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Subject:	DSE 2- Time Series Analysis
Topic Name:	The Savory Dough
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Objective: To examine the revenue of Domino's Pizza using Time Series analysis.

Why choose this topic for project?

Domino's generates revenues and earnings by charging royalities to its franchisees.

As it is the market leader in the pizza segment with a network of 17,644 restaurants over the world. And its sales are increasing over the years.

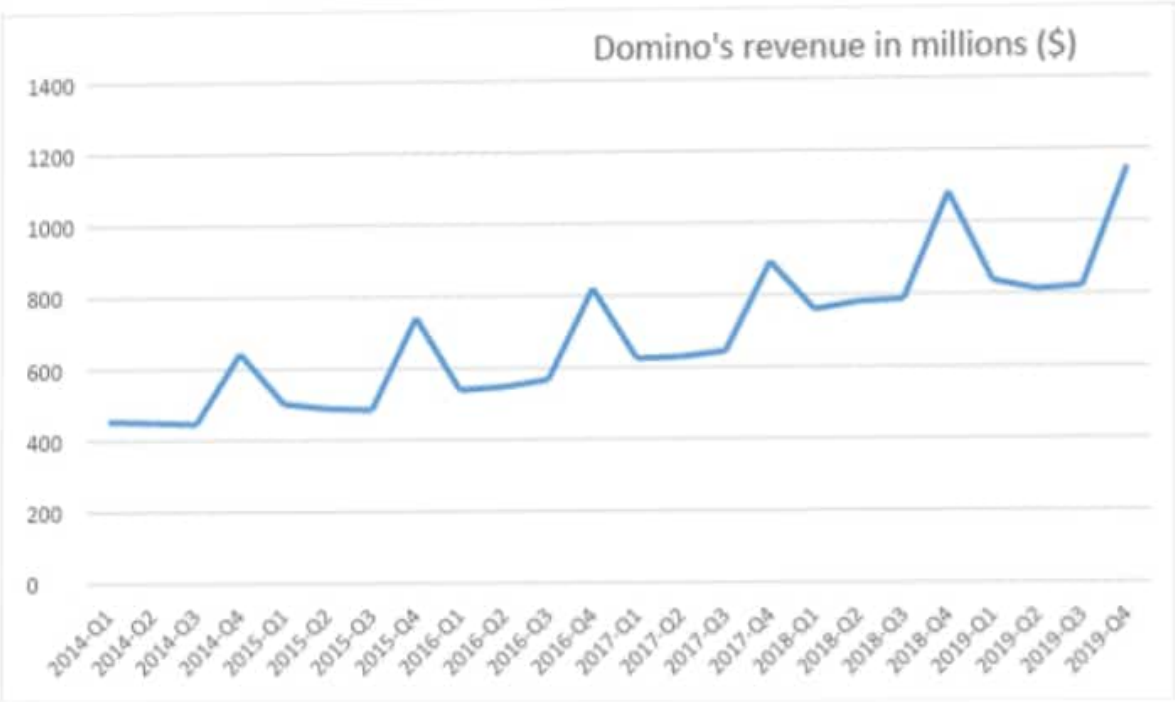
In order to study the constant trend and seasonal component present in the data of revenue of Domino's Pizza across 6 years.

Data collected from the site:

https://www.netcials.com/financial-revenue-history-usa/1286681-DOMINOS-PIZZA-INC/

Q2) Select any real-life data in which both trend and seasonal component are present. Apply appropriate smoothing technique to smooth the chosen data using appropriate smoothing constants.

Quarter	Domino's revenue in millions ($)
2014-Q1	453.85
2014-Q2	450.46
2014-Q3	446.57
2014-Q4	642.95
2015-Q1	502.03
2015-Q2	488.62
2015-Q3	484.7
2015-Q4	741.18
2016-Q1	539.18
2016-Q2	547.34
2016-Q3	566.68
2016-Q4	819.44
2017-Q1	624.22
2017-Q2	628.61
2017-Q3	643.64
2017-Q4	891.51
2018-Q1	758.37
2018-Q2	779.4
2018-Q3	785.97
2018-Q4	1082.14
2019-Q1	835.96
2019-Q2	811.65
2019-Q3	820.81
2019-Q4	1150.873



