Introduction:

Present study is based on the notion of time series analysis, the analysis of time series is useful in administration, planning, evaluation, of socio economic progress as well as for research in various scientific fields including pure sciences, econometrics and humanities. In the present study the significance of difference in net sale, gross profit made by company, Revenue generated across the months and season studied. finding significance of difference with respect to shop making amount of profit in relation to location of shop, number of sales occurred for different months of the year, average sales for different months of the year, Gross profit for different months of the year Total of 366 respondents were studied and data were collected using a pretested questionnaire.

Problem definition and business intelligence required.

In this study we try to investigate and tests the hypothesis

Number of sale of a product varies over a period of time, here we tests the hypothesis of whether difference in number of sales, Average sales, Gross profit varies over a period of month, In another hypothesis study is undertaken to test hypothesis of whether difference in number of sales and average sales varies between rainy days and Gross Profit.

Business Intelligence required:

- To test the significance of difference Analysis of variance and General Linear Model using post Hoc tests for multiple comparisons between categories of month and the season is studied. Bonferroni test is used for multiple comparisons and correlation is used to study relationship between the variables.

- Bar Chart, Scatter Diagram, box plot is used to visualize the data graphically.

To answer the aforesaid hypothesis following analysis is conducted**.**

1.0 What are my top selling products?

On the basis of quantity sold following are the top selling products are.

Natural Coconut Milk Icecream

products
Almond Milk Products
Apple Cider Vineger products
Orgran Buckwheat Crispbread 125gm*
Beef Mince Organic products
Olive Bread 610gm Vitality
Buckwheat
Coconut Chips Thin Organic products
Orange - Blood*
Eggs products
Organic Choc Super Berries 50gm*
Honey Bee Healthy Creamed products Honey products

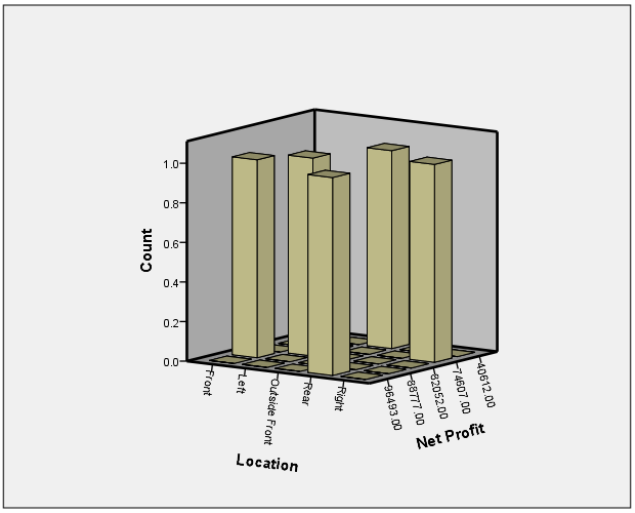
‘

2.0 What location in the shop makes the most amount of Revenue?

Location	Net Profit
1.Front	88777
2. Left	82052
3. Outside Front	40612
4. Rear	96493
5. Right	74607

Total Revenue Generated were maximum that is, 39074 $.

Bar Graph Depicting Location wise Net Profit

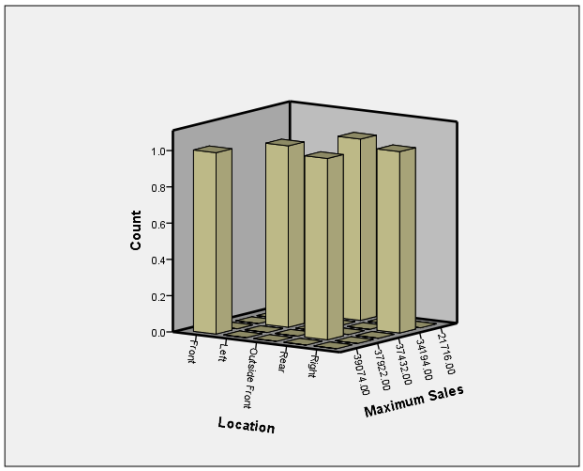


3.0 What location in the shop makes the most amount of Profit?

Location	Maximum Sales
1.Front	39074
2. Left	37432
3. Outside Front	21716
4. Rear	37922
5. Right	34194

