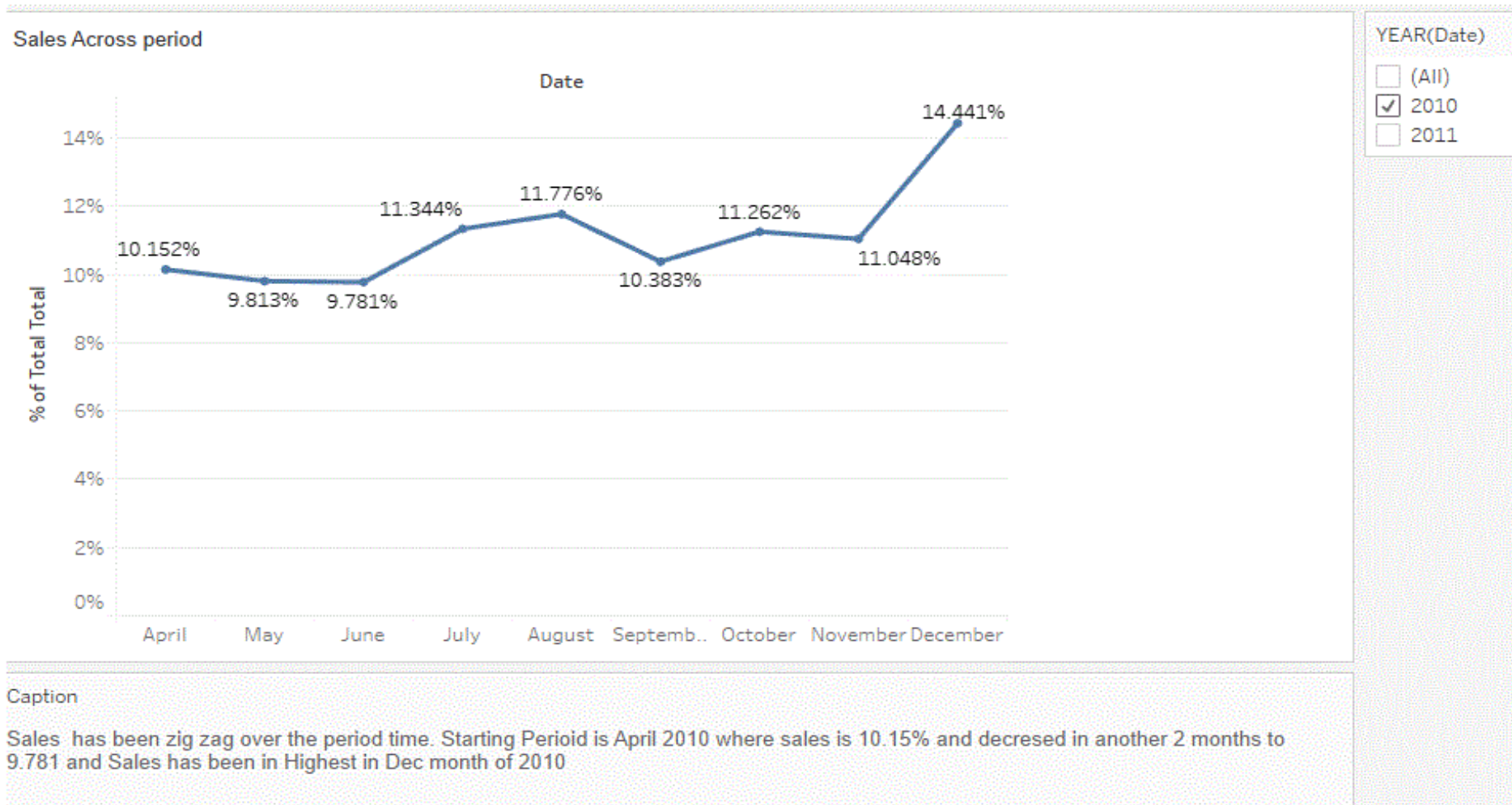
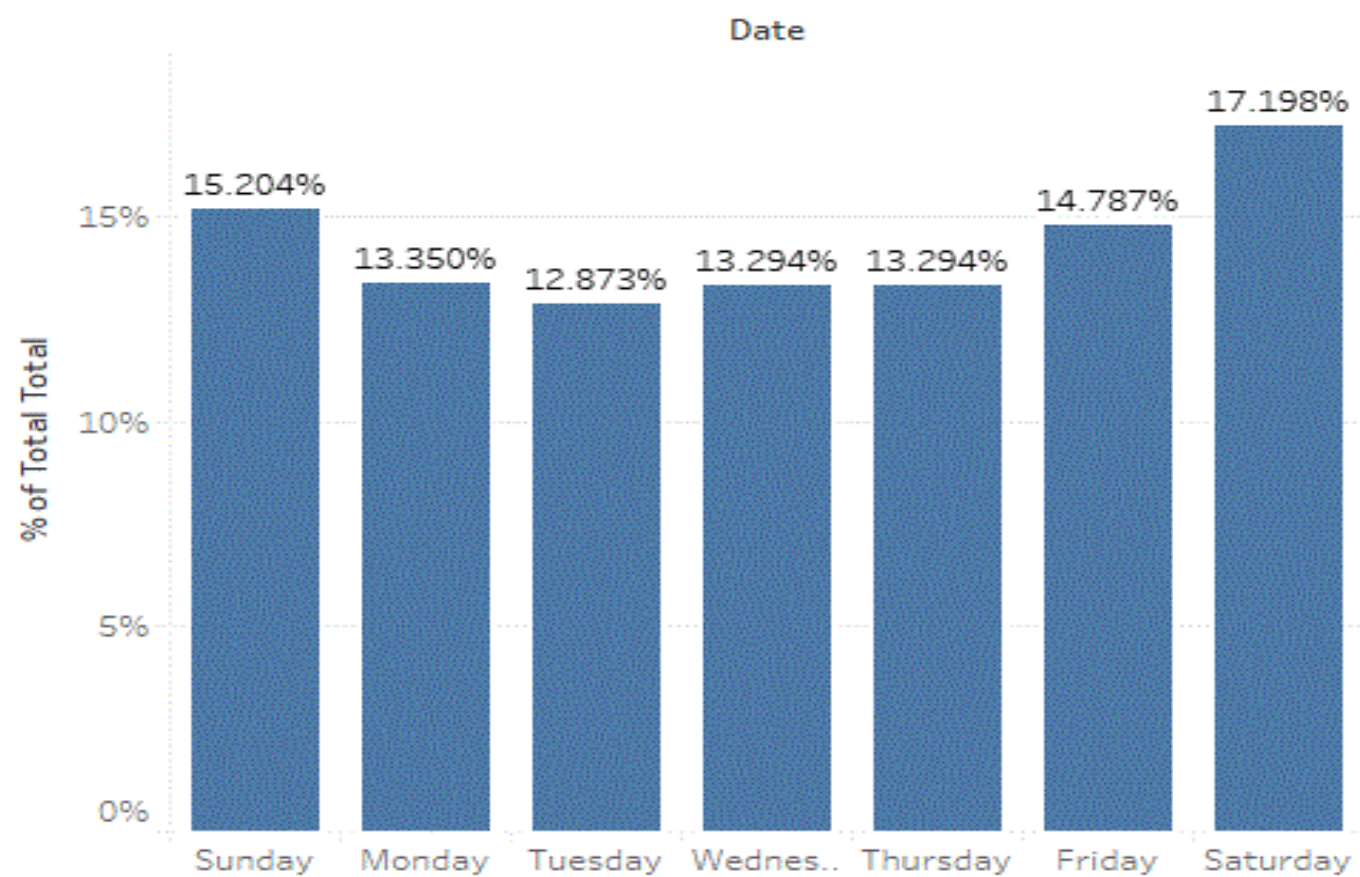


