

# Using predictive analytics modelling to optimize losses in commercial kitchen operations

MANOJ KUMAR PANT, SAURABH PRADHAN

## **Abstract :**

Using predictive analytics modelling to optimize losses in commercial kitchen operations. A study of the mess operations of a management college over one year was done which is serving about 900 + people during each meal. The food wastage was calculated post food preparation due to incorrect estimate in the kitchen plus the wastage due to food left behind on plates. The losses during breakfast, lunch, evening snacks and dinner were studied. It was seen that the graphs of % food wastage loss for each type of meal over a yearly time frame were nearly similar with a negative slope. We have also attempted to analyse the reasons for the food loss both from the point of view of the kitchen and the customers (in our case mostly students). We have ranked the reasons for the same as factors which are controllable and ones which are not controllable. The paper also attempts to prepare a model which tries to predict the losses in future and manage them within limits.

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Keywords: Predictive, food, wastage, kitchen

## **Introduction**

Wastage (Merriam Webster's learner's dictionary): wasteful use of something valuable: loss of something by using too much of it or using it in a way that is not necessary or effective.

In our paper we have tried to use the term wastage as applied to the mess operations of a management college (termed as commercial kitchen).

In our context the wastage is defined in the context of two components:

- (a) Fresh wastage: the waste due to excess prepared food in the kitchen
- (b) Plate wastage: Wastage due to leftover food in the plates after eating.

Both the above definition of wastage needs a bit of explanation.

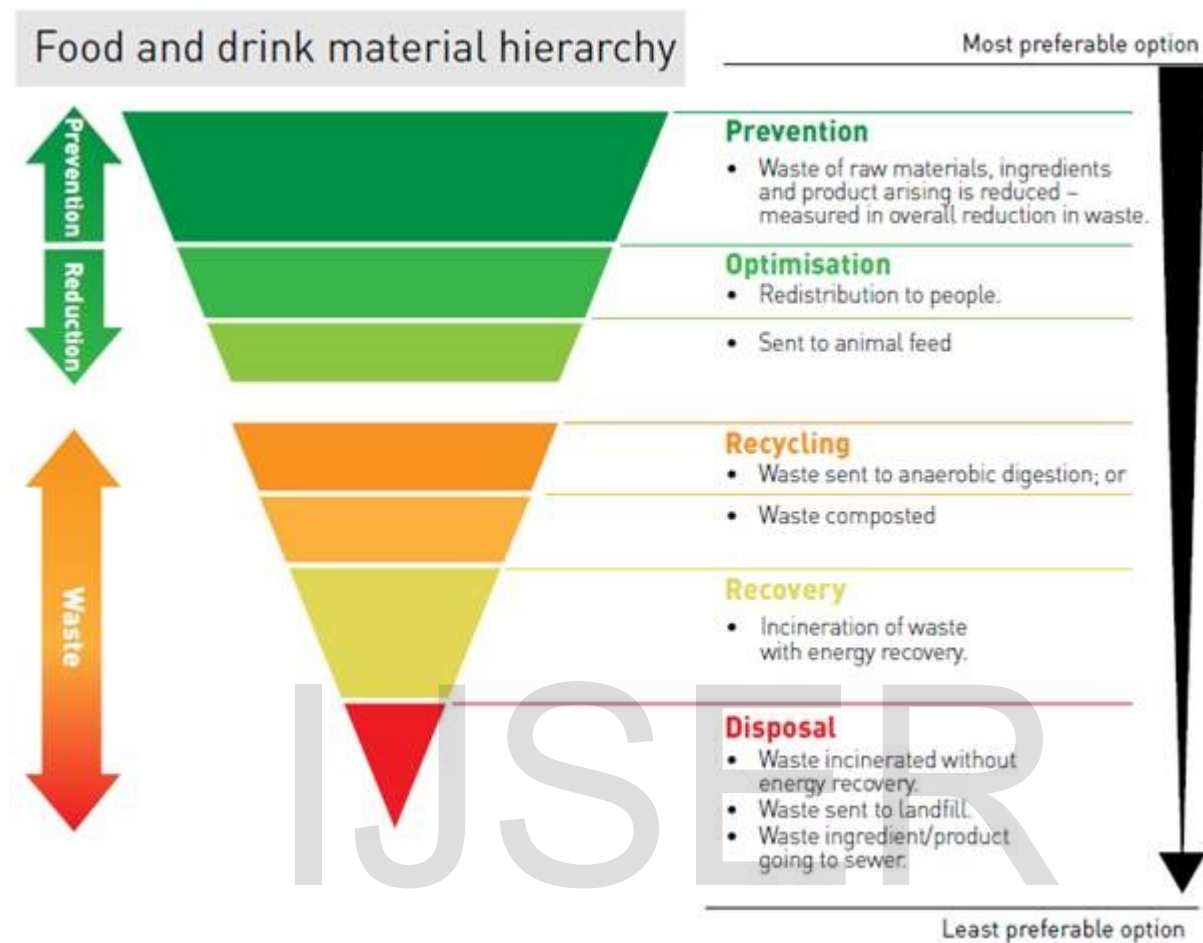
Fresh wastage occurs due to the following: incorrect forecasting of food quantity, bad food quality resulting in the rejection of the food batch, students skipping the food without cancelling the food billing for the day; least amount of food that can be cancelled for is one day thereby one meal during the day does not get cancelled, student eating less during the examination days resulting in the cooked food going waste, breakfast is usually missed or less food is eaten due to early morning classes at 9am: resulting in food wastage, students not liking certain menu's resulting in those items not being taken for eating at all, etc. Plate wastage occurs due to: taking more food quantity than can be eaten, taking food on plate and finding that the preparation is not good; thereby leaving it on the plate. We have done the survey of 200 students in the college and taken their responses through an open ended questionnaire where they have shared their responses and given suggestions. Various other factors responsible in varying degrees for the wastage which we have seen over a period of 5 years are as follows: the number of students taking admission in a year, the slight reduction in the predominance of students from North in the college, the number of foreign students coming as part of the exchange program every year, the absence of non-vegetarian food being cooked in the mess other than eggs, increased focus in admissions through South Indian and Eastern states of India, college functions which involve invitation of parents / guests and dignitaries not confirmed till the last moment, students food conduit wanting the monotony of the mess menu to be changed at certain non-defined intervals, summer vacation resulting in the reduction in the number of students in the campus. The future reasons which we expect for future wastage could be: increase in intake of foreign students over the years in the college, various other disciplines and courses being provided by