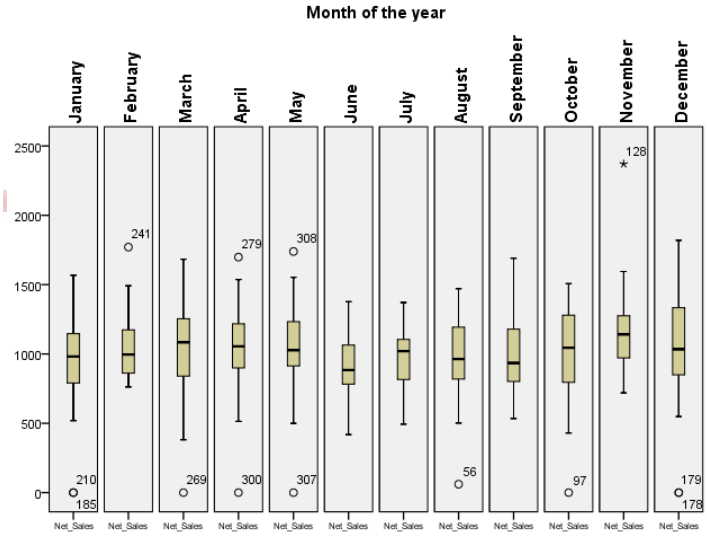
Observed that maximum sales were observed from front location. 39074$

Bar Graph Depicting Location Wise Maximum Sales



4.0 Is there a difference in number of Sales between different months of the year?

Solution:



Box plot representing distribution of data median at middle, third quartile at the top of box and first quartile at lower part of the box and dots represents the outliers these are the characteristics of boxplot, looking at the graph it is seen that median values for the month range in the tune of 1000.

Multiple comparisons using Post-Hoc Bonferroni test

Multiple Comparisons

Dependent Variable: Number of sales

Bonferroni

(I) Month of the year	(J) Month of the year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
January	February	-96.41	80.748	1.000	-370.74	177.93
	March	-97.72	79.391	1.000	-367.45	172.01
	April	-112.51	80.050	1.000	-384.48	159.45
	May	-87.23	79.391	1.000	-356.95	182.50
	June	47.14	80.050	1.000	-224.82	319.10
	July	-29.32	79.391	1.000	-299.05	240.40
	August	-44.15	79.391	1.000	-313.88	225.58
	September	-24.37	80.050	1.000	-296.33	247.60
	October	-63.13	79.391	1.000	-332.86	206.59
	November	-207.76	80.050	.650	-479.73	64.20
	December	-98.82	79.391	1.000	-368.54	170.91
February	January	96.41	80.748	1.000	-177.93	370.74
	March	-1.32	80.748	1.000	-275.65	273.02
	April	-16.11	81.396	1.000	-292.65	260.43
	May	9.18	80.748	1.000	-265.16	283.51
	June	143.54	81.396	1.000	-132.99	420.08
	July	67.08	80.748	1.00	-	341.42

				0	207.26	
	August	52.26	80.748	1.000	-222.08	326.59
	September	72.04	81.396	1.000	-204.50	348.58
	October	33.27	80.748	1.000	-241.07	307.61
	November	-111.36	81.396	1.000	-387.90	165.18
	December	-2.41	80.748	1.000	-276.75	271.93
March	January	97.72	79.391	1.000	-172.01	367.45
	February	1.32	80.748	1.000	-273.02	275.65
	April	-14.79	80.050	1.000	-286.76	257.17
	May	10.49	79.391	1.000	-259.23	280.22
	June	144.86	80.050	1.000	-127.10	416.82
	July	68.40	79.391	1.000	-201.33	338.12
	August	53.57	79.391	1.000	-216.16	323.30
	September	73.35	80.050	1.000	-198.61	345.32
	October	34.59	79.391	1.000	-235.14	304.31
	November	-110.04	80.050	1.000	-382.01	161.92
	December	-1.10	79.391	1.000	-270.82	268.63
April	January	112.51	80.050	1.000	-159.45	384.48
	February	16.11	81.396	1.000	-260.43	292.65
	March	14.79	80.050	1.000	-257.17	286.76
	May	25.28	80.050	1.00	-	297.25

				0	246.68	
	June	159.65	80.703	1.000	-114.53	433.84
	July	83.19	80.050	1.000	-188.78	355.15
	August	68.36	80.050	1.000	-203.60	340.33
	September	88.15	80.703	1.000	-186.04	362.33
	October	49.38	80.050	1.000	-222.59	321.34
	November	-95.25	80.703	1.000	-369.43	178.94
	December	13.70	80.050	1.000	-258.27	285.66
May	January	87.23	79.391	1.000	-182.50	356.95
	February	-9.18	80.748	1.000	-283.51	265.16
	March	-10.49	79.391	1.000	-280.22	259.23
	April	-25.28	80.050	1.000	-297.25	246.68
	June	134.37	80.050	1.000	-137.60	406.33
	July	57.90	79.391	1.000	-211.82	327.63
	August	43.08	79.391	1.000	-226.65	312.80
	September	62.86	80.050	1.000	-209.10	334.83
	October	24.09	79.391	1.000	-245.63	293.82
	November	-120.53	80.050	1.000	-392.50	151.43
	December	-11.59	79.391	1.000	-281.31	258.14
June	January	-47.14	80.050	1.000	-319.10	224.82
	February	-143.54	81.396	1.00	-	132.99