## Q Exploratory Analysis of data & executive summary of your top findings, supported by graphs.



### Sales Across Various Days



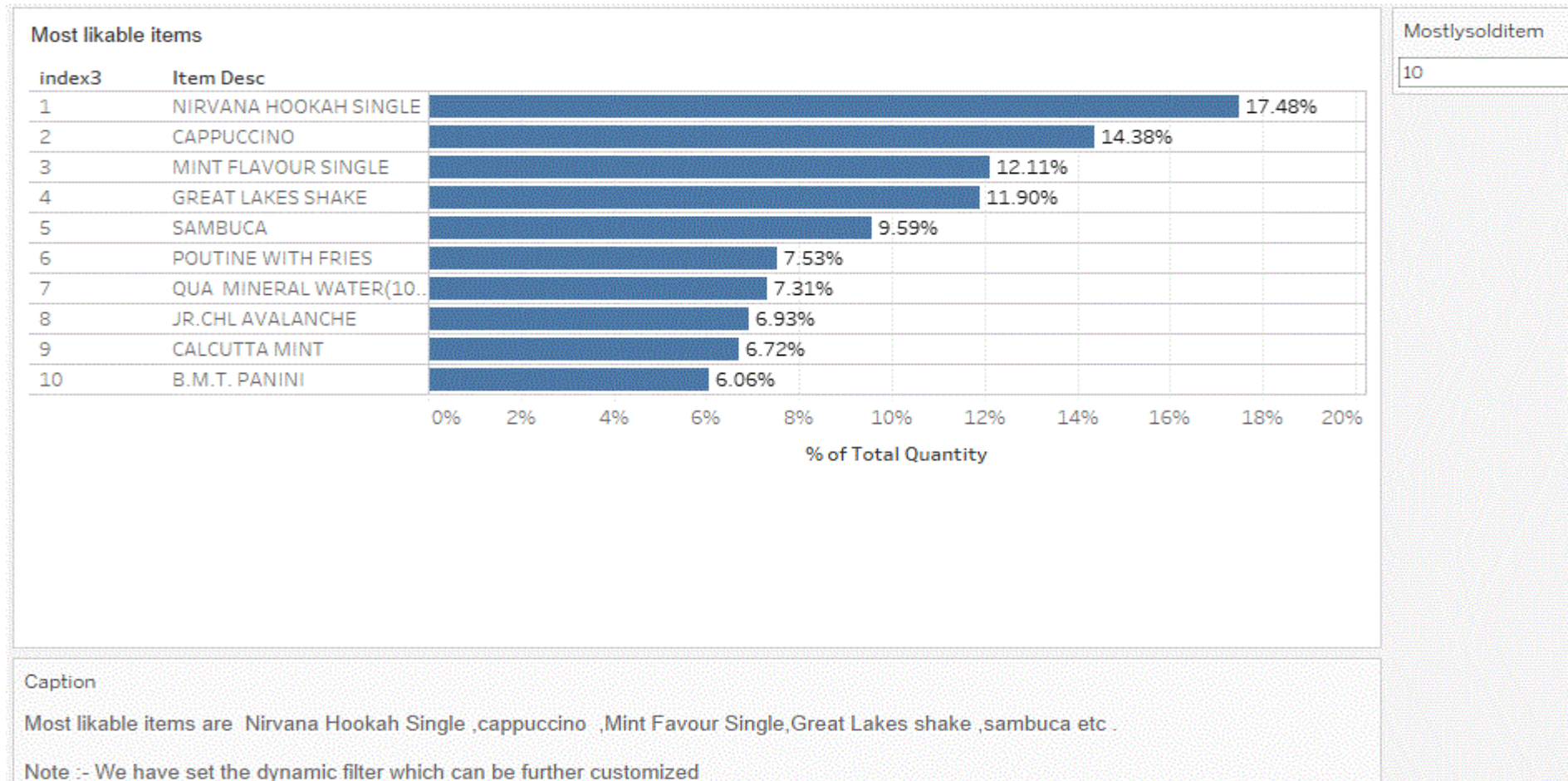
#### Caption

Saturday is the Highest Sales Day. Sunday is Second Largest and Friday is Third Largest Sales Day.

