences
- For detecting matches to complex patterns
- A significant boost to the analytical capabilities of SQL
- **Very powerful**



WITH GREAT
POWER COMES
COMPLEX
SYNTAX

Agenda

- Start using Pattern Matching
- Step by step
- Not all the capabilities...
- But all the essentials (and more)
- Simple examples

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._SYM^{L2}

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Who Am I?



THINGS TO DO TODAY

Date 1993 COMPLETED

- 1) ☐
- 2) Start developing ☐
- 3) in ORACLE6 + ☐
- 4) SQL*Forms 3.0 ☐
- 5) + Oracle*CASE ☐
- 6) 5.0 ☐
- 7) ☐
- 8) ☐
- 9) ☐
- 10) ☐

A Real-Life Example

Today	
Change day ▼	
14:13	Zac Des Louvresses
14:31	Zac Des Louvresses
14:49	Zac Des Louvresses
15:07	Zac Des Louvresses
15:25	Zac Des Louvresses
15:43	Zac Des Louvresses
16:00	Zac Des Louvresses
16:15	Zac Des Louvresses
20:10	Zac Des Louvresses
20:30	Zac Des Louvresses
20:50	Zac Des Louvresses
21:10	Zac Des Louvresses
21:30	Zac Des Louvresses

Today	
Change day ▼	
11:13 – 15:43 Every 18 min	
15:43 – 16:15 Every 15–17 min	
20:10 – 21:30 Every 20 min	

YEAR	WINNER	SONG	PERFORMER	POINTS	LANGUAGE	HOST
1956	Switzerland	Refrain	Lys Assia		French	Switzerland
1957	Netherlands	Net als toen	Corry Brokken	31	Dutch	Germany
1958	France	Dors, mon amour	André Claveau	27	French	Netherlands
1959	Netherlands	Een beetje	Teddy Scholten	21	Dutch	France
1960	France	Tom Pillibi	Jacqueline Boyer	32	French	United Kingdom
1961	Luxembourg	Nous les amoureux	Jean-Claude Pascal	31	French	France
1962	France	Un premier amour	Isabelle Aubret	26	French	Luxembourg
1963	Denmark	Dansevisé	Grethe and Jørgen Ingmann	42	Danish	United Kingdom
1964	Italy	Non ho l'età	Gigliola Cinquetti	49	Italian	Denmark
1965	Luxembourg	Poupée de cire, poupée de son	France Gall	32	French	Italy
1966	Austria	Merci, Chérie	Udo Jürgens	31	German	Luxembourg
1967	United Kingdom	Puppet on a String	Sandie Shaw	47	English	Austria
1968	Spain	La, la, la	Massiel	29	Spanish	United Kingdom
1969	Netherlands	De troubadour	Lenny Kuhr	18	Dutch	Spain
1970	Ireland	All Kinds of Everything	Dana	32	English	Netherlands
1971	Monaco	Un banc, un arbre, une rue	Séverine	128	French	Ireland
1972	Luxembourg	Après toi	Vicky Leandros	128	French	United Kingdom
1973	Luxembourg	Tu te reconnaîtras	Anne-Marie David	129	French	Luxembourg
						United

Find all the wins of Luxembourg

```
SELECT *  
FROM EUROVISION_WINNERS  
WHERE WINNER = 'Luxembourg';
```

Find all the wins of Luxembourg

Pattern
Variable

①

YEAR	WINNER	SONG	HOST
1960	France	Tom Pillibi	United Kingdom
1961	Luxembourg	Nous les amoureux	France
1962	France	Un premier amour	Luxembourg

LUX



②

1963	Denmark	Ed Kingdon	
1964	Italy	ark	
1965	Luxembourg	y	
1966	Austria	embourg	
1967	United Kin	ria	
1968	Spain	ed Kingdon	
1969	Netherland	n	
1970	Ireland	All kinds of Everything	Netherlands



③

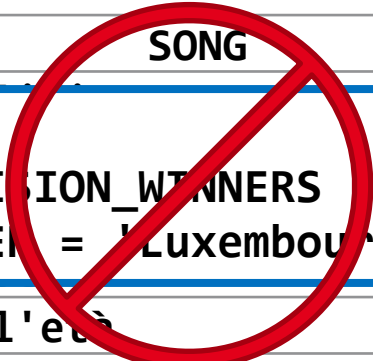
④

YEAR	WINNER	SONG	HOST
1971	1 1961 Luxembourg	Nous les amoureux	France
1972	2 1965 Luxembourg	Poupée de cire, poupée de son	Italy
1973	3 1972 Luxembourg	Après toi	United Kingdom
1974	4 1973 Luxembourg	Tu te reconnaîtras	Luxembourg
1975	5 1983 Luxembourg	Si la vie est cadeau	Germany
1977	France	L'oiseau et l'enfant	United Kingdom
1978	Israel	A-Ba-Ni-Bi	France



Find **2 successive** wins of Luxembourg

YEAR	WINNER	SONG	HOST
1960	France		United Kingdom
1961	Luxembourg		France
1962	France		Luxembourg
1963	Denmark		United Kingdom
1964	Italy	Non ho l'età	Denmark
1965	Luxembourg	Poupée de cire, poupée de son	Italy
1966	Austria	Merci, Chérie	Luxembourg
1967	United Kingdom	Puppet on a String	Austria
1968	Spain	La, la, la	United Kingdom
1969	Netherlands	De troubadour	Spain
1970	Ireland	All Kinds of Everything	Netherlands
1971	Monaco	Un banc, un arbre, une rue	Ireland
1972	Luxembourg	Après toi	United Kingdom
1973	Luxembourg	Tu te reconnaîtras	Luxembourg
1974	Sweden	Waterloo	United Kingdom
1975	Netherlands	Ding-a-dong	Sweden
1976	United Kingdom	Save Your Kisses for Me	Netherlands
1977	France	L'oiseau et l'enfant	United Kingdom
1978	Israel	A-Ba-Ni-Bi	France



```
SELECT *
FROM EUROVISION_WINNERS
WHERE WINNER = 'Luxembourg';
```

Find **2 successive** wins of Luxembourg

order by

Pattern
Variable

YEAR	WINNER	SONG	HOST	LUX
1960	France	Tom Pillibi	United Kingdom	
1961	Luxembourg	Nous les amoureux	France	<input checked="" type="checkbox"/>
1962	France	Un premier amour	France	
1963	Denmark	Denmark	Denmark	
1964	Italy	Italy	Italy	
1965	Luxembourg	Luxembourg	Luxembourg	<input checked="" type="checkbox"/>
1966	Austria	Austria	Austria	
1967	United Kingdom	United Kingdom	United Kingdom	
1968	Spain	Spain	Spain	
1969	Netherlands	Netherlands	Netherlands	
1970	Ireland	Ireland	Ireland	
1971	Monaco	Monaco	Monaco	
1972	Luxembourg	Après toi	United Kingdom	<input checked="" type="checkbox"/>
1973	Luxembourg	Tu te reconnaîtras	Luxembourg	<input checked="" type="checkbox"/>
1974	Sweden	Waterloo	United Kingdom	
1975	Netherlands	Ding-a-dong	Sweden	
1976	United Kingdom	Save Your Kisses for Me	Netherlands	
1977	France	L'oiseau et l'enfant	United Kingdom	
1978	Israel	A-Ba-Ni-Bi	France	