5 years

				0	420.08	
	March	-144.86	80.050	1.000	-416.82	127.10
	April	-159.65	80.703	1.000	-433.84	114.53
	May	-134.37	80.050	1.000	-406.33	137.60
	July	-76.46	80.050	1.000	-348.43	195.50
	August	-91.29	80.050	1.000	-363.25	180.68
	September	-71.51	80.703	1.000	-345.69	202.68
	October	-110.27	80.050	1.000	-382.24	161.69
	November	-254.90	80.703	.114	-529.09	19.28
	December	-145.96	80.050	1.000	-417.92	126.01
July	January	29.32	79.391	1.000	-240.40	299.05
	February	-67.08	80.748	1.000	-341.42	207.26
	March	-68.40	79.391	1.000	-338.12	201.33
	April	-83.19	80.050	1.000	-355.15	188.78
	May	-57.90	79.391	1.000	-327.63	211.82
	June	76.46	80.050	1.000	-195.50	348.43
	August	-14.83	79.391	1.000	-284.55	254.90
	September	4.96	80.050	1.000	-267.01	276.92
	October	-33.81	79.391	1.000	-303.54	235.92
	November	-178.44	80.050	1.000	-450.40	93.53
	December	-69.49	79.391	1.00	-	200.23

5 years

				0	339.22	
August	January	44.15	79.391	1.000	-225.58	313.88
	February	-52.26	80.748	1.000	-326.59	222.08
	March	-53.57	79.391	1.000	-323.30	216.16
	April	-68.36	80.050	1.000	-340.33	203.60
	May	-43.08	79.391	1.000	-312.80	226.65
	June	91.29	80.050	1.000	-180.68	363.25
	July	14.83	79.391	1.000	-254.90	284.55
	September	19.78	80.050	1.000	-252.18	291.75
	October	-18.98	79.391	1.000	-288.71	250.74
	November	-163.61	80.050	1.000	-435.58	108.35
	December	-54.67	79.391	1.000	-324.39	215.06
September	January	24.37	80.050	1.000	-247.60	296.33
	February	-72.04	81.396	1.000	-348.58	204.50
	March	-73.35	80.050	1.000	-345.32	198.61
	April	-88.15	80.703	1.000	-362.33	186.04
	May	-62.86	80.050	1.000	-334.83	209.10
	June	71.51	80.703	1.000	-202.68	345.69
	July	-4.96	80.050	1.000	-276.92	267.01
	August	-19.78	80.050	1.000	-291.75	252.18
	October	-38.77	80.050	1.00	-	233.20

5 years

				0	310.73	
	November	-183.40	80.703	1.000	-457.58	90.79
	December	-74.45	80.050	1.000	-346.41	197.52
October	January	63.13	79.391	1.000	-206.59	332.86
	February	-33.27	80.748	1.000	-307.61	241.07
	March	-34.59	79.391	1.000	-304.31	235.14
	April	-49.38	80.050	1.000	-321.34	222.59
	May	-24.09	79.391	1.000	-293.82	245.63
	June	110.27	80.050	1.000	-161.69	382.24
	July	33.81	79.391	1.000	-235.92	303.54
	August	18.98	79.391	1.000	-250.74	288.71
	September	38.77	80.050	1.000	-233.20	310.73
	November	-144.63	80.050	1.000	-416.59	127.34
	December	-35.68	79.391	1.000	-305.41	234.04
November	January	207.76	80.050	.650	-64.20	479.73
	February	111.36	81.396	1.000	-165.18	387.90
	March	110.04	80.050	1.000	-161.92	382.01
	April	95.25	80.703	1.000	-178.94	369.43
	May	120.53	80.050	1.000	-151.43	392.50
	June	254.90	80.703	.114	-19.28	529.09
	July	178.44	80.050	1.000	-93.53	450.40
	August	163.61	80.050	1.00	-	435.58

				0	108.35	
	September	183.40	80.703	1.000	-90.79	457.58
	October	144.63	80.050	1.000	-127.34	416.59
	December	108.95	80.050	1.000	-163.02	380.91
December	January	98.82	79.391	1.000	-170.91	368.54
	February	2.41	80.748	1.000	-271.93	276.75
	March	1.10	79.391	1.000	-268.63	270.82
	April	-13.70	80.050	1.000	-285.66	258.27
	May	11.59	79.391	1.000	-258.14	281.31
	June	145.96	80.050	1.000	-126.01	417.92
	July	69.49	79.391	1.000	-200.23	339.22
	August	54.67	79.391	1.000	-215.06	324.39
	September	74.45	80.050	1.000	-197.52	346.41
	October	35.68	79.391	1.000	-234.04	305.41
	November	-108.95	80.050	1.000	-380.91	163.02

Based on observed means.