- Key Observations

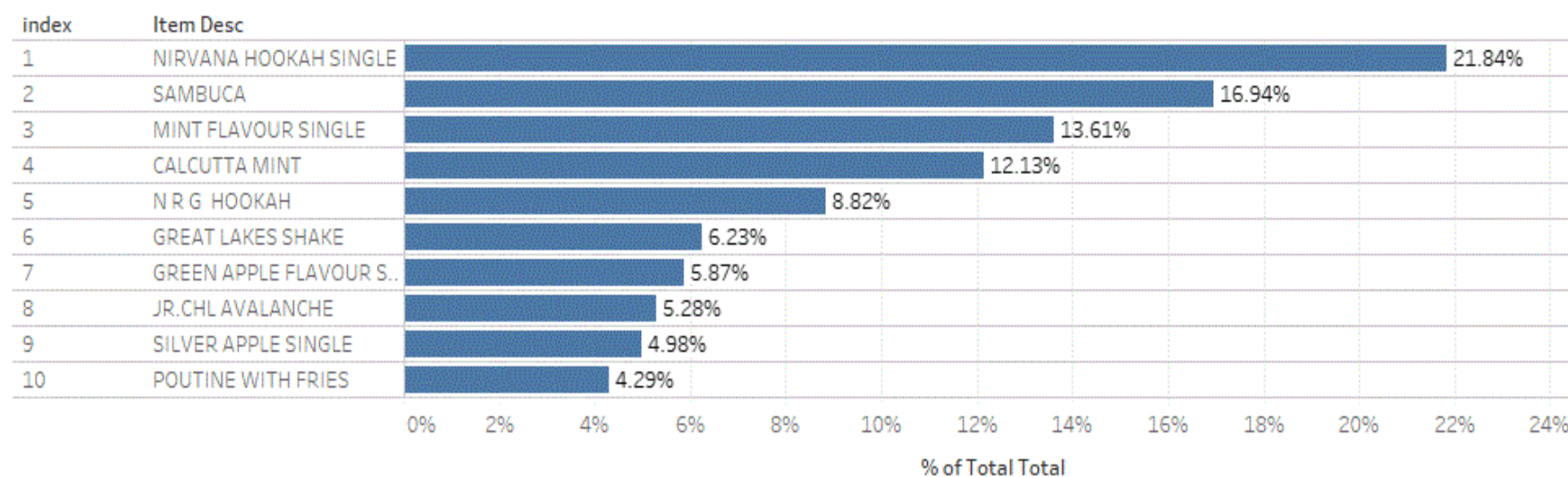
- Sales has been zig zag over the period time. Starting Period is April 2010 where sales is 10.15% and decreased in another 2 months to 9.781 and Sales has been in Highest in Dec month of 2010
- Saturday is the Highest Sales Day. Sunday is Second Largest and Friday is Third Largest Sales Day.
- Top Bottom which are rarely ordered by customers 1+1 VLN CAB SAUV(BTL),1+1 VLN SAUV BLANC(BTL),2 AXE OCEAN PINTOAGE(BTL),4 SEASONS CLAS SYRAH(BTL),ADD BUTTERED TOAST,AL SIKANDARI TWIST,2HOOKAH DOUBLE,ASH TRAYS,BIG1 4 SEASONS ,CLAS SAUV(BTL),BIG1 4SEASON CLAS SAUV(GLS)
- Most likable Items are Nirvana Hookah Single,Cappuccino,Mint Flavour Single,Great Lakes Shake,Sambuca,Poutine fries,Qua Mineral Water ,JR. CHL Avalanche ,Calcutta Mint,B.M.T panini
- Most items sold in terms of value are Nirvana Hookah Single,Sambuca,Mint Flavour Single,Calcutta Minit,NRG Hookah ,Great Lake Shakes ,Green Apple Favours ,JR Cha avalanche ,Silver Apple Single ,Poutine With Fry
- **Important Note :- All the graph can be viewed from tableau link (I am enclosing in word file)**

**Q 2. What kind of trends do you notice in terms of consumer behavior over different times of the day and different days of the week? Can you give concrete recommendations based on the same?**





