

# Business Patterns & Seasonality

## 1 – Understanding Seasonality

**Assignment:** Analyze monthly and weekly volume patterns in website sessions and orders in 2012 to analyze seasonal trends in order to support plan for 2013.

```
-- Analyzing Seasonality
USE mavenfuzzyfactory;
SELECT
    YEAR(s.created_at) AS yr,
    MONTH(s.created_at) AS mo,
    COUNT(DISTINCT s.website_session_id) AS sessions,
    COUNT(DISTINCT o.order_id) AS orders
FROM website_sessions s LEFT JOIN orders o
ON s.website_session_id = o.website_session_id
WHERE s.created_at < '2013-01-01'
GROUP BY 1,2;
```

yr	mo	sessions	orders
2012	3	1877	60
2012	4	3732	99
2012	5	3734	108
2012	6	3967	140
2012	7	4245	169
2012	8	6098	228
2012	9	6543	287
2012	10	8182	371
2012	11	14020	618
2012	12	10072	506

- In general, Session and Order volumes are growing steadily over time.
- Peak Season appeared at the end of the year where the highest amount of sessions and orders occurred in November. Figures in December dropped a bit from November but were still much higher relative to the beginning of the year in 2012.
- Customer Support and Inventory Management should be in line with the surge to fill the demand in holiday seasons.

## 2 – Understanding Data for Customer Service

**Assignment:** Analyze the Average Session Volume by hour of day and day of week to support Customer Service decisions, i.e. number of live chat customer service rep during each time period to improve customer experience.

```
-- Analyzing Business Patterns
WITH daily_hourly_sessions AS
(
SELECT
    DATE(created_at) AS created_date,
    WEEKDAY(created_at) AS wkday,
    HOUR(created_at) AS hr,
    COUNT(DISTINCT website_session_id) AS sessions
FROM website_sessions
WHERE created_at BETWEEN '2012-09-15' AND '2012-11-15' -- before holiday surge
GROUP BY 1,2,3)

SELECT
    hr,
    ROUND(AVG(CASE WHEN wkday = 0 THEN sessions ELSE NULL END),1) AS mon,
    ROUND(AVG(CASE WHEN wkday = 1 THEN sessions ELSE NULL END),1) AS tue,
    ROUND(AVG(CASE WHEN wkday = 2 THEN sessions ELSE NULL END),1) AS wed,
    ROUND(AVG(CASE WHEN wkday = 3 THEN sessions ELSE NULL END),1) AS thu,
    ROUND(AVG(CASE WHEN wkday = 4 THEN sessions ELSE NULL END),1) AS fri,
    ROUND(AVG(CASE WHEN wkday = 5 THEN sessions ELSE NULL END),1) AS sat,
    ROUND(AVG(CASE WHEN wkday = 6 THEN sessions ELSE NULL END),1) AS sun
FROM daily_hourly_sessions
GROUP BY hr
ORDER BY hr;
```

hr	mon	tue	wed	thu	fri	sat	sun
0	9.3	7.9	8.3	9	9.6	7.6	5.6
1	7.9	7.1	5.7	7	6.9	4.4	5
2	5.9	6.3	5.4	5.5	7	5.4	3.4
3	6.4	4.9	3.7	5.3	4.5	3.6	3
4	5.4	4.9	5.6	5.6	4.4	3.8	3.1
5	5.3	5.2	5.8	3.6	5.4	3	2.4
6	5.3	6	4.7	6	5.6	4.9	3.6
7	5.4	6.4	5.7	6.1	6.1	4.2	3.6
8	9.1	8.4	8.7	10.4	7.5	4.9	4.4
9	14.1	13.7	15.2	17.9	11	4.8	5.2
10	17.3	15.2	19.9	18.1	18.3	8.6	5.6
11	19.1	17.9	21.8	20.3	19.5	7	7
12	17.3	21.1	24.6	21.8	19.8	7.6	6.6
13	21.3	22.3	22.4	23.9	19	8.1	7.4
14	17.9	23.8	20.9	20.5	21.9	8.6	7.6
15	17.8	19.4	22.9	18	19.6	8.9	7.7
16	22.7	19.7	24.8	24.3	21.5	6.1	5.8
17	20.1	21.1	22.7	18.5	20.4	8.1	5.9
18	17.6	16.1	19.2	18.9	12.3	6.8	8.1
19	12.9	13.9	14.4	14.9	11.3	4.9	6.9
20	12.3	13.9	13.8	12	13.3	6.9	7.8
21	11.6	13.2	13.3	10.8	10.1	6.1	8.3
22	9.2	11.3	10.1	10.1	7.6	5.4	9.9
23	9.1	9.7	10.4	11.8	5	5.2	9.7

- In terms of average number of sessions, slightly less traffic coming in during the Weekend.
- Higher volume appears during 8AM to 5PM, an additional support member might be needed.