The error term is Mean Square(Error) = 97695.752.

Post hoc multiple comparison tests. Once it is determined that differences exist among the means using Analysis of variance, post hoc range tests and pair wise multiple comparisons can determine which means differ. Comparisons are made on unadjusted values. These tests are used for fixed between-subjects factors only. These tests of between-subjects effects help to determine the significance of factor. Hence, from the above table shows that number of sale do not differ significantly for months, P>0.5.

Analysis of Variance (ANOVA).

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1399993.2	11	127272	1.303	0.221
Within Groups	34584296.4	354	97695.752		

The differences between these months was not found statistically significant, $F(11,354) = 1.303$, $p = .221$ and we conclude that number of sale do not differ significantly with month.

5.0 Is there a difference in number of Average sales between different months of the year?

Multiple Comparisons

Dependent Variable: Average_Sale

Bonferroni

(I) Month of the year	(J) Month of the year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
January	February	.16	1.031	1.000	-3.35	3.66
	March	-1.68	1.022	1.000	-5.15	1.80
	April	-.02	1.031	1.000	-3.52	3.49
	May	-.21	1.022	1.000	-3.69	3.26
	June	.26	1.022	1.000	-3.22	3.73
	July	-.08	1.014	1.000	-3.53	3.36
	August	-1.59	1.014	1.000	-5.04	1.85
	September	1.27	1.022	1.000	-2.21	4.74
	October	-.29	1.022	1.000	-3.76	3.18
	November	-2.43	1.022	1.000	-5.90	1.04
	December	-.40	1.031	1.000	-3.90	3.10
February	January	-.16	1.031	1.000	-3.66	3.35
	March	-1.84	1.022	1.000	-5.31	1.64
	April	-.17	1.031	1.000	-3.68	3.33
	May	-.37	1.022	1.000	-3.84	3.10
	June	.10	1.022	1.000	-3.37	3.58

	July	-.24	1.014	1.000	-3.69	3.21
	August	-1.75	1.014	1.000	-5.20	1.69
	September	1.11	1.022	1.000	-2.36	4.59
	October	-.45	1.022	1.000	-3.92	3.03
	November	-2.59	1.022	.781	-6.06	.89
	December	-.56	1.031	1.000	-4.06	2.95
March	January	1.68	1.022	1.000	-1.80	5.15
	February	1.84	1.022	1.000	-1.64	5.31
	April	1.66	1.022	1.000	-1.81	5.14
	May	1.47	1.014	1.000	-1.98	4.91
	June	1.94	1.014	1.000	-1.51	5.38
	July	1.60	1.006	1.000	-1.82	5.01
	August	.08	1.006	1.000	-3.33	3.50
	September	2.95	1.014	.256	-.50	6.39
	October	1.39	1.014	1.000	-2.06	4.83
	November	-.75	1.014	1.000	-4.20	2.69
	December	1.28	1.022	1.000	-2.20	4.75
April	January	.02	1.031	1.000	-3.49	3.52
	February	.17	1.031	1.000	-3.33	3.68
	March	-1.66	1.022	1.000	-5.14	1.81
	May	-.20	1.022	1.000	-3.67	3.28
	June	.28	1.022	1.000	-3.20	3.75
	July	-.07	1.014	1.000	-3.51	3.38
	August	-1.58	1.014	1.000	-5.02	1.87
	September	1.29	1.022	1.000	-2.19	4.76
	October	-.27	1.022	1.000	-3.75	3.20
	November	-2.41	1.022	1.000	-5.89	1.06
	December	-.38	1.031	1.000	-3.89	3.12
May	January	.21	1.022	1.000	-3.26	3.69

	February	.37	1.022	1.000	-3.10	3.84
	March	-1.47	1.014	1.000	-4.91	1.98
	April	.20	1.022	1.000	-3.28	3.67
	June	.47	1.014	1.000	-2.97	3.92
	July	.13	1.006	1.000	-3.29	3.55
	August	-1.38	1.006	1.000	-4.80	2.04
	September	1.48	1.014	1.000	-1.96	4.93
	October	-.08	1.014	1.000	-3.52	3.37
	November	-2.22	1.014	1.000	-5.66	1.23
	December	-.19	1.022	1.000	-3.66	3.29
June	January	-.26	1.022	1.000	-3.73	3.22
	February	-.10	1.022	1.000	-3.58	3.37
	March	-1.94	1.014	1.000	-5.38	1.51
	April	-.28	1.022	1.000	-3.75	3.20
	May	-.47	1.014	1.000	-3.92	2.97
	July	-.34	1.006	1.000	-3.76	3.08
	August	-1.85	1.006	1.000	-5.27	1.56
	September	1.01	1.014	1.000	-2.43	4.46
	October	-.55	1.014	1.000	-3.99	2.90
	November	-2.69	1.014	.553	-6.13	.76
	December	-.66	1.022	1.000	-4.13	2.82
July	January	.08	1.014	1.000	-3.36	3.53
	February	.24	1.014	1.000	-3.21	3.69
	March	-1.60	1.006	1.000	-5.01	1.82
	April	.07	1.014	1.000	-3.38	3.51
	May	-.13	1.006	1.000	-3.55	3.29
	June	.34	1.006	1.000	-3.08	3.76
	August	-1.51	.997	1.000	-4.90	1.88
	September	1.35	1.006	1.000	-2.07	4.77
	October	-.21	1.006	1.000	-3.62	3.21
	Novembe	-2.35	1.006	1.000	-5.76	1.07