### Sales of top N items



Top n Menu Items

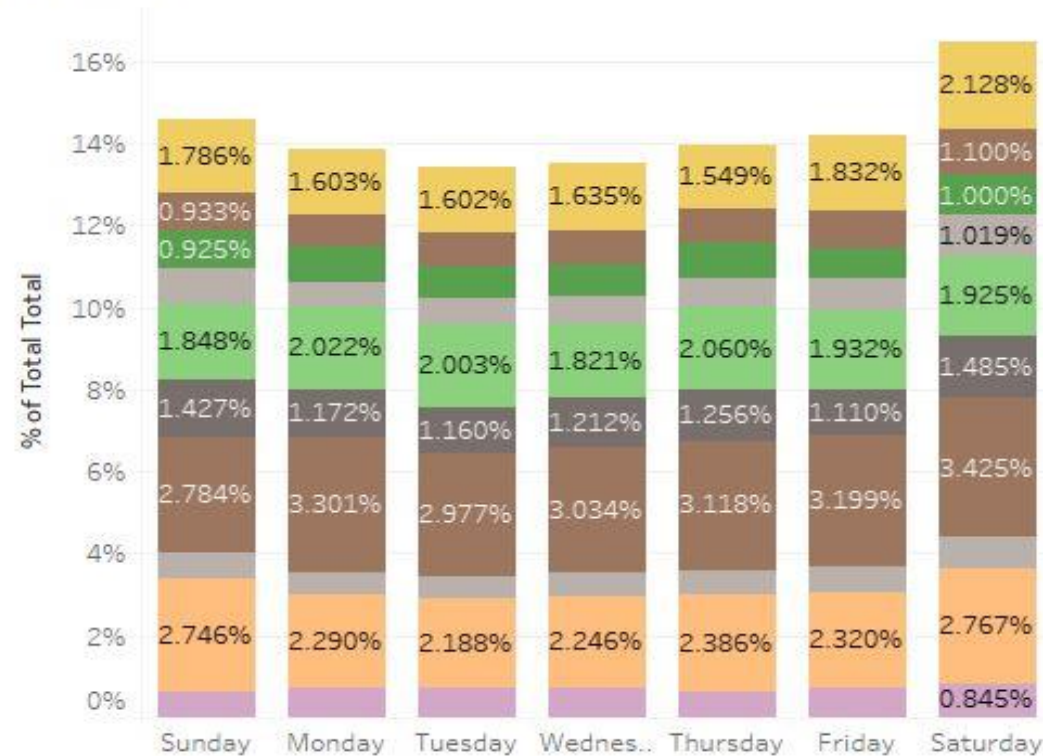
10

Caption

Sales of top n items , We have set the filtered for 10 ten items .it can be further customzied to 20,30 etc

# Item trend across the week

Items Across Week



## Caption

Weekly Trend of the items . Presently it has configured for 10 items . And it is dynamic in nature , From this any number of items can be viewed

## WEEKDAY(Date)

- ☒ (All)
- ☒ Sunday
- ☒ Monday
- ☒ Tuesday
- ☒ Wednesday
- ☒ Thursday
- ☒ Friday
- ☒ Saturday

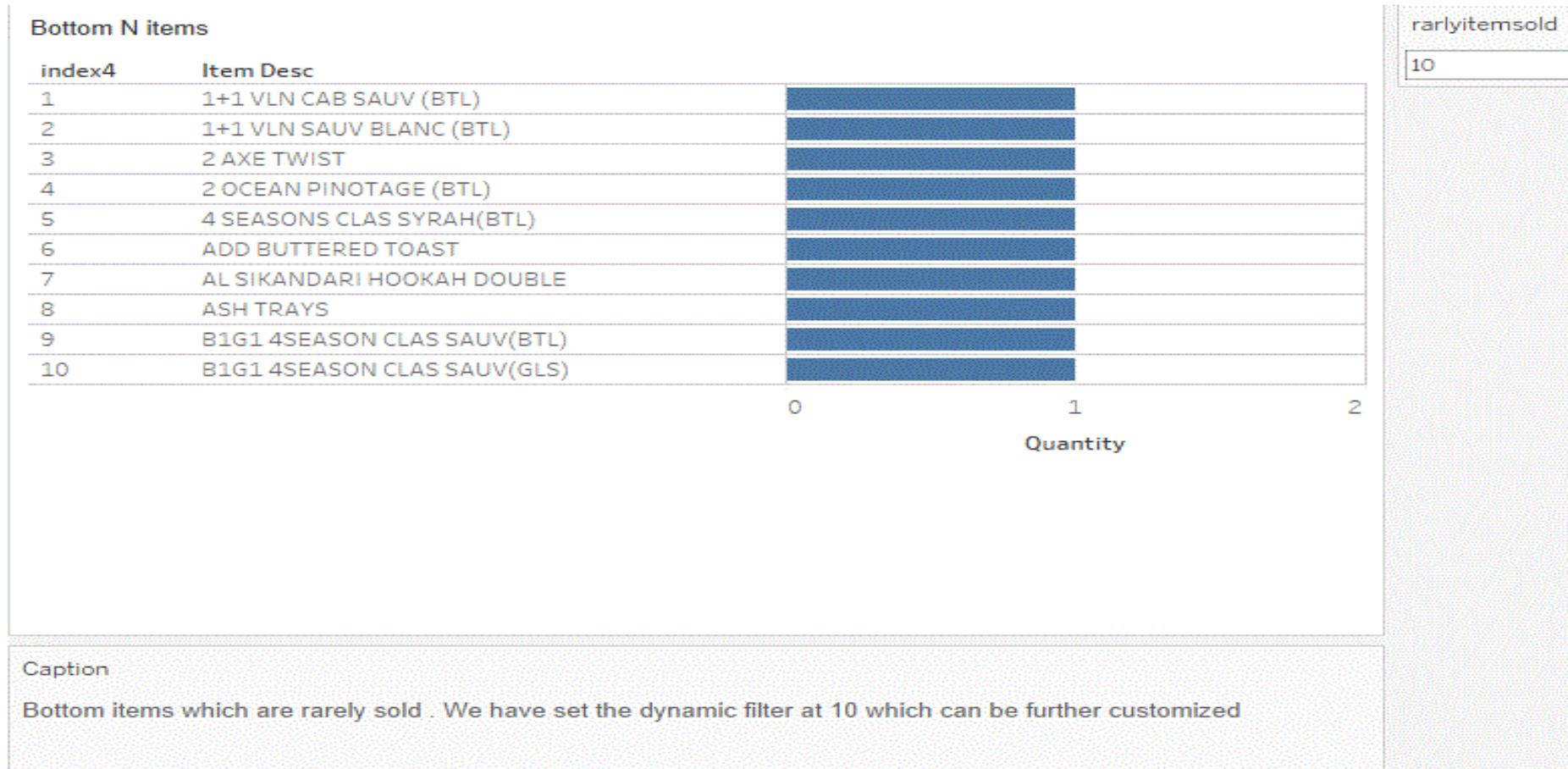
## Item Desc

- CALCUTTA MINT
- GREAT LAKES SHAKE
- GREEN APPLE FLAVO..
- JR. CHL AVALANCHE
- MINT FLAVOUR SING..
- N R G HOOKAH
- NIRVANA HOOKAH S..
- POUTINE WITH FRIES
- SAMBUCA
- SILVER APPLE SINGLE