the college in future, college adding one more residential campus away from the college with quasi-independent mess etc.

### **Theory:**

Commercial kitchens in India come under the purview of FSSAI (Food Safety and Standards Authority of India). Various other compliance licenses and approvals are required for a commercial kitchen which involves municipal authorities, health authorities. Each system of operations has a recycle, reuse and dump component to it. We shall only be considering the dump component of food wastage. Each food preparation operation has a prescribed SOP (Standard Operating Practices) to ensure a consistent and uniform experience. Every day the mess kitchen at various colleges throws away lots of waste post the food preparation. There is also a fair amount of food which gets wasted in the plates. The cost of food for the preparation of various servings during the day is the 2<sup>nd</sup> highest component besides the staff salary. There are enough reasons to organize kitchen wastage. The goal should be to reduce, reuse and recycle. Reducing waste makes good business sense. Various business decisions can be taken to reduce waste beginning with: Involve and create a team responsible for the operations involving wastage, documentation of all purchase decision along with the business decisions, analysing and tracking wastage in the mess operations, conducting an inventory check frequently to compare purchase and quantum of garbage generated, changing of menu to reduce generation of leftovers, audit and documentation of each component of food wastage is the first step to begin with, using small portions of quantities which get wasted due to expiry issues, investing in good quality kitchen equipment, using FIFO process for any produce in the kitchen and ensuring clear segregation of products of different lots, most of the waste produced at the end of a mess shift/ day can be categorized as recycled through composting or used as animal feed. The wastage is due to spoilage during cooking, preparation waste, and waste in plates. People involved in various operations from food preparation to food consumption all are gathered on board for the endeavour of wastage

reduction. Calculation of food wastage is done and an economic value is assigned to it and metrics, accountabilities, targets, timeframes and rewards are set to reduce food wastage.



<http://www.fdrsinc.org>

### **Methodology:**

As we began to engage ourselves in the project, we initially had the motive of converging our focus on dealing with fresh wastage (i.e. the wastage that is under the control of the college mess and solely depends upon the mess administration). We tried to dig down the possible aspects of the aforesaid wastage from the mess administration and re-confirm the same by a focussed observation in the campus mess dining halls over a period of more than a month.