	r					
	December	-.32	1.014	1.000	-3.76	3.13
August	January	1.59	1.014	1.000	-1.85	5.04
	February	1.75	1.014	1.000	-1.69	5.20
	March	-.08	1.006	1.000	-3.50	3.33
	April	1.58	1.014	1.000	-1.87	5.02
	May	1.38	1.006	1.000	-2.04	4.80
	June	1.85	1.006	1.000	-1.56	5.27
	July	1.51	.997	1.000	-1.88	4.90
	September	2.86	1.006	.308	-.55	6.28
	October	1.30	1.006	1.000	-2.11	4.72
	November	-.84	1.006	1.000	-4.25	2.58
	December	1.19	1.014	1.000	-2.25	4.64
September	January	-1.27	1.022	1.000	-4.74	2.21
	February	-1.11	1.022	1.000	-4.59	2.36
	March	-2.95	1.014	.256	-6.39	.50
	April	-1.29	1.022	1.000	-4.76	2.19
	May	-1.48	1.014	1.000	-4.93	1.96
	June	-1.01	1.014	1.000	-4.46	2.43
	July	-1.35	1.006	1.000	-4.77	2.07
	August	-2.86	1.006	.308	-6.28	.55
	October	-1.56	1.014	1.000	-5.00	1.89
	November	-3.70*	1.014	.020	-7.14	-.25
	December	-1.67	1.022	1.000	-5.14	1.81
October	January	.29	1.022	1.000	-3.18	3.76
	February	.45	1.022	1.000	-3.03	3.92
	March	-1.39	1.014	1.000	-4.83	2.06
	April	.27	1.022	1.000	-3.20	3.75
	May	.08	1.014	1.000	-3.37	3.52
	June	.55	1.014	1.000	-2.90	3.99
	July	.21	1.006	1.000	-3.21	3.62
	August	-1.30	1.006	1.000	-4.72	2.11

	September	1.56	1.014	1.000	-1.89	5.00
	November	-2.14	1.014	1.000	-5.59	1.30
	December	-.11	1.022	1.000	-3.58	3.36
November	January	2.43	1.022	1.000	-1.04	5.90
	February	2.59	1.022	.781	-.89	6.06
	March	.75	1.014	1.000	-2.69	4.20
	April	2.41	1.022	1.000	-1.06	5.89
	May	2.22	1.014	1.000	-1.23	5.66
	June	2.69	1.014	.553	-.76	6.13
	July	2.35	1.006	1.000	-1.07	5.76
	August	.84	1.006	1.000	-2.58	4.25
	September	3.70*	1.014	.020	.25	7.14
	October	2.14	1.014	1.000	-1.30	5.59
	December	2.03	1.022	1.000	-1.44	5.50
December	January	.40	1.031	1.000	-3.10	3.90
	February	.56	1.031	1.000	-2.95	4.06
	March	-1.28	1.022	1.000	-4.75	2.20
	April	.38	1.031	1.000	-3.12	3.89
	May	.19	1.022	1.000	-3.29	3.66
	June	.66	1.022	1.000	-2.82	4.13
	July	.32	1.014	1.000	-3.13	3.76
	August	-1.19	1.014	1.000	-4.64	2.25
	September	1.67	1.022	1.000	-1.81	5.14
	October	.11	1.022	1.000	-3.36	3.58
	November	-2.03	1.022	1.000	-5.50	1.44

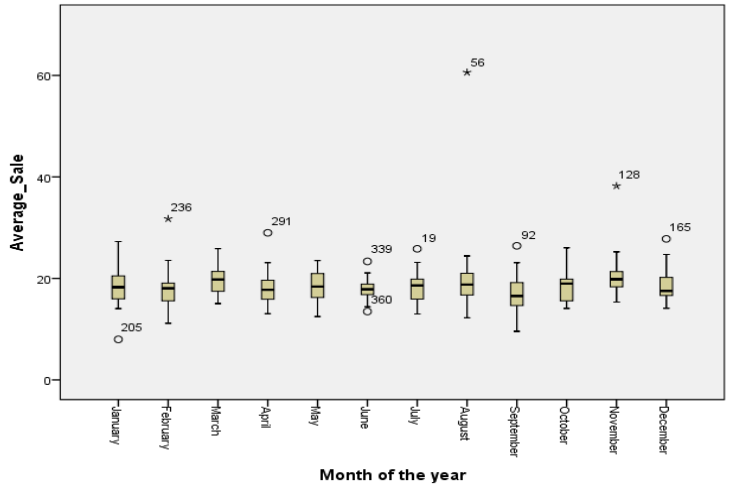
Based on observed means.
The error term is Mean Square(Error) = 15.416.