	Quarters					
year	I	II	III	IV	Average	ŷt
2014	453.85	450.46	446.57	642.95	498.4575	472.8629
2015	502.03	488.62	484.7	741.18	554.1325	558.6536
2016	539.18	547.34	566.68	819.44	618.16	644.4444
2017	624.22	628.61	643.64	891.51	696.995	730.2351
2018	758.37	779.4	785.97	1082.14	851.47	816.0259
2019	835.96	811.65	820.81	1150.873	904.8233	901.8166

$\hat{Y}t = a+bt$ (t= year i.e. 1, 2,3,4,5,6)

We get, a= 387.0721, b= 85.79075

$\therefore \hat{Y}t = 387.0721 + 85.79075$

Estimation of trends:

	II- (b-4)	Y^t-(b/8)	Y^t +(b/8)	III +(b/4)
year/quarter	I	II	III	IV
2014	440.6913	462.139	483.5867	505.0344
2015	526.4821	547.9298	569.3774	590.8251
2016	612.2728	633.7205	655.1682	676.6159
2017	698.0636	719.5113	740.9589	762.4066
2018	783.8543	805.302	826.7497	848.1974
2019	869.6451	891.0928	912.5404	933.9881

Detrend the data:

	calculation= original - estimated			
year/quarter	I	II	III	IV
2014	13.15868	-11.679	-37.0167	137.9156
2015	-24.4521	-59.3098	-84.6774	150.3549
2016	-73.0928	-86.3805	-88.4882	142.8241
2017	-73.8436	-90.9013	-97.3189	129.1034
2018	-25.4843	-25.902	-40.7797	233.9426
2019	-33.6851	-79.4428	-91.7304	216.8849
$\bar{x}_i$	-36.2332	-58.9359	-73.3352	168.5042
Si	-36.2332	-58.9359	-73.3352	168.5043

$\bar{x}$ = -1.66667E-05

$\Sigma Si = 0$

α= 0.4, β=0.3, γ=0.1

1-α=0.6, 1-β=0.7, 1-γ=0.9

year	T	Observation	Lt	Tt	St	$\hat{y}_{t+p}$
2013	-3				-36.2332	
	-2				-58.9359	
	-1				-73.3352	
	0		387.0721	85.79075	168.5043	
2014	1	453.85	479.751	87.85719	-35.199979	
	2	450.46	544.3233	80.87172	-62.42863692	508.6723
	3	446.57	583.0791	68.23694	-79.65258724	551.8598
	4	642.95	580.5679	47.01251	157.892081	819.8203
2015	1	502.03	591.4402	36.17046	-40.62100398	592.3804
	2	488.62	596.9859	26.98301	-67.02235978	565.182
	3	484.7	600.1224	19.82906	-83.22956454	544.3163
	4	741.18	605.286	15.42944	155.6922712	777.8435
2016	1	539.18	604.3497	10.5197	-43.07587092	580.0944
	2	547.34	614.6666	10.45886	-67.05278071	547.847
	3	566.68	635.0391	13.43296	-81.74251642	541.8959
	4	819.44	654.5823	15.26604	156.6088126	804.1643
2017	1	624.22	668.8274	14.95974	-43.22901992	626.7725
	2	628.61	688.5374	16.38482	-66.34023999	616.7343
	3	643.64	713.1063	18.84006	-80.5148972	623.1797
	4	891.51	733.1283	19.19464	156.7861007	888.5552
2018	1	758.37	772.0334	25.10777	-40.27245532	709.0939
	2	779.4	816.5808	30.93966	-63.42429401	730.8009
	3	785.97	855.1062	33.21539	-79.37702968	767.0055
	4	1082.14	903.1345	37.65927	159.0080377	1045.108
2019	1	835.96	914.9693	29.91191	-44.14613579	900.5213
	2	811.65	916.9584	21.53508	-67.61270636	881.4569

	3	820.81	923.1709	16.93831	-81.67541786	859.1165
	4	1150.873	960.8115	23.14899	162.1133825	1099.117

Conclusion:

From the graph we can see that, the fitted value (ŷt+p) is same for the previous years. So we can observe that our Domino's Revenue is highest on Q4 then it decreases till Q1. So we can say that Domino's Revenue is highest in the Q4.