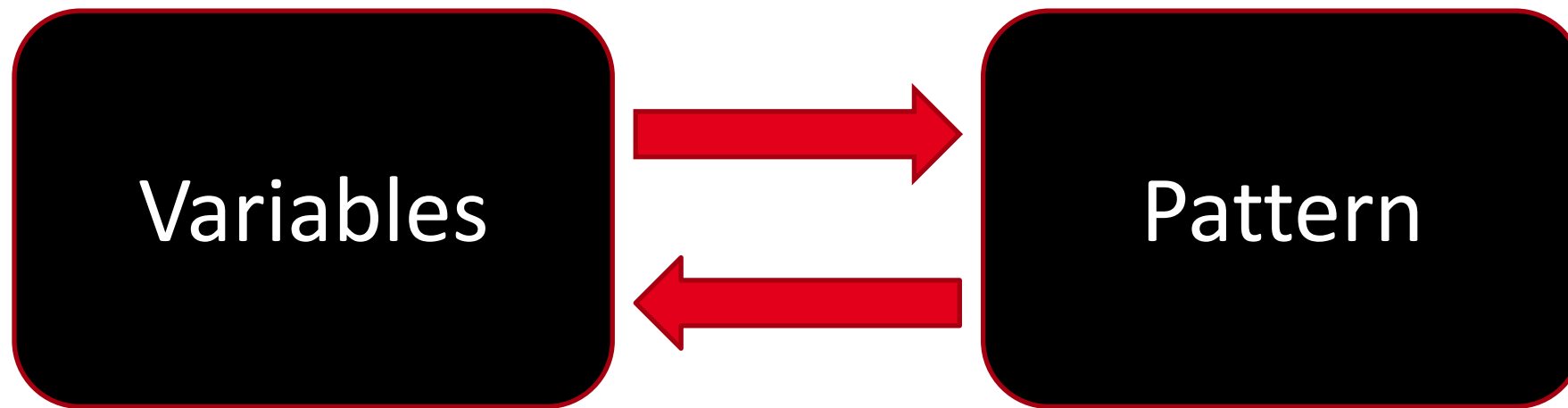
```

SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)

```

Pattern
Concatenation

①



Find **2 successive** wins of Luxembourg

order by

Pattern
Variable

YEAR	WINNER	SONG	HOST	LUX
1960	France	Tom Pillibi	United Kingdom	
1961	Luxembourg	Nous les amoureux	France	<input checked="" type="checkbox"/>
1962	France	Un premier amour	Luxembourg	
1963	Denmark		United Kingdom	
1964	Italy		Denmark	
1965	Luxembourg		Italy	<input checked="" type="checkbox"/>
1966	Austria		Luxembourg	
1967	United Kingdom		Austria	
1968	Spain		United Kingdom	
1969	Netherlands		Netherlands	
1970	Ireland		Ireland	
1971	Monaco	On danse, on aime, on s'adore	Ireland	
1972	Luxembourg	Après toi	United Kingdom	<input checked="" type="checkbox"/>
1973	Luxembourg	Tu te reconnaîtras	Luxembourg	<input checked="" type="checkbox"/>
1974	Sweden		United Kingdom	
1975	Netherlands		United Kingdom	
1976	United Kingdom		Luxembourg	
1977	France	L'oiseau et l'enfant	United Kingdom	
1978	Israel	A-Ba-Ni-Bi	France	

```

SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)

```

①

	YEAR	WINNER	SONG	HOST
1	1972	Luxembourg	Après toi	United Kingdom
2	1973	Luxembourg	Tu te reconnaîtras	Luxembourg

Find **2 successive** wins of Luxembourg

```
SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```

Find **2 successive** wins of Luxembourg

```
SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX{2})
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```

Pattern
Quantifier

	YEAR	WINNER	SONG	HOST
1	1972	Luxembourg	Après toi	United Kingdom
2	1973	Luxembourg	Tu te reconnaîtras	Luxembourg

PATTERN Quantifiers

Pattern	Number of consecutive occurrences
X	1
X{n}	n
X{n,}	n or more
X{n,m}	between n and m
X{,m}	between 0 and m
X*	0 or more
X?	0 or 1
X+	1 or more

Find **one or more successive** wins of Luxembourg

order by

Pattern
Variable


①	1961	Luxembourg	Nous les amoureux	France	
	1962	France	Un premier amour	Luxembourg	
	1963	Denmark		United Kingdom	
	1964	Italy		Denmark	
	1965	Luxembourg		Italy	
	1966	Austria		Luxembourg	
	1967	United Kingdom		Austria	
	1968	Spain		United Kingdom	
	1969	Netherlands		Netherlands	
	1970	Ireland		Ireland	
②	<pre>SELECT YEAR, WINNER, SONG, HOST FROM EUROVISION_WINNERS MATCH_RECOGNIZE (ORDER BY YEAR ALL ROWS PER MATCH PATTERN (LUX+) DEFINE LUX AS WINNER = 'Luxembourg')</pre>				
	1971				
	1972	1	1961 Luxembourg	Nous les amoureux	France
	1973	2	1965 Luxembourg	Poupée de cire, poupée de son	Italy
	1974	3	1972 Luxembourg	Après toi	United Kingdom
	1975	4	1973 Luxembourg	Tu te reconnaîtras	Luxembourg
③	1976	5	1983 Luxembourg	Si la vie est cadeau	Germany
	1977		France	L'oiseau et l'enfant	United Kingdom
	1978		Israel	A-Ba-Ni-Bi	France

```

SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX+)
  DEFINE LUX AS WINNER = 'Luxembourg'
)


```

```
SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```



	YEAR	WINNER	SONG	HOST
1	1961	Luxembourg	Nous les amoureux	France
2	1965	Luxembourg	Poupée de cire, poupée de son	Italy
3	1972	Luxembourg	Après toi	United Kingdom
4	1973	Luxembourg	Tu te reconnaîtras	Luxembourg
5	1983	Luxembourg	Si la vie est cadeau	Germany

```
SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  ALL ROWS PER MATCH
  PATTERN (LUX+)
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```



	YEAR	WINNER	SONG	HOST
1	1961	Luxembourg	Nous les amoureux	France
2	1965	Luxembourg	Poupée de cire, poupée de son	Italy
3	1972	Luxembourg	Après toi	United Kingdom
4	1973	Luxembourg	Tu te reconnaîtras	Luxembourg
5	1983	Luxembourg	Si la vie est cadeau	Germany