*. The mean difference is significant at the 0.05 level.

Analysis of variance shows average sale is significantly different for months, now by using Post hoc multiple comparison Bonferroni tests, pair wise multiple comparisons can determine which

means differ. Hence, from the above table shows that average sale do not differ significantly for months, P>0.5.

Boxplot showing month-wise distribution of average sale.



Tests of Hypothesis:

Null Hypothesis:

H_0: Mean Average Sale of twelve months is equal

Alternative Hypothesis:

H_1: Average Sale of month differ significantly and unequal.

Analysis of Variance (ANOVA)

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	335.651	11	30.514	1.979	0.030
Within Groups	5333.831	346	15.416		

The differences in average sale between these months was statistically significant, $F(11,346) = 1.979$, $p = .030$ and we conclude that average sale differ significantly with month.

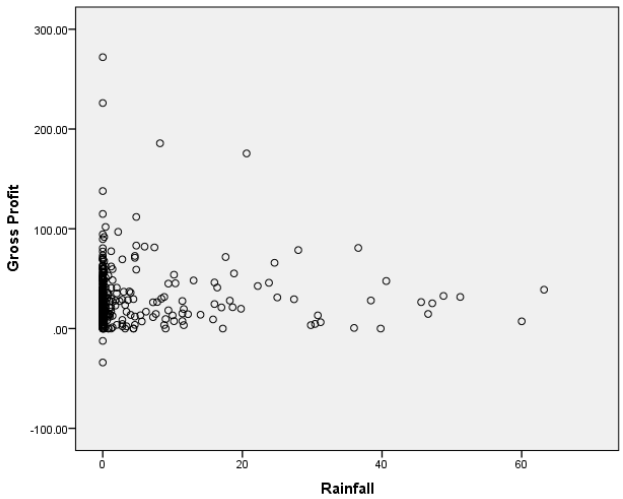
6.0 Is there a correlation between rain days and Gross Profit?

There is no relationship between Rainfall and Gross profit r=0.008, P=0.885 and correlation is found to be insignificant and very weak.

	Rainfall	Gross Profit
RainFall	1	0.008*
Gross Profit	0.008*	1

P=0.885

Scatter plot between RainFall and Gross Profit



7.0 Is there a difference in number of Sales between different Seasons?

Multiple Comparisons

Dependent Variable: Net_Sales

Bonferroni

(I) Season of the year	(J) Season of the year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Summer	Autumn	-34.62	46.297	P>0.05	-157.44	88.19
	Winter	55.00	46.297	P>0.05	-67.82	177.82
	Spring	-33.65	46.423	P>0.05	-156.80	89.50
Autumn	Summer	34.62	46.297	P>0.05	-88.19	157.44
	Winter	89.62	46.1	P>0.05	-32.86	212.10

			70			
	Spring	.98	46.297	P>0.05	-121.84	123.79
Winter	Summer	-55.00	46.297	P>0.05	-177.82	67.82
	Autumn	-89.62	46.170	P>0.05	-212.10	32.86
	Spring	-88.65	46.297	P>0.05	-211.47	34.17
Spring	Summer	33.65	46.423	P>0.05	-89.50	156.80
	Autumn	-.98	46.297	P>0.05	-123.79	121.84
	Winter	88.65	46.297	P>0.05	-34.17	211.47

Based on observed means.

The error term is Mean Square(Error) = 98056.709.