Our *raison d'être* was to innovate a new and distinct structured process for the commercial kitchens (college campus mess in our case) to maximize the productivity with minimized loss due to any kind of wastage by utilizing all the available resources, tools and techniques to optimize the current gaps in the on-going process of mess administration. The eventual target was to come up with the most optimized and structured process to be blended with the current on going process so that the flow of mess administration does not get hindered and our issue on wastage is sorted out simultaneously. The same process can be thrown to any campus dining administration to achieve the ultimate objective.

Gradually, the focus also shifted towards the consuming entities which majorly consist of students, faculties and all the college staff members. The responsibility of minimizing the wastage from plates i.e. plate wastage (the wastage that is not under the control of the college mess and solely depends upon the consuming entities). Therefore as a part of our project we tried to engage the consuming entities in the waste cycle to develop a sustainable culture in controlling the amount of waste from their plates. While identifying the possible reasons and alternatives, it came to our notice that the mess administration is already committed to a raw and un-structured process that has a potential of being refined to perfection. However, this research is still in its initial stages. We thought that it shall be an impractical attempt, since we still did not possess all of the research and information required for such a massive project to get off the ground. Essentially, we were putting the cart before the horse, and thus, we planned a different path to gain the focus for our project. We still were determined on the idea of focusing the project on waste minimization and sensed that there is an intimate link between people, the food that they consume, and the food that is neglected by all but the trash bin. So, we decided to still focus on chasing other potential reasons for waste minimization in dining halls. A focussed discussion with the college faculty and personnel also played a crucial chunk in our change of the project focus and content. To begin with, we met with the mess administration, who is in-charge of all the mess and dining services for the college. Although they showed a great concern in our project and visualized that we were passionate about our ideas for an innovative and structured

process, they informed us that it was probably too far sighted to achieve under the given climate and the cracked coordination among the departments. The other fields of concern identified by us include a resistive funding for any suggested process change, and the reluctance of the institute to engage in such an enormous effort, even if it proved to be worthwhile once it will be operational. Our next meeting was with the members of the food conduit who are the volunteers in managing the dining services. Our meeting with them again showed us that our new objective was impractical for the institute considering the current state. They specified that commencing a pilot project would lead to be a waste of our time. According to them, by the time a ground-breaking project would finally be able to get off the ground, the institute would likely be in an entirely new situation with regards to the capability to implement a project on campus-wide basis and with different staff members.

Finally, we collected some reviews and insights from the students- a major food consuming group that gave us an idea about what can be the reason for food wastage during dining process. Throughout our project, the core objectives we desired to accomplish have altered significantly. As the technicalities of our project gave us no feasible opportunities, we budged towards conducting a waste audit, and identifying the results to compare it with waste management results of other big commercial kitchen giants like IRCTC. Food waste practices of other similar commercial kitchens also showed us the spectrum from an inefficient spectrum to the best in the class with zero waste kitchens. By conducting our waste audit on our institute, researching the gaps faced by other commercial kitchen like IRCTC we have tried to evolve a process which can be a stepping stone for other future projects to help further waste reduction initiatives and help in a sustainable waste process.

The entire collected data has been coded concerning the privacy of the institute. The data has been coded as follows:

#### Coding of the data:

#### **B1\_110715.Sat :-**

This means B1: Breakfast on the first day of the data set; and 110715 means 11<sup>th</sup> July 2015.

Sat means: Saturday (day of the week)

Similarly, L1\_11072015.Sat, E1\_110715.Sat, D1\_110715.Sat represent lunch, evening snacks, and dinner respectively. Other notations have their usual meaning as explained above.

**% Food wastage=****(Food wastage during a particular meal +Food wastage on plates)x100**

### **Total food prepared for the meal**

Actual number of meal plate's data was available. We have found out that a student consumes, on an average 500 gms during of breakfast / lunch/ snacks/ dinner.

Total breakfast/ lunch/evening snacks/dinner = Number of plates of food consumed x 0.5 kg

Number of plates of food = Total number of enrolled students in the college – Night outs

- Number of people who have cancelled the meal for longer duration

The % wastage of food for each meal was calculated from the data available and sorted in decreasing order for the year. The graph was plotted from the above data (Table 1). We have used auto regression to calculate the data for prediction of the waste.