**A match is
a consecutive sequence
of
(zero, one, or more)
records,
that matches a
specific pattern**

```
SELECT      YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```

```
SELECT      YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (LUX+)
  DEFINE LUX AS WINNER = 'Luxembourg'
)
```

```

SELECT MATCH#, YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (LUX)
  DEFINE LUX AS WINNER = 'Luxembourg'
)

```

```

SELECT MATCH#, YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (LUX+)
  DEFINE LUX AS WINNER = 'Luxembourg'
)

```



	MATCH#	YEAR	WINNER	SONG	HOST
1	1	1961	Luxembourg	Nous les amoureux	France
2	2	1965	Luxembourg	Poupée de cire, poupée de son	Italy
3	3	1972	Luxembourg	Après toi	United Kingdom
4	4	1973	Luxembourg	Tu te reconnaîtras	Luxembourg
5	5	1983	Luxembourg	Si la vie est cadeau	Germany



	MATCH#	YEAR	WINNER	SONG	HOST
1	1	1961	Luxembourg	Nous les amoureux	France
2	2	1965	Luxembourg	Poupée de cire, poupée de son	Italy
3	3	1972	Luxembourg	Après toi	United Kingdom
4	3	1973	Luxembourg	Tu te reconnaîtras	Luxembourg
5	4	1983	Luxembourg	Si la vie est cadeau	Germany

Input and Output



Input and Output

```
SELECT * FROM
```

```
EUROVISION_WINNERS
```

```
MATCH_RECOGNIZE (
```

```
)
```

Input and Output

```
SELECT * FROM
```

```
EUROVISION_WINNERS
```

```
MATCH_RECOGNIZE (
```

```
)
```

Input and Output

```
SELECT XYZ.* FROM
```

```
EUROVISION_WINNERS
```

```
MATCH_RECOGNIZE (
```

```
) XYZ
```

```
SELECT * FROM
(SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
WHERE YEAR BETWEEN 1990 AND 2000)
MATCH_RECOGNIZE (
)
```

Input and Output

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

);

Multiple Pattern Variables

order by

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992			
1993			
1994			
1995			
1996			
1997			
1998			om
1999			
2000			

```

SELECT * FROM
(SELECT YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
WHERE YEAR BETWEEN 1990 AND 2000)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN ( )
  DEFINE
);

```

Multiple Pattern Variables

order by

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

```
PATTERN (
  DEFINE
```

```
);
```

Multiple Pattern Variables

order by

Pattern
Variables

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

I
?
?
?
?
?

```

PATTERN (
  DEFINE I AS WINNER LIKE 'I%'

);

```

Multiple Pattern Variables

order by

Pattern
Variables

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

I	LN
?	
	?
?	
?	
?	?
?	
	?
?	
	?
	?

```

PATTERN (
  DEFINE I AS WINNER LIKE 'I%',
        LN AS LENGTH(SONG)>=18
);

```

Multiple Pattern Variables

order by

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

Pattern
Variables

I	LN	UK
?		
	?	
?		
?		
?	?	
?		
	?	
?		?
	?	
	?	

```
PATTERN (
  DEFINE I AS WINNER LIKE 'I%',
        LN AS LENGTH(SONG)>=18,
        UK AS HOST='United Kingdom'
);
```

Multiple Pattern Variables

order by

Pattern
Variables

①

②

③

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	Nocturne	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Take Me to Your Heaven	Israel
2000	Denmark	Fly on the Wings of Love	Sweden

I	LN	UK
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>

```

PATTERN (I LN UK?)
DEFINE I AS WINNER LIKE 'I%',
      LN AS LENGTH(SONG)>=18,
      UK AS HOST='United Kingdom'
);
  
```

Multiple Pattern Variables

order by

Pattern Variables

1

2

3

YEAR	WINNER	SONG	HOST
1990	Italy	Insieme: 1992	Yugoslavia
1991	Sweden	Fångad av en stormvind	Italy
1992	Ireland	Why Me?	Sweden
1993	Ireland	In Your Eyes	Ireland
1994	Ireland	Rock 'n' Roll Kids	Ireland
1995	Norway	The Voice	Ireland
1996	Ireland	The Voice	Norway
1997	United Kingdom	Love Shine a Light	Ireland
1998	Israel	Diva	United Kingdom
1999	Sweden	Heaven	Israel
2000	Denmark	the Wings of Love	Sweden

I	LN	UK
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>

PATTERN	YEAR	MATCH#	WINNER	SONG	HOST
DEFINE	1	1990	1 Italy	Insieme: 1992	Yugoslavia
	2	1991	1 Sweden	Fångad av en stormvind	Italy
	3	1993	2 Ireland	In Your Eyes	Ireland
	4	1994	2 Ireland	Rock 'n' Roll Kids	Ireland
	5	1996	3 Ireland	The Voice	Norway
	6	1997	3 United Kingdom	Love Shine a Light	Ireland
	7	1998	3 Israel	Diva	United Kingdom

);

```
SELECT * FROM
(SELECT YEAR, WINNER, SONG, HOST
 FROM EUROVISION_WINNERS
 WHERE YEAR BETWEEN 1990 AND 2000)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (I LN UK?)
  DEFINE I AS WINNER LIKE 'I%',
         LN AS LENGTH(SONG)>=18,
         UK AS HOST='United Kingdom'
);
```

Find two or more successive wins of the same country

Implicit Pattern Variable

YEAR	WINNER	SONG	HOST		SAME
1977	France	L'oiseau et l'enfant	United Kingdom		
1978	Israel	A-Ba-Ni-Bi	France		
1979	Israel	Hallelujah	Israel		<input checked="" type="checkbox"/>
1980	Ireland	What's Another Year	Netherlands	<input checked="" type="checkbox"/>	
1981	United Kingdom	Makin' Time	France	<input checked="" type="checkbox"/>	
1982	Germany	Ein Lied	France	<input checked="" type="checkbox"/>	
1983	Luxembourg	Si la vie	France	<input checked="" type="checkbox"/>	
1984	Sweden	Digga	France	<input checked="" type="checkbox"/>	
1985	Norway	La det bli	France	<input checked="" type="checkbox"/>	
1986	Belgium	J'ai	France	<input checked="" type="checkbox"/>	
1987	Ireland	Hold On	France	<input checked="" type="checkbox"/>	
1988	Switzerland	Ne partez pas	France	<input checked="" type="checkbox"/>	
1989	Yugoslavia	Rock Me	France	<input checked="" type="checkbox"/>	
1990	Italy	Insidi	France	<input checked="" type="checkbox"/>	
1991	Sweden	Fångad av en stormvind	Italy	<input checked="" type="checkbox"/>	
1992	Ireland	Why Me?	Sweden	<input checked="" type="checkbox"/>	
1993	Ireland	In Your Eyes	Ireland		<input checked="" type="checkbox"/>
1994	Ireland	Rock 'n' Roll Kids	Ireland		<input checked="" type="checkbox"/>
1995	Norway	Nocturne	Ireland		