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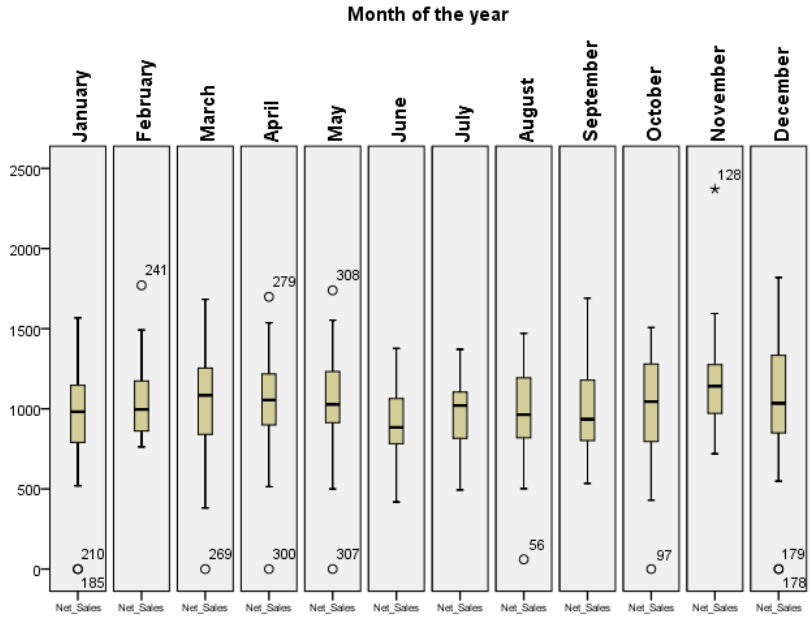
Post hoc multiple comparison test reveal that there is no significant difference in average sale across the categories of months, Bonferoni test is employed for multiple comparison. Statistical significance is tested at 5% level of significance. Results are not statistically significant here we fail to reject the null hypothesis.

Boxplot showing distribution of month wise number of sale



Hypothesis:

H_0: Mean average sale equal for all groups (i.e., $\mu_1 = \mu_2 = \mu_3 = ... = \mu_{12}$)

(ANOVA TABLE)

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	855.940	3	285.313	1.138	0.334
Within Groups	90773.03	362	250.754		

Results of the analysis of variance reveals that there is statistically significant difference were observed in determining the number of sale across the months, $F(3,362) = 1.138$, $p = .334$ and we conclude that number of sale do not differ significantly with month.

1.0 Is there a difference in number of Average sales between different Seasons?

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Multiple Comparisons

Dependent Variable: Average_Sale

Bonferroni

(I) Season of the year	(J) Season of the year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Summer	Autumn	-.56	.603	1.000	-2.16	1.04
	Winter	-.40	.598	1.000	-1.99	1.19
	Spring	-.40	.601	1.000	-2.00	1.19
Autumn	Summer	.56	.603	1.000	-1.04	2.16
	Winter	.16	.594	1.000	-1.41	1.74
	Spring	.16	.597	1.000	-1.43	1.74

Winter	Summer	.40	.598	1.000	-1.19	1.99
	Autumn	-.16	.594	1.000	-1.74	1.41
	Spring	.00	.593	1.000	-1.57	1.57
Spring	Summer	.40	.601	1.000	-1.19	2.00
	Autumn	-.16	.597	1.000	-1.74	1.43
	Winter	.00	.593	1.000	-1.57	1.57

Based on observed means.
The error term is Mean Square(Error) = 15.973.

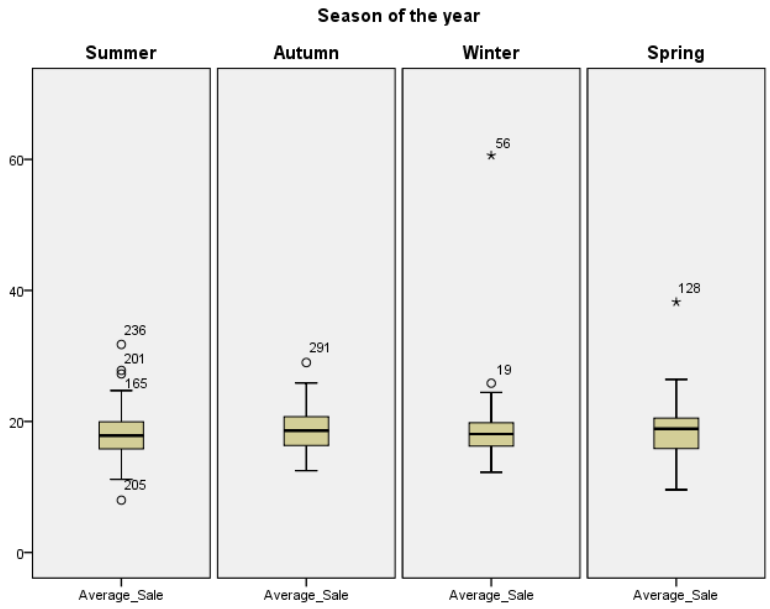
Multiple comparison using bonferroni post hoc test was conducted the results shows that the average sale do not differ significantly among the season of the year from Jan-Dec all p values are greater than 5%. Hence comparison shows with respect to season shows the insignificant results.

EssayCorp 5 years

Descriptive statistics for season-wise average sale.

Season of the year	Statistic	
Summer	Mean	18.18
	SD	3.5
Autumn	Mean	18.74
	SD	18.74
Winter	Mean	18.58
	SD	5.3
Spring	Mean	18.58
	SD	3.9

Boxplot Showing distribution of average sale for season.