### **Findings:**

(1) The slope of the reducing % wastage curve with time is an exponential curve with higher -ve slope initially which reduces to a taper with time. All the curves for % wastage in breakfast (Graph 1), lunch (Graph 2), evening snacks (Graph 3) and dinner (Graph 4) are similar with differing scales.

(2) Average % wastage in evening snacks over a year = 3.32%

Average % wastage in breakfast over a year = 6.98%

Average % wastage in lunch over a year = 14.63%

Average % wastage in dinner over a year = 17.95%

The wastage is the highest during dinner time and least during the evening snacks time.

(3) The ratio of the % fresh wastage and the % of plate wastages are nearly similar for evening snacks and dinner. In case of breakfast and lunch the % of fresh wastage to the % of plate wastage is nearly half.

(4) The following equation gives the auto regression wastage loss

$$Y_t = 10.25138 + 0.44333Y_{t-1} + 0.41718Y_{t-2} \quad (\text{Figure 5})$$

If the data has been of years, then  $Y_{2016} = 10.25138 + 0.44333Y_{2015} + 0.41718Y_{2014}$

### **Analysis:**

Although we have conducted a research to gather data over a period of 343 days consecutively but on the days suggested with maximum head counts in dining space, we conducted an audit of the wastage and came to know the following reasons for wastage. Incorrect forecasting of food quantity, bad food quality resulting in the rejection of the food batch, students skipping the food without cancelling the food billing for the day, least amount of food that can be cancelled for is one day, thereby one meal during the day does not get cancelled, student eating less during the examination days resulting in the cooked food going to waste, breakfast is usually missed or less food is eaten due to early morning classes at 9am: resulting in food wastage, students not liking certain menu's resulting in those items not being taken for eating at all, taking more food quantity than can be eaten, taking food on plate



and finding that the preparation is not good; thereby leaving it on the plate, . Various other factors responsible in varying degrees for the wastage which we have seen over a period of 5 years are as follows: the number of students taking admission in a year, the slight reduction in the predominance of students from North in the college, the number of foreign students coming as part of the exchange program every year, the absence of non- vegetarian food being cooked in the mess other than eggs, increased focus in admissions through South Indian and Eastern states of India, college functions which involve invitation of parents/ guests and dignitaries not confirmed till the last moment , students food conduit wanting the monotony of the mess menu to be changed at certain non-defined intervals, summer vacation resulting in the reduction in the number of students in the campus . The future reasons which we expect for future wastage could be: increase in intake of foreign students over the years in the college, various other disciplines and courses being provided by the college in future, college adding one more residential campus away from the college with quasi- independent mess etc. Furthermore, various other factors responsible in varying degrees for the wastage which we have seen over a period of 5 years are as follows: the number of students taking admission in a year, the slight reduction in the predominance of students from North in the college, the number of foreign students coming as part of the exchange program every year, the absence of non- vegetarian food being cooked in the mess other than eggs, increased focus in admissions through South Indian and Eastern states of India, college functions which involve invitation of parents / guests and dignitaries not confirmed till the last moment, Members of food conduit wanting the monotony of the mess menu to be changed at certain non-defined intervals, summer vacation resulting in the reduction in the number of students in the campus .

The future reasons which we expect for future wastage could be increase in intake of foreign students over the years in the college, various other disciplines and courses being provided by the college in

future, college adding one more residential campus away from the college with quasi- independent mess etc.

### **Discussions:**

The findings of auto regression on wastage are helpful for us to forecast the expected wastage on a day to day and not on a yearly basis. The availability of long term data (10 years at least) would have enabled us to predict and design a more robust model with better predictive capabilities. Moreover the fluctuating reasons on a day to day basis are not predictable and an average yearly data does not concentrate on a single day reason. Also, there the reasons for wastage in future years would carry a higher weightage questioning the validity of the equation to an extent.

However, there is also a widened scope of the study by doing lift analysis using the various menus being used and the best possible menu resulting in the least amount of wastage considering the different menu options in the institute. The scope of study could be increased by calculating wastages at each stage of food preparation till the wastage in plates and detailed documentation of the same.