## Items

- In the support of answer to question What kind of trends do you notice in terms of consumer behavior over different times of the day and different days of the week? Can you give concrete recommendations based on the same? there are 3 graph has been prepared
- 1. Most Likable items in terms of quantity
- 2. Most Items sold in th terms of valuation
- 3. Items trends arosss the week
- Most likable Items are Nirvana Hookah Single,Cappuccino,Mint Flavour Single,Great Lakes Shake,Sambuca,Poutinefries,Qua Mineral Water ,JR. CHL Avalanche ,Calcutta Mint,B.M.T panini
- Most items sold in iterns of value are Nirvana Hookah Single,Sambuca,Minit Flavour Single,Calcutta Minit,NRG Hookah ,Great Lake Shakes ,Green Apple Favours ,JR Cha avalance ,Silver Apple Single ,Poutine With Fry
- Through the graph Items across the Week , trend of various of items across the week can be easily observed .e.g Nirvana Hookah and Sambuca having Max sales on Saturday as compare to other days.
- We can Introduce the loyalty points . If person purchase any most likable item 6 times in a week , then 7th times would be free. It will maintain the customer motivation .
- If customer buys the Items of certain amount on certain day, On the basis of the we can offer the loyalty point . From the Loyalty point person can the buy items which is rarly sold . On the basis of customer feedback further corrective action can be taken

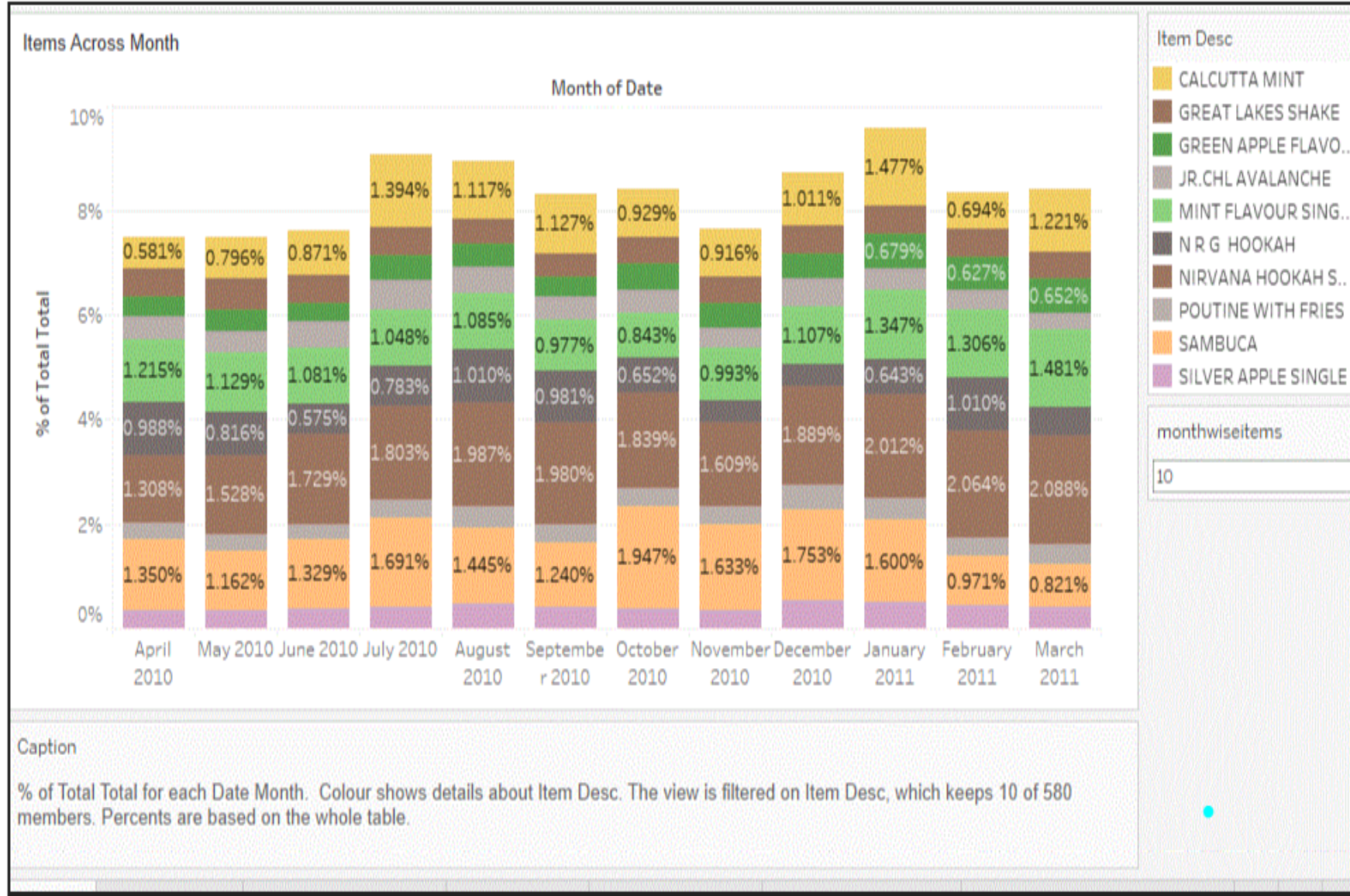
### Q3 Are there certain menu items that can be taken off the menu?