(ANOVA TABLE)

Source of Variation	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	15.148	3	5.049	0.316	0.814
Within Groups	5654.334	354	15.973		
Total	5669.483	357			

Using analysis of variance determine whether there are any statistically significant differences between the means of two or more Season. The differences between these season was not statistically significant, $F(3,354) = 0.316$, $p = .814$ and we conclude that Average sale do not differ significantly with season.

9.0 Is there a difference in number of Gross Profit between different Seasons?

Post Hoc tests of Multiple comparision.

Multiple Comparisons						
Dependent Variable: Gross_Sales Bonferroni						
(I) Season of the year	(J) Season of the year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Summer	Autumn	-22.94	48.089	P>0.05	-150.51	104.63

	Winter	58.78	48.089	P>0.05	-68.79	186.36
	Spring	-46.44	48.220	P>0.05	-174.36	81.48
Autumn	Summer	22.94	48.089	P>0.05	-104.63	150.51
	Winter	81.72	47.957	P>0.05	-45.50	208.95
	Spring	-23.50	48.089	P>0.05	-151.08	104.07
Winter	Summer	-58.78	48.089	P>0.05	-186.36	68.79
	Autumn	-81.72	47.957	P>0.05	-208.95	45.50
	Spring	-105.23	48.089	P>0.05	-232.80	22.35
Spring	Summer	46.44	48.220	P>0.05	-81.48	174.36
	Autumn	23.50	48.089	P>0.05	-104.07	151.08
	Winter	105.23	48.089	P>0.05	-22.35	232.80

Based on observed means.
The error term is Mean Square(Error) = 105796.319.

By using Post hoc tests it is found that gross profit do not differ significantly across the categories of season when multiple comparisons is employed, Bonferoni test is used for multiple comparison. Statistical significance is tested at 5% level of significance all P Values are found to be greater than 0.5

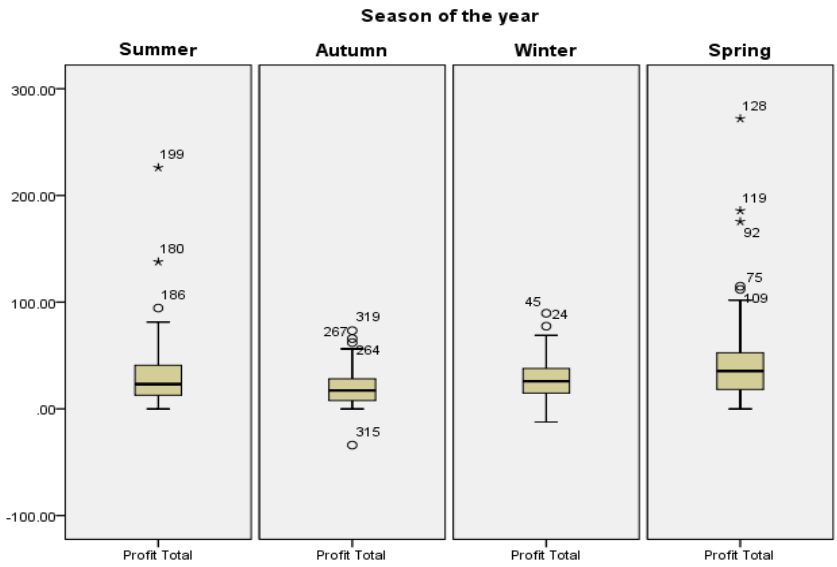
Descriptive statistics for Gross profit of different season.

Season of the year	Statistic	SE
Summer	Mean	31.42
	SD	31.67
Autumn	Mean	19.73
	SD	16.62
Winter	Mean	27.64
	SD	18.72
Springs	Mean	44.211
	SD	41.36

(ANOVA TABLE)

Source of Variation	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	28591.757	3	9530.586	11.456	0.000
Within Groups	301149.197	362	831.904		
Total	329740.954	365			

There is significant difference in mean gross profit across the season, F (3,362) = 11.456, p = .000 and we conclude that Gross profit differ significantly.



Boxplot depicts the distribution of data and median values and outliers indicated by asterisks pertaining to gross profit

Results:

Following hypothesis was tested and these hypotheses along with significant/insignificant findings are stated below.

Hypothesis	Supported/ Not Supported	P Value
Whether there is a difference in number of sales between different months of the year.	Not Supported	P.0.05
Whether a difference in number of average sales between different months of the year.	Supported	P<0.05

Whether there is a difference in number of gross profit between different months of the year	Supported	P<0.05
To study relationship and correlation between rainy days and Gross Profit	Correlation is weak	P>0.05 (r = 0.08)
Whether there is a difference in number of sales between different seasons	Not Supported	P>0.05
Whether there is a difference in number of average sales between different seasons.	Not supported	P>0.05

EssayCorp 5 years