```

SELECT MATCH#, YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (X SAME+)
  DEFINE SAME AS WINNER = PREV(WINNER)
);
  
```

PREV
NEXT

Physical
Navigation

Find **two or more successive wins** of the **same country**

```
SELECT MATCH#, YEAR, WINNER, SONG, HOST
FROM EUROVISION_WINNERS
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() AS MATCH#
  ALL ROWS PER MATCH
  PATTERN (X SAME+)
  DEFINE SAME AS WINNER = PREV(WINNER)
);
```

	MATCH#	YEAR	WINNER	SONG	HOST
1	1	1972	Luxembourg	Après toi	United Kingdom
2	1	1973	Luxembourg	Tu te reconnaîtras	Luxembourg
3	2	1978	Israel	A-Ba-Ni-Bi	France
4	2	1979	Israel	Hallelujah	Israel
5	3	1992	Ireland	Why Me?	Sweden
6	3	1993	Ireland	In Your Eyes	Ireland
7	3	1994	Ireland	Rock 'n' Roll Kids	Ireland

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après toi	128
1973	Luxembourg	Tu te reconnaîtras	129
1974	Sweden	Waterloo	24
1975	Netherlands	Ding-a-dong	152
1976	United Kingdom	Save Your Kisses for Me	164
1977	France	L'oiseau et l'enfant	136
1978	Israel	A-Ba-Ni-Bi	157
1979	Israel	Hallelujah	125
1980	Ireland	What's Another Year	143
1981	United Kingdom	Making Your Mind Up	136
1982	Germany	Ein bißchen Frieden	161
1983	Luxembourg	Si la vie est cadeau	142
1984	Sweden	Diggi-Loo Diggi-Ley	145
1985	Norway	La det swinge	123
1986	Belgium	J'aime la vie	176
1987	Ireland	Hold Me Now	172
1988	Switzerland	Ne partez pas sans moi	137
1989	Yugoslavia	Rock Me	137

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH
  PATTERN (
  DEFINE
)
ORDER BY YEAR;

```

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH
  PATTERN (A
  DEFINE
    )
  ORDER BY YEAR;

```

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après toi	
1973	Luxembourg	Tu te rends compte	
1974	Sweden	Watergate	
1975	Netherlands	Ding Dong	
1976	United Kingdom	Save Your Sins for Me	
1977	France	L'oiseau et le enfant	
1978	Israel	A-Ba-Ni-Bi	
1979	Israel	Hallelujah	
1980	Ireland	What's Another Year	
1981	United Kingdom	Makin' Time	
1982	Germany	Ein Moment	
1983	Luxembourg	Si la vie est un jardin	
1984	Sweden	Digga	
1985	Norway	La det skjedde	
1986	Belgium	J'air	
1987	Ireland	Hold On to Love	
1988	Switzerland	Ne partez pas sans moi	
1989	Yugoslavia	Rock Me	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH
  PATTERN (A SAME* )
  DEFINE
    SAME AS WINNER = PREV(WINNER)
)
ORDER BY YEAR;

```

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH

  PATTERN (A SAME* DIFF+
  )
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
  )
ORDER BY YEAR;

```

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH
  PATTERN (A SAME* DIFF+ )
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
)
ORDER BY YEAR;

```

Qualifier

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH

  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY YEAR;

```

Find returning winners after a break

YEAR	WINNER	SONG	POINTS
1971	Monaco	Un banc, un arbre, une rue	128
1972	Luxembourg	Après	
1973	Luxembourg	Tu te	
1974	Sweden	Water	
1975	Netherlands	Ding	
1976	United Kingdom	Save	
1977	France	L'ois	
1978	Israel	A-Ba	
1979	Israel	Halle	
1980	Ireland	What	
1981	United Kingdom	Makin	
1982	Germany	Ein b	
1983	Luxembourg	Si la	
1984	Sweden	Digg	
1985	Norway	La de	
1986	Belgium	J'air	
1987	Ireland	Hold	
1988	Switzerland	Ne pa	
1989	Yugoslavia	Rock	
1990	Italy	Insieme: 1992	149
1991	Sweden	Fångad av en stormvind	146

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#
  ALL ROWS PER MATCH

  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY YEAR;

```

	MATCH#	YEAR	WINNER	SONG	POINTS
1	1	1972	Luxembourg	Après toi	128
2	1	1973	Luxembourg	Tu te reconnaîtras	129
3	1	1974	Sweden	Waterloo	24
4	1	1975	Netherlands	Ding-a-dong	152
5	1	1976	United Kingdom	Save Your Kisses for Me	164
6	1	1977	France	L'oiseau et l'enfant	136
7	1	1978	Israel	A-Ba-Ni-Bi	157
8	1	1979	Israel	Hallelujah	125
9	1	1980	Ireland	What's Another Year	143
10	1	1981	United Kingdom	Making Your Mind Up	136
11	1	1982	Germany	Ein bißchen Frieden	161
12	1	1983	Luxembourg	Si la vie est cadeau	142
13	2	1984	Sweden	Diggi-Loo Diggi-Ley	145
14	2	1985	Norway	La det swinge	123
15	2	1986	Belgium	J'aime la vie	176
16	2	1987	Ireland	Hold Me Now	172
17	2	1988	Switzerland	Ne partez pas sans moi	137
18	2	1989	Yugoslavia	Rock Me	137
19	2	1990	Italy	Insieme: 1992	149
20	2	1991	Sweden	Fångad av en stormvind	146

)
ORDER BY YEAR;

i, POINTS
INNERS
) 1991)

(ST+)

),

IER

	MATCH#	YEAR	WINNER	SONG	POINTS
1	1	1972	Luxembourg	Après toi	128
2	1	1973	Luxembourg	Tu te reconnaîtras	129
3	1	1974	Sweden	Waterloo	24
4	1	1975	Netherlands	Ding-a-dong	152
5	1	1976	United Kingdom		
6	1	1977	France		
7	1	1978	Israel		
8	1	1979	Israel		
9	1	1980	Ireland		
10	1	1981	United Kingdom		
11	1	1982	Germany		
12	1	1983	Luxembourg		
13	2	1984	Sweden		
14	2	1985	Norway		
15	2	1986	Belgium		
16	2	1987	Ireland		
17	2	1988	Switzerland		
18	2	1989	Yugoslavia		
19	2	1990	Italy		
20	2	1991	Sweden		