- Above Graph shows which are bottom 10 Items which are rarely ordered by the customers .
- 10 Bottom which are rarely ordered by customers 1+1 VLN CAB SAUV(BTL),1+1 VLN SAUV BLANC(BTL),2 AXE TWIST,2 OCEAN PINTOAGE(BTL),4 SEASONS CLAS SYRAH(BTL),ADD BUTTERED TOAST,AL SIKANDARI HOOKAH DOUBLE,ASH TRAYS,BIG1 4 SEASONS ,CLAS SAUV(BTL),BIG1 4SEASON CLAS SAUV(GLS)
- Above menu items , there are other items which can be obtaining just putting the value N in the filter
- These items can be reviewed and finally decision can be taken for removing the items

## Q4 Are there trends across months that you are able to notice?

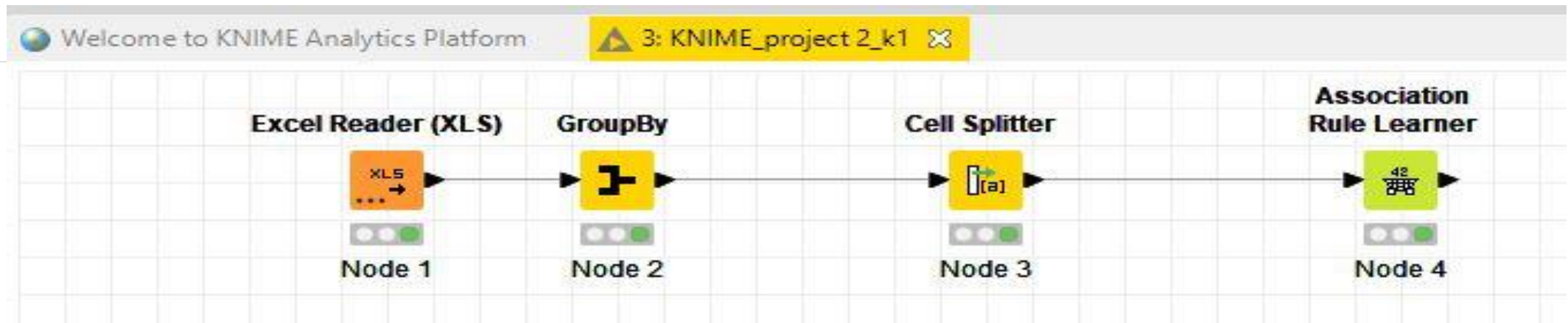


- Above Figure shows the top 10 items trends across the month.
- though this graph trend of any top n items can be determined.
- e.g Sales of Nirvana Hookah is increased from 1.3 % to 2.08 % from April 2010 to March 2011.
- e.g Same way We can easily see Sales of Sambuca has been from April 2010 to Mar 2011

Identify the most popular combos that can be suggested to the restaurant chain after a thorough analysis of the most commonly occurring sets of menu items in the customer orders. The restaurant doesn't have any combo meals. Can you suggest the best combo meals?( Answer As per a,b,c)

a) Use of Market Basket Analysis (Association Rules)

How Market Basket Analysis has been derived





**There are four steps Involved In deriving the Association Rule.**

**Step1 :- Firstly Data is read through Excel Reader Node .**

**Step 2 :- Data is group by Bill Number .**

**Step 3:- Cell Splitter Node has been invoked and delimited by ,**

**Step 4:- Association Rules learner has been applied**

**As the final result 85 rules are derived as below**

---

# Association Rule Part 1

Row ID	<input type="checkbox"/> Sup...	<input type="checkbox"/> Confide...	<input type="checkbox"/> Lift	<input checked="" type="checkbox"/> Consequent	<input checked="" type="checkbox"/> implies	[...] Items
rule0	0	0.212	4.461	QUA MINERAL WATER(1000ML)	<---	[WARM PEPPER & CHICKPEA SALAD]
rule1	0	0.206	7.965	COUNTRY LEMONADE	<---	[ADD POTATO WEDGES]
rule2	0	0.333	37.444	MEZE PLATTER	<---	[VEG PASTA PESTO]
rule3	0	0.467	9.566	POUTINE WITH FRIES	<---	[ADD CHICKEN SAUSAGE]
rule4	0	0.583	224.301	STUFFED MUSHROOM	<---	[SPINACH TEMPURA]
rule5	0	0.226	263.373	MUSTARD HONEY MAYO SALA...	<---	[CHICKEN SALAMI]
rule6	0	0.2	269.162	CEASAR SALAD BOWL	<---	[COTTAGE CHEESE]
rule7	0	0.2	87.478	FRUIT FROM THE TROPICS	<---	[CELERY N ORANGE]
rule8	0	0.216	4.547	QUA MINERAL WATER(1000ML)	<---	[CRUMBED TOFU CRUSTINI]
rule9	0	0.205	2.625	CAPPUCCINO	<---	[ASIAN WOK TOSSED SALAD]
rule10	0	0.25	7.831	MASALA CHAI CUTTING	<---	[BEER HOOKAH]
rule11	0	0.216	16.963	THE CHOCO LATTE	<---	[CAFE MIT SCHLAG]
rule12	0	0.229	103.869	APPLE CARROT N GINGER JUICE	<---	[CELERY N ORANGE]
rule13	0	0.229	290.834	FRENCH VINAIGRETTE SALAD ...	<---	[COTTAGE CHEESE]
rule14	0	0.267	358.882	CEASAR SALAD BOWL	<---	[CHICKEN SAUSAGE]
rule15	0	0.25	416.56	MASALA OMELETTE	<---	[MUSHROOM]
rule16	0	0.25	5.257	QUA MINERAL WATER(1000ML)	<---	[ETHIOPIAN YIRGACHEFFE (AULAIT)]
rule17	0	0.265	15	GARDEN FRESH PANINI	<---	[ADD POTATO WEDGES]
rule18	0	0.281	31.593	MEZE PLATTER	<---	[BEER HOOKAH]
rule19	0	0.237	4.855	POUTINE WITH FRIES	<---	[PASTA ALFREDO NONVEG]
rule20	0	0.281	5.765	POUTINE WITH FRIES	<---	[BEER HOOKAH]
rule21	0	0.281	67.87	SCRAMBLED EGGS	<---	[MUSHROOM]
rule22	0	0.281	152.577	PASTA ALFREDO VEG	<---	[BEER HOOKAH]
rule23	0	0.257	299.923	MUSTARD HONEY MAYO SALA...	<---	[COTTAGE CHEESE]
rule24	0	0.4	5.119	CAPPUCCINO	<---	[ADD IRISH CREAM FLAVOUR]
rule25	0	0.312	624.839	CHEDDAR CHEESE	<---	[MUSHROOM]
rule26	0	0.286	624.839	MUSHROOM	<---	[CHEDDAR CHEESE]
rule27	0	0.238	476.068	CHEDDAR CHEESE	<---	[MASALA OMELETTE]
rule28	0	0.286	476.068	MASALA OMELETTE	<---	[CHEDDAR CHEESE]
rule29	0	0.312	88.183	3 RED BULL	<---	[BEER HOOKAH]
rule30	0	0.204	1.699	NIRVANA HOOKAH SINGLE	<---	[MARINATED CHICKEN & AIOLI]
rule31	0	0.204	2.607	CAPPUCCINO	<---	[GREAT LAKES-JAVA BLEND (AULAIT)]
rule32	0	0.22	2.816	CAPPUCCINO	<---	[ADD VANILLA FLAVOUR]
rule33	0	0.314	75.843	SCRAMBLED EGGS	<---	[CHEDDAR CHEESE]
rule34	0	0.204	89.658	BAHUT BERRY	<---	[CRANBERRY SMOOTHIES]
rule35	0	0.212	477.545	CHICKEN SALAMI	<---	[CEASAR SALAD BOWL]
rule36	0	0.355	477.545	CEASAR SALAD BOWL	<---	[CHICKEN SALAMI]
rule37	0	0.245	5.15	QUA MINERAL WATER(1000ML)	<---	[WAIST WATCHING OMELETTE]
rule38	0	0.375	3.128	NIRVANA HOOKAH SINGLE	<---	[5 RED BULL]