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#

  ALL ROWS PER MATCH

  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY YEAR;

```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
3	1	1974	Sweden	Waterloo	24	DIFF
4	1	1975	Netherlands	Ding-a-dong	152	DIFF
5	1	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
6	1	1977	France	L'oiseau et l'enfant	136	DIFF
7	1	1978	Israel	A-Ba-Ni-Bi	157	DIFF
8	1	1979	Israel	Hallelujah	125	DIFF
9	1	1980	Ireland	What's Another Year	143	DIFF
10	1	1981	United Kingdom	Making Your Mind Up	136	DIFF
11	1	1982	Germany	Ein bißchen Frieden	161	DIFF
12	1	1983	Luxembourg	Si la vie est cadeau	142	LIKE_FIRST
13	2	1984	Sweden	Diggi-Loo Diggi-Ley	145	A
14	2	1985	Norway	La det swinge	123	DIFF
15	2	1986	Belgium	J'aime la vie	176	DIFF
16	2	1987	Ireland	Hold Me Now	172	DIFF
17	2	1988	Switzerland	Ne partez pas sans moi	137	DIFF
18	2	1989	Yugoslavia	Rock Me	137	DIFF
19	2	1990	Italy	Insieme: 1992	149	DIFF
20	2	1991	Sweden	Fångad av en stormvind	146	LIKE_FIRST

AR

)
ORDER BY YEAR;

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1		1971	Monaco	Un banc, un arbre, une rue	128	
2	1	1972	Luxembourg	Après toi	128	A
3	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
4	1	1974	Sweden	Waterloo	24	DIFF
5	1	1975	Netherlands	Ding-a-dong	152	DIFF
6	1	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
7	1	1977	France	L'oiseau et l'enfant	136	DIFF
8	1	1978	Israel	A-Ba-Ni-Bi	157	DIFF
9	1	1979	Israel	Hallelujah	125	DIFF
10	1	1980	Ireland	What's Another Year	143	DIFF
11	1	1981	United Kingdom	Making Your Mind Up	136	DIFF
12	1	1982	Germany	Ein bißchen Frieden	161	DIFF
13	1	1983	Luxembourg	Si la vie est cadeau	142	LIKE_FIRST
14	2	1984	Sweden	Diggi-Loo Diggi-Ley	145	A
15	2	1985	Norway	La det swinge	123	DIFF
16	2	1986	Belgium	J'aime la vie	176	DIFF
17	2	1987	Ireland	Hold Me Now	172	DIFF
18	2	1988	Switzerland	Ne partez pas sans moi	137	DIFF
19	2	1989	Yugoslavia	Rock Me	137	DIFF
20	2	1990	Italy	Insieme: 1992	149	DIFF
21	2	1991	Sweden	Fångad av en stormvind	146	LIKE_FIRST

ORDER BY YEAR;

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1		1971	Monaco	Un banc, un arbre, une rue	128	
2	1	1972	Luxembourg	Après toi	128	A
3	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
4	1	1974	Sweden	Waterloo	24	DIFF
5	1	1975	Netherlands			
6	1	1976	United Kingdom			
7	1	1977	France			
8	1	1978	Israel			
9	1	1979	Israel			
10	1	1980	Ireland			
11	1	1981	United Kingdom			
12	1	1982	Germany			
13	1	1983	Luxembourg			
14	2	1984	Sweden			
15	2	1985	Norway			
16	2	1986	Belgium			
17	2	1987	Ireland			
18	2	1988	Switzerland			
19	2	1989	Yugoslavia			
20	2	1990	Italy			
21	2	1991	Sweden			

```

SELECT MATCH#, YEAR, WINNER, SONG, POINTS, VAR
FROM (SELECT
      WHERE PAST LAST ROW (the default)
      MATCH_REF TO NEXT ROW
      ORDER TO FIRST var
      MEASURE TO [LAST] var
      MATCH_REF
      CLASSIFY( ) var
      ALL ROWS PER MATCH WITH UNMATCHED ROWS
      AFTER MATCH SKIP PAST LAST ROW
      PATTERN (A SAME* DIFF+ LIKE_FIRST+)
      DEFINE
        SAME AS WINNER = PREV(WINNER),
        DIFF AS WINNER != A.WINNER,
        LIKE_FIRST AS WINNER = A.WINNER
    )
ORDER BY YEAR;

```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
3	1	1974	Sweden	Waterloo	24	DIFF
4	1	1975	Netherlands	Ding-a-dong	152	DIFF
5	1	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
6	1	1977	France	L'oiseau et l'enfant	136	DIFF
7	1	1978	Israel	A-Ba-Ni-Bi	157	DIFF
8	1	1979	Israel	Hallelujah	125	DIFF
9	1	1980	Ireland	What's Another Year	143	DIFF
10	1	1981	United Kingdom	Making Your Mind Up	136	DIFF
11	1	1982	Germany	Ein bißchen Frieden	161	DIFF
12	1	1983	Luxembourg	Si la vie est cadeau	142	LIKE_FIRST
13	2	1974	Sweden	Waterloo	24	A
14	2	1975	Netherlands	Ding-a-dong	152	DIFF
15	2	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
16	2	1977	France	L'oiseau et l'enfant	136	DIFF
17	2	1978	Israel	A-Ba-Ni-Bi	157	DIFF
18	2	1979	Israel	Hallelujah	125	DIFF
19	2	1980	Ireland	What's Another Year	143	DIFF
20	2	1981	United Kingdom	Making Your Mind Up	136	DIFF
21	2	1982	Germany	Ein bißchen Frieden	161	DIFF
22	2	1983	Luxembourg	Si la vie est cadeau	142	DIFF
23	2	1984	Sweden	Diggi-Loo Diggi-Ley	145	LIKE_FIRST
24	3	1976	United Kingdom	Save Your Kisses for Me	164	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
3	1	1974	Sweden	Hoo	24	DIFF
4	1	1975	Netherlands	Ding-a-dong	152	DIFF
5	1	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
6	1	1977	France	L'oiseau et l'enfant	136	DIFF
7	1	1978	Israel	A-Ba-Ni-Bi	157	DIFF
8	1	1979	Israel	Hallelujah	125	DIFF
9	1	1980	Ireland	What's Another Year	143	DIFF
10	1	1981	United Kingdom	Making Your Mind Up	136	DIFF
11	1	1982	Germany	Ein bißchen Frieden	161	DIFF
12	1	1983	Luxembourg	Si la vie est cadeau	142	LIKE_FIRST
13	2	1974	Sweden	Waterloo	24	A
14	2	1975	Netherlands	Ding-a-dong	152	DIFF
15	2	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
16	2	1977	France	L'oiseau et l'enfant	136	DIFF
17	2	1978	Israel	A-Ba-Ni-Bi	157	DIFF
18	2	1979	Israel	Hallelujah	125	DIFF
19	2	1980	Ireland	What's Another Year	143	DIFF
20	2	1981	United Kingdom	Making Your Mind Up	136	DIFF
21	2	1982	Germany	Ein bißchen Frieden	161	DIFF
22	2	1983	Luxembourg	Si la vie est cadeau	142	DIFF
23	2	1984	Sweden	Diggi-Loo Diggi-Ley	145	LIKE_FIRST
24	3	1976	United Kingdom	Save Your Kisses for Me	164	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

TO_YEAR

NON-WINNING YEARS

9

ANN

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

TO_YEAR

NON_WINNING_YEARS

9

SELECT

```
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
```

```
MATCH_RECOGNIZE (
```

```
  ORDER BY YEAR
```

```
  MEASURES
```

```
    MATCH_NUMBER() MATCH#
```

```
AFTER MATCH SKIP TO FIRST DIFF
PATTERN (A SAME* DIFF+ LIKE_FIRST+)
DEFINE
```

```
  SAME AS WINNER = PREV(WINNER),
```

```
  DIFF AS WINNER != A.WINNER,
```

```
  LIKE_FIRST AS WINNER = A.WINNER
```

```
)
```

```
ORDER BY MATCH#;
```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

TO_YEAR

NON_WINNING_YEARS

9

SELECT

```
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
```

```
MATCH_RECOGNIZE (
```

```
  ORDER BY YEAR
```

```
  MEASURES
```

```
    MATCH_NUMBER() MATCH#
```

ONE ROW PER MATCH

AFTER MATCH SKIP TO FIRST DIFF

PATTERN (A SAME* DIFF+ LIKE_FIRST+)

DEFINE

```
  SAME AS WINNER = PREV(WINNER),
```

```
  DIFF AS WINNER != A.WINNER,
```

```
  LIKE_FIRST AS WINNER = A.WINNER
```

)

ORDER BY MATCH#;

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

TO_YEAR

NON_WINNING_YEARS

9

SELECT

```
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
```

```
MATCH_RECOGNIZE (
```

```
  ORDER BY YEAR
```

```
  MEASURES
```

```
    MATCH_NUMBER() MATCH#,
    A.WINNER         WINNER
```

```
  ONE ROW PER MATCH
```

```
  AFTER MATCH SKIP TO FIRST DIFF
```

```
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
```

```
  DEFINE
```

```
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
```

```
)
```

```
ORDER BY MATCH#;
```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

SELECT

FROM (SELECT * FROM EUROVISION_WINNERS
WHERE YEAR BETWEEN 1971 AND 1991)

MATCH_RECOGNIZE (
ORDER BY YEAR
MEASURES

MATCH_NUMBER(MATCH#)
A.WINNER WINNER,

FIRST(YEAR) FROM_YEAR,
LAST(YEAR) TO_YEAR

ONE ROW PER MATCH

AFTER MATCH SKIP TO FIRST DIFF

PATTERN (A SAME* DIFF+ LIKE_FIRST+)

DEFINE

SAME AS WINNER = PREV(WINNER),

DIFF AS WINNER != A.WINNER,

LIKE_FIRST AS WINNER = A.WINNER

ORDER BY MATCH#;

Logical
Navigation

9

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

SELECT

FROM (SELECT * FROM EUROVISION
WHERE YEAR BETWEEN 1971MATCH_RECOGNIZE (
ORDER BY YEAR

MEASURES

MATCH_NUM

A.WINNER

FIRST(YEAR)

LAST (YEAR)

COUNT(DIFF.*)

ONE ROW PER MATCH

AFTER MATCH SKIP TO FIRST DIFF

PATTERN (A SAME* DIFF+ LIKE_FIRST+)

DEFINE

SAME AS WINNER = PREV(WINNER),

DIFF AS WINNER != A.WINNER,

LIKE_FIRST AS WINNER = A.WINNER

ORDER BY MATCH#;

COUNT
MAX
MIN
SUM
AVGAggregate
Functions

NON_WINNER_YEARS

NON_WINNING_YEARS

9

FROM_YEAR

WINNER

TO_YEAR

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	2	1980	Ireland	What's An		
20	2	1981	United Kingdom	Making Yo		
21	2	1982	Germany	Ein bißche		
22	2	1983	Luxembourg	Si la vie e		
23	2	1984	Sweden	Diggi-Loo		
24	3	1976	United Kingdom	Save Your Kisses for Me	104	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

TO_YEAR

NON_WINNING_YEARS

9

```
SELECT MATCH#, WINNER, FROM_YEAR, TO_YEAR,
       NON_WINNER_YEARS
```

```
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
```

```
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
```

```
    MATCH_NUMBER() MATCH#,
    A.WINNER        WINNER,
    FIRST(YEAR)     FROM_YEAR,
    LAST (YEAR)     TO_YEAR,
    COUNT(DIFF.*)   NON_WINNER_YEARS
```

```
ONE ROW PER MATCH
```

```
AFTER MATCH SKIP TO FIRST DIFF
```

```
PATTERN (A SAME* DIFF+ LIKE_FIRST+)
```

```
DEFINE
```

```
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
```

```
)
```

```
ORDER BY MATCH#;
```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reco		
3	1	1974	Sweden	Hoo		
4	1	1975	Netherlands	Ding-a-do		
5	1	1976	United Kingdom	Save You		
6	1	1977	France	L'oiseau e		
7	1	1978	Israel	A-Ba-Ni-B		
8	1	1979	Israel	Hallelujah		
9	1	1980	Ireland	What's An		
10	1	1981	United Kingdom	Making Yo		
11	1	1982	Germany	Ein bißche		
12	1	1983	Luxembourg	Si la vie e		
13	2	1974	Sweden	Waterloo		
14	2	1975	Netherlands	Ding-a-do		
15	2	1976	United Kingdom	Save You		
16	2	1977	France	L'oiseau e		
17	2	1978	Israel	A-Ba-Ni-B		
18	2	1979	Israel	Hallelujah		
19	3	1977	France	L'oiseau et l'enfant	136	DIFF
20	1	1	Luxembourg			9
21	2	2	Sweden			9
22	3	3	United Kingdom			4
23	4	4	Ireland			6
24	5	5	Sweden			6