# Association Rule part 2

Row ID	D ▲ Sup...	D Confide...	D Lift	S Consequent	S implies	[...] Items
rule38	0	0.375	3.128	NIRVANA HOOKAH SINGLE	<---	[5 RED BULL]
rule39	0	0.222	4.555	POUTINE WITH FRIES	<---	[MARINATED CHICKEN & AIOLI]
rule40	0	0.387	520.958	MAC N CHEESE	<---	[ADD CHICKEN]
rule41	0	0.231	520.958	ADD CHICKEN	<---	[MAC N CHEESE]
rule42	0	0.255	3.262	CAPPUCCINO	<---	[C C C ROMA TOMATO SALAD]
rule43	0	0.52	114.797	KHEEMA GHOTALA	<---	[TOAST BUTTER]
rule44	0	0.371	7.614	POUTINE WITH FRIES	<---	[ADD COTTAGE CHEESE]
rule45	0	0.371	147.689	APPLE PEAR N LIME	<---	[CELERY N ORANGE]
rule46	0	0.209	4.394	QUA MINERAL WATER(1000ML)	<---	[YEMENI GREAT LAKES (REG)]
rule47	0	0.2	4.206	QUA MINERAL WATER(1000ML)	<---	[COUS COUS WRAP]
rule48	0	0.375	4.799	CAPPUCCINO	<---	[ADD CINNAMON FLAVOUR]
rule49	0	0.221	20.528	ADD FRIES	<---	[GREEK GYROS CRUSTINI]
rule50	0	1	3,332.476	2 RED BULL	<---	[N R G HOOKAH]
rule51	0	0.714	3,332.476	N R G HOOKAH	<---	[2 RED BULL]
rule52	0	0.211	2.694	CAPPUCCINO	<---	[CON PANNA]
rule53	0	0.229	3.284	GREAT LAKES SHAKE	<---	[CHOCOLATE ICECREAM]
rule54	0	0.64	21.379	CAFFE LATTE	<---	[ADD IRISH CREAM FLAVOUR]
rule55	0	0.246	8.23	CAFFE LATTE	<---	[ADD WHIPPED CREAM]
rule56	0	0.425	959.431	ADD CHICKEN	<---	[SAIGON NOODLES]
rule57	0	0.548	959.431	SAIGON NOODLES	<---	[ADD CHICKEN]
rule58	0	0.409	8.386	POUTINE WITH FRIES	<---	[ADD SMOKED CHICKEN]
rule59	0	0.224	57.3	CHUNKY CHOCO CHIP COOKIES	<---	[OATMEAL AND RAISIN COOKIES]
rule60	0	0.286	6.046	JR.CHL AVALANCHE	<---	[CHOCOLATE ICECREAM]
rule61	0	0.213	5.716	B.M.T. PANINI	<---	[POTATO WEDGES]
rule62	0	0.223	11.826	COUNTRY ROAST CHICKEN PA...	<---	[POTATO WEDGES]
rule63	0	0.28	26.057	ADD FRIES	<---	[COUS COUS WRAP]
rule64	0	0.355	85.629	SCRAMBLED EGGS	<---	[GRILLED CHICKEN SAUSAGES]
rule65	0	0.625	20.878	CAFFE LATTE	<---	[ADD CINNAMON FLAVOUR]
rule66	0	0.225	2.88	CAPPUCCINO	<---	[BLUE BERRY MUFFINS]
rule67	0	0.391	5.008	CAPPUCCINO	<---	[ADD CARAMEL FLAVOUR]
rule68	0	0.273	4.315	SAMBUCA	<---	[RED BULL 3+2]
rule69	0	0.391	5.622	GREAT LAKES SHAKE	<---	[ADD WHIPPED CREAM]
rule70	0	0.406	5.194	CAPPUCCINO	<---	[ADD WHIPPED CREAM]
rule71	0.001	0.8	26.723	CAFFE LATTE	<---	[ADD VANILLA FLAVOUR]
rule72	0.001	0.638	21.301	CAFFE LATTE	<---	[ADD CARAMEL FLAVOUR]
rule73	0.001	0.462	101.891	KHEEMA GHOTALA	<---	[BUTTERED TOASTS]
rule74	0.001	0.325	45.925	ORANGE ARRABIATA	<---	[ADD HERB ROAST CHICKEN]
rule75	0.001	0.21	1.749	NIRVANA HOOKAH SINGLE	<---	[3 RED BULL]
rule76	0.001	0.223	20.798	ADD FRIES	<---	[TRADITIONAL ITALIAN CRUSTINI]



# Association Rule part 3

rule77	0.001	0.266	7.144	B.M.T. PANINI	<---	[FRENCH FRIES]
rule78	0.001	0.465	79.364	LEMON INFUSED CHAR GRILLE...	<---	[ADD HERB ROAST CHICKEN]
rule79	0.001	0.412	5.924	GREAT LAKES SHAKE	<---	[VANILLA ICECREAM]
rule80	0.001	0.464	5.936	CAPPUCCINO	<---	[ADD HAZELNUT FLAVOUR]
rule81	0.002	0.546	18.235	CAFFE LATTE	<---	[ADD HAZELNUT FLAVOUR]
rule82	0.002	0.201	5.394	B.M.T. PANINI	<---	[ADD FRIES]
rule83	0.002	0.202	1.682	NIRVANA HOOKAH SINGLE	<---	[QUA MINERAL WATER(500ML)]
rule84	0.004	0.249	3.932	SAMBUCA	<---	[RED BULL 2+1]



## b) Associations Identified

- There are 14 rules identified as below .
- Please make a note Association rules are identified on the basis of support, confidence and lift values .

Row ID	<b>D</b> ▼ Sup...	<b>D</b> ▼ Confi...	<b>D</b> Lift	<b>S</b> Consequent	<b>S</b> implies	[...] Items
rule84	0.004	0.249	3.932	SAMBUCA	<---	[RED BULL 2+1]
rule83	0.002	0.202	1.682	NIRVANA HOOKAH SINGLE	<---	[QUA MINERAL WATER(500ML)]
rule82	0.002	0.201	5.394	B.M.T. PANINI	<---	[ADD FRIES]
rule81	0.002	0.546	18.235	CAFFE LATTE	<---	[ADD HAZELNUT FLAVOUR]
rule80	0.001	0.464	5.936	CAPPUCCINO	<---	[ADD HAZELNUT FLAVOUR]
rule79	0.001	0.412	5.924	GREAT LAKES SHAKE	<---	[VANILLA ICECREAM]
rule78	0.001	0.465	79.364	LEMON INFUSED CHAR GRILLE...	<---	[ADD HERB ROAST CHICKEN]
rule77	0.001	0.266	7.144	B.M.T. PANINI	<---	[FRENCH FRIES]
rule76	0.001	0.223	20.798	ADD FRIES	<---	[TRADITIONAL ITALIAN CRUSTINI]
rule75	0.001	0.21	1.749	NIRVANA HOOKAH SINGLE	<---	[3 RED BULL]
rule74	0.001	0.325	45.925	ORANGE ARRABIATA	<---	[ADD HERB ROAST CHICKEN]
rule73	0.001	0.462	101.891	KHEEMA GHOTALA	<---	[BUTTERED TOASTS]
rule72	0.001	0.638	21.301	CAFFE LATTE	<---	[ADD CARAMEL FLAVOUR]
rule71	0.001	0.8	26.723	CAFFE LATTE	<---	[ADD VANILLA FLAVOUR]

### c) Suggestion of Possible Combos with Lucrative Offers

Given below Possible combos has been derived considering the support , confidence and lift .

Rule No	Support	confidence	lift	consequent		Items
rule84	0.004144	0.248500428	3.931846481	SAMBUCA	<---	[RED BULL 2+1]
rule83	0.002401	0.201680672	1.682443296	NIRVANA HOOKAH SINGLE	<---	[QUA MINERAL WATER(500ML)]
rule82	0.002158	0.200797872	5.394332707	B.M.T. PANINI	<---	[ADD FRIES]
rule81	0.001615	0.54589372	18.23519537	CAFFE LATTE	<---	[ADD HAZELNUT FLAVOUR]
rule80	0.001372	0.463768116	5.935519439	CAPPUCCINO	<---	[ADD HAZELNUT FLAVOUR]
rule79	0.001243	0.412322275	5.923863158	GREAT LAKES SHAKE	<---	[VANILLA ICECREAM]
rule78	0.001043	0.464968153	79.36439335	LEMON INFUSED CHAR GRILLED VEG	<---	[ADD HERB ROAST CHICKEN]
rule77	0.001015	0.265917603	7.143741149	B.M.T. PANINI	<---	[FRENCH FRIES]

- Important Note :-
- If you see the association rules , Most of the items are likable by the customers / or sales of these items are very high
- Most likable Items are Nirvana Hookah Single,Cappuccino,Mint Flavour Single,Great Lakes Shake,Sambuca,Poutinefries,Qua Mineral Water ,JR. CHL Avalanche ,Calcutta Mint,B.M.T panini
- Most items sold in iterns of value are Nirvana Hookah Single,Sambuca,Minit Flavour Single,Calcutta Minit,NRG Hookah ,Great Lake Shakes ,Green Apple Favours ,JR Cha avalance ,Silver Apple Single ,Poutine With Fry