```

SELECT MATCH#, WINNER, FROM_YEAR, TO_YEAR,
       NON_WINNER_YEARS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#,
    A.WINNER        WINNER,
    FIRST(YEAR)     FROM_YEAR,
    LAST (YEAR)     TO_YEAR,
    COUNT(DIFF.*)   NON_WINNER_YEARS
  ONE ROW PER MATCH
  AFTER MATCH SKIP TO FIRST DIFF
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE

```

R),

WINNER

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1	1	1972	Luxembourg	Après toi	128	A
2	1	1973	Luxembourg	Tu te reconnaîtras	129	SAME
3	1	1974	Sweden	Hoo	24	DIFF
4	1	1975	Netherlands	Ding-a-dong	152	DIFF
5	1	1976	United Kingdom	Save	164	DIFF
6	1	1977	France	L'oise	136	DIFF
7	1	1978	Israel	A-Ba-Ni-Bi	157	DIFF
8	1	1979	Israel	Hallelujah	125	DIFF
9	1	1980	Ireland	What's Another Year	143	DIFF
10	1	1981	United Kingdom	Making Your Mind Up	136	DIFF
11	1	1982	Germany	Ein bißchen Frieden	161	DIFF
12	1	1983	Luxembourg	Si la vie est cadeau	142	LIKE_FIRST
13	2	1974	Sweden	Waterloo	24	A
14	2	1975	Netherlands	Ding-a-dong	152	DIFF
15	2	1976	United Kingdom	Save Your Kisses for Me	164	DIFF
16	2	1977	France	L'oiseau et l'enfant	136	DIFF
17	2	1978	Israel	A-Ba-Ni-Bi	157	DIFF
18	2	1979	Israel	Hallelujah	125	DIFF
19	2	1980	Ireland	What's Another Year	143	DIFF
20	2	1981	United Kingdom	Making Your Mind Up	136	DIFF
21	2	1982	Germany	Ein bißchen Frieden	161	DIFF
22	2	1983	Luxembourg	Si la vie est cadeau	142	DIFF
23	2	1984	Sweden	Diggi-Loo Diggi-Ley	145	LIKE_FIRST
24	3	1976	United Kingdom	Save Your Kisses for Me	164	A
25	3	1977	France	L'oiseau et l'enfant	136	DIFF

FROM_YEAR

WINNER

AVG_POINTS_OF_WINNER

TO_YEAR

NON_WINNING_YEARS

9

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1					128	A
2					129	SAME
3					24	DIFF
4					152	DIFF
5				Me	164	DIFF
6					136	DIFF
7					157	DIFF
8					125	DIFF
9					143	DIFF
10					136	DIFF
11					161	DIFF
12					142	LIKE_FIRST
13					24	A
14					152	DIFF
15				Me	164	DIFF
16					136	DIFF
17					157	DIFF
18					125	DIFF
19					143	DIFF
20					136	DIFF
21					161	DIFF
22					142	DIFF
23					145	LIKE_FIRST
24				Me	164	A
25					136	DIFF

```

SELECT *
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER()    MATCH#,
    A.WINNER           WINNER,
    FIRST(YEAR)        FROM_YEAR,
    LAST (YEAR)        TO_YEAR,
    COUNT(DIFF.*)      NON_WINNER_YEARS,
    AVG(DIFF.POINTS)   AVG_POINTS_OF_OTHERS

```

ONE ROW PER MATCH
 AFTER MATCH SKIP TO FIRST DIFF
 PATTERN (A SAME* DIFF+ LIKE_FIRST+)

```

DEFINE
  SAME AS WINNER = PREV(WINNER),
  DIFF AS WINNER != A.WINNER,
  LIKE_FIRST AS WINNER = A.WINNER

```

```

)
ORDER BY MATCH#;

```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1					128	A
2					129	SAME
3					24	DIFF
4					152	DIFF
5				Me	164	DIFF
6					136	DIFF
7					157	DIFF
8					125	DIFF
9					143	DIFF
10					136	DIFF
11					161	DIFF
12					142	LIKE_FIRST
13					24	A
14					152	DIFF
15				Me	164	DIFF
16					136	DIFF
17					157	DIFF
18					125	DIFF
19					143	DIFF
20					136	DIFF
21					161	DIFF
22					142	DIFF
23					145	LIKE_FIRST
24				Me	164	A
25					136	DIFF

```

SELECT *
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER()    MATCH#,
    A.WINNER           WINNER,
    FIRST(YEAR)        FROM_YEAR,
    LAST (YEAR)        TO_YEAR,
    COUNT(DIFF.*)      NON_WINNER_YEARS,
    AVG(DIFF.POINTS)   AVG_POINTS_OF_OTHERS

  ONE ROW PER MATCH
  AFTER MATCH SKIP TO FIRST DIFF
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  SUBSET W = (A, SAME, LIKE_FIRST)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY MATCH#;

```

	MATCH#	YEAR	WINNER	SONG	POINTS	VAR
1					128	A
2					129	SAME
3					24	DIFF
4					152	DIFF
5				Me	164	DIFF
6					136	DIFF
7					157	DIFF
8					125	DIFF
9					143	DIFF
10					136	DIFF
11					161	DIFF
12					142	LIKE_FIRST
13					24	A
14					152	DIFF
15				Me	164	DIFF
16					136	DIFF
17					157	DIFF
18					125	DIFF
19					143	DIFF
20					136	DIFF
21					161	DIFF
22					142	DIFF
23					145	LIKE_FIRST
24				Me	164	A
25					136	DIFF

```

SELECT *
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER()    MATCH#,
    A.WINNER           WINNER,
    FIRST(YEAR)        FROM_YEAR,
    LAST (YEAR)        TO_YEAR,
    COUNT(DIFF.*)      NON_WINNER_YEARS,
    AVG(DIFF.POINTS)   AVG_POINTS_OF_OTHERS,
    AVG(W.POINTS)     AVG_POINTS_OF_WINNER
  ONE ROW PER MATCH
  AFTER MATCH SKIP TO FIRST DIFF
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  SUBSET W = (A, SAME, LIKE_FIRST)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY MATCH#;

```

```
SELECT MATCH#, WINNER, FROM_YEAR, TO_YEAR,
       NON_WINNER_YEARS
FROM (SELECT * FROM EUROVISION_WINNERS
      WHERE YEAR BETWEEN 1971 AND 1991)
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#,
    A.WINNER        WINNER,
    FIRST(YEAR)     FROM_YEAR,
    LAST (YEAR)     TO_YEAR,
    COUNT(DIFF.*)   NON_WINNER_YEARS
  ONE ROW PER MATCH
  AFTER MATCH SKIP TO FIRST DIFF
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY MATCH#;
```

```
SELECT MATCH#, WINNER, FROM_YEAR, TO_YEAR,  
       NON_WINNER_YEARS  
FROM EUROVISION_WINNERS
```

```
MATCH_RECOGNIZE (  
  ORDER BY YEAR  
  MEASURES  
    MATCH_NUMBER() MATCH#,  
    A.WINNER        WINNER,  
    FIRST(YEAR)     FROM_YEAR,  
    LAST (YEAR)     TO_YEAR,  
    COUNT(DIFF.*)   NON_WINNER_YEARS  
  ONE ROW PER MATCH  
  AFTER MATCH SKIP TO FIRST DIFF  
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)  
  DEFINE  
    SAME AS WINNER = PREV(WINNER),  
    DIFF AS WINNER != A.WINNER,  
    LIKE_FIRST AS WINNER = A.WINNER  
)  
ORDER BY NON_WINNER_YEARS, MATCH#;
```

MATCH#	WINNER	FROM_YEAR	TO_YEAR	NON_WINNER_YEARS
2	Netherlands	1957	1959	1
3	France	1958	1960	1
5	France	1960	1962	1
29	Ireland	1992	1996	1
35	Sweden	2012	2015	2
6	Luxembourg	1961	1965	3
18	United Kingdom	1976	1981	4
25	Ireland	1987	1994	4
37	Ukraine	2016	2022	4
13	Netherlands	1969	1975	5
10	Luxembourg	1965	1973	6
20	Ireland	1980	1987	6
23	Sweden	1984	1991	6
36	Sweden	2015	2023	6
28	Sweden	1991	1999	7
12	United Kingdom	1967	1976	8
4	Netherlands	1959	1969	9
14	Ireland	1970	1980	9
15	Luxembourg	1972	1983	9
16	Sweden	1974	1984	9
24	Norway	1985	1995	9
34	Ukraine	2004	2016	11
32	Sweden	1999	2012	12
33	Denmark	2000	2013	12
30	Norway	1995	2009	13
7	France	1962	1977	14
21	United Kingdom	1981	1997	15
19	Israel	1978	1998	18
31	Israel	1998	2018	19
9	Italy	1964	1990	25
22	Germany	1982	2010	27
27	Italy	1990	2021	29
1	Switzerland	1956	1988	31
26	Switzerland	1988	2024	34
8	Denmark	1963	2000	36
17	Netherlands	1975	2019	43
11	Austria	1966	2014	47

```
SELECT MATCH#, WINNER, FROM_YEAR, TO_YEAR,
       NON_WINNER_YEARS
FROM EUROVISION_WINNERS
```

```
MATCH_RECOGNIZE (
  ORDER BY YEAR
  MEASURES
    MATCH_NUMBER() MATCH#,
    A.WINNER        WINNER,
    FIRST(YEAR)     FROM_YEAR,
    LAST (YEAR)     TO_YEAR,
    COUNT(DIFF.*)   NON_WINNER_YEARS
  ONE ROW PER MATCH
  AFTER MATCH SKIP TO FIRST DIFF
  PATTERN (A SAME* DIFF+ LIKE_FIRST+)
  DEFINE
    SAME AS WINNER = PREV(WINNER),
    DIFF AS WINNER != A.WINNER,
    LIKE_FIRST AS WINNER = A.WINNER
)
ORDER BY NON_WINNER_YEARS, MATCH#;
```

13:00 – 14:00	Pranzo Lunch	
	<i>(room "Alda Merini")</i>	<i>(room "Cedro")</i>
14:00 – 14:45	Paolo Zampolini - Technology Reply Trasformazione workload Database Oracle da AWS verso OCI in architettura multicloud 🇮🇹	Gianni Ceresa - DATAlysis LLC Oracle ACE Director Analytics in 2024 can hurt your database in new, unexpected, ways 🇬🇧
15:00 – 15:45	Niall Mc Phillips - Long Acre sàrl Oracle ACE Pro What's Our Vector, Victor? Navigating AI Vector Searches in Oracle 23ai 🇬🇧	Giovanni Rosa - Technology Reply Automatizzare la documentazione di codice legacy con IA Generativa sfruttando i servizi OCI AI Vector Search 🇮🇹
16:00 – 16:45	Oren Nakdimon - Moovit Oracle ACE Director Write Less (Code) with More (Features) 🇬🇧	Piet de Visser - PDVBV Oracle ACE Pro Distributed databases, what to expect 🇬🇧
17:00 – 17:45	Neil Chandler - Chandler Systems Ltd Oracle ACE Director Fundamental Oracle Security – What Many Of You Are Not Doing 🇬🇧	Oren Nakdimon - Moovit Oracle ACE Director Oracle SQL Pattern Matching Made Easy 🇬🇧
17:45 – 18:00	Conclusione GoodBye Message	

```
(  
select route_name,  
       departure_time  
from   ...  
where  ...  
)
```

```
(  
select route_name,  
       departure_time  
from   ...  
where  ...  
) match_recognize (  

```

```
)
```

```
(  
select route_name,  
       departure_time  
from   ...  
where  ...  
) match_recognize (  
    partition by route_name . . .  
  
)
```



Dividing into
Groups

```
(  
select route_name,  
       departure_time  
from   ...  
where  ...  
) match_recognize (  
    partition by route_name  
    order by departure_time  
  
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
    partition by route_name
    order by departure_time

    pattern (X Y{2,}      )
    define
        Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
    partition by route_name
    order by departure_time

    pattern (X Y{2,}      )
    define
        Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(  
  select route_name,  
         departure_time  
  from   ...  
  where  ...  
) match_recognize (  
  partition by route_name  
  order by departure_time
```



Pattern
Alternation

```
pattern (X Y{2,} | X).  
define
```

```
  Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
```

```
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures

  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,

  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,

  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,

  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,
           count(*) number_of_trips
  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```
select route_name,
```

```
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,
           count(*) number_of_trips
  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
```

```

select route_name, number_of_trips,

(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,
           count(*) number_of_trips
  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)

```

```

select route_name, number_of_trips,
       to_char(from_time,'hh24:mi')
       ||nv12(to_time,
              ' - '||to_char(to_time,'hh24:mi')||' every '||minutes||' minutes',
              null) departures
(
select route_name,
       departure_time
from    ...
where   ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,
           count(*) number_of_trips
  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)

```

```

select route_name, number_of_trips,
       to_char(from_time, 'hh24:mi')
       || nv12(to_time,
               ' - ' || to_char(to_time, 'hh24:mi') || ' every ' || minutes || ' minutes',
               null) departures
(
select route_name,
       departure_time
from   ...
where  ...
) match_recognize (
  partition by route_name
  order by departure_time
  measures X.departure_time from_time,
           last(Y.departure_time) to_time,
           (first(Y.departure_time)-X.departure_time)*24*60 minutes,
           count(*) number_of_trips
  pattern (X Y{2,} | X)
  define
    Y as departure_time-prev(departure_time) = first(Y.departure_time)-X.departure_time
)
order by route_name, from_time;

```

23c> print rc

ROUTE_NAME	NUMBER_OF_TRIPS	DEPARTURES
Piccadilly	1	05:24
Piccadilly	1	05:38
Piccadilly	1	05:50
Piccadilly	4	06:00 - 06:21 every 7 minutes
Piccadilly	1	06:27
Piccadilly	1	06:33
Piccadilly	1	06:38
Piccadilly	1	06:44
Piccadilly	1	06:49
Piccadilly	125	06:55 - 17:15 every 5 minutes
Piccadilly	22	17:19 - 19:04 every 5 minutes
Piccadilly	40	19:10 - 22:25 every 5 minutes
Piccadilly	11	22:29 - 23:19 every 5 minutes
Piccadilly	3	23:25 - 23:35 every 5 minutes
Piccadilly	1	23:39
Piccadilly	1	23:44
Piccadilly	1	23:50
Piccadilly	1	23:55
Piccadilly	5	00:00 - 00:20 every 5 minutes
Piccadilly	1	00:27
Piccadilly	18	00:30 - 03:20 every 10 minutes

21 rows selected.

23c> pause

THANK YOU 😊

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X @DBoriented