### **Conclusions:**

Though there are a lot of concerns facing the current operations, we have suggested some basic yet effective ways to innovate the current process which is cost and time efficient and does not hinder the current process drastically in terms of effectiveness. The regular and strict practice can put down the

level of waste to a minimum quantity. These are some of the proposed solutions which are applicable to all type of commercial kitchens.

- 1) Commercial kitchens should opt for smarter small portion plates rather than larger plates. It means that an optimum quantity of food should be placed in smaller plates.
- 2) For those who are not comfortable with the mess timings should be given the option to take away what they can't consume instead of feeding the same to trash bin. For the same, paper bags or personal carrying medium like tiffin's could be used.
- 3) All the trash should be separated into three categories depending upon their nature like recycle, compost and landfill to enable easy segregation of waste and less hassle for the consuming person to minimize the waste.
- 4) Change in menu items and a regional mix of menu items should be a regular routine to facilitate the healthy taste of all consuming persons from all corners of different ethnic groups on a daily basis.
- 5) Ideal storage and monitoring of inventory should be carried out to minimize the wastage during storage, logistics and handling.
- 6) Maintaining a balance between efficiency and cost by engaging sufficient staff members in preparing a right amount of food quantity instead of preparing the same amount multiple number of times. Basically predicting the actual number of consuming entities in a correct manner would serve the purpose.
- 7) Make the purchases wisely. Some of the ingredients used in meal preparation go waste because of expiry issues. The purchase of the ingredients should be in smaller packages.
- 8) The staff members should also be trained about the movement in the kitchen.
- 9) Regularly rotate the food ingredients in the inventory and educate the same to staff members to facilitate freshness of food and thereby reducing pre-cooking wastages.

Food wastage can be predicted for a day individually using auto regression using the data point for the two individual days. The predictive analytics of food wastage is possible for a long term data for at least 10 years. In our case the data is available for 1 year only. We have used simple regression and qualitative research to find out the causes of food wastage. The qualitative research was conducted with the sampling of about 200 respondents of the college through a questionnaire which captured the individual responses on a scale. Additionally open ended comments also helped to build up the repository of reasons for the food wastage in mess. Additionally we also interviewed the staff involved in the mess logistics and operations about the reason for wastage at their end. We could further use lift analysis to see what combination of menu would further optimise the plate wastage in food for each of the meals served in a day. The wastage due to incorrect forecast at the initial stage of preparation can be reduced by documenting the wastage SKU wise and tracking it over period of time. The study opens up new and exhaustive frontiers of waste management. Since the kitchen is for a captive community the scope of differential pricing is further reduced.

#### **Implications:**

We have tried to use the predictive analytics model to forecast the wastage in commercial kitchens (mess). However the same is not possible for a smaller cross sectional data (1 year only). Further the reasons for the wastage in the current data set for mess operation keep on changing every year with new additional factors coming in every year. Also the % wastage curve calculated from highest to the lowest over the year is an exponential curve with highest negative slope initially followed by slowing down of the negative tapering. We have used the historical wastage data of two previous days to predict the wastage data for the current day. There is bound to be a certain minimum wastage for a very small scale of operations which is seen by the intercept of the equation.

#### **Tables:**

<b><u>Breakfast</u></b>	<b><u>Lunch</u></b>	<b><u>Evening snacks</u></b>	<b><u>Dinner</u></b>
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<b>Total plates expected for the day</b>	
<b>Code</b>	
<b>Actual breakfast</b>	
<b>Fresh wastage during breakfast(kg)</b>	
<b>Plates wastage during breakfast(kg)</b>	
<b>Actual lunch</b>	
<b>Fresh wastage during lunch(kg)</b>	
<b>Plates wastage during lunch(kg)</b>	
<b>Actual plate of snacks</b>	
<b>Fresh wastage during snacks(kg)</b>	
<b>Plates wastage during snacks(kg)</b>	
<b>Actual dinner</b>	
<b>Fresh wastage during dinner(kg)</b>	
<b>Plates wastage during dinner(kg)</b>	

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692	B1_110715.Sat	569	9	18	635	8	22	332	4.7	1	605	$\frac{4}{1}$	38
689	B2_120715.Sun	485	5	5	580	23	23	311	1.3	3	700	$\frac{4}{7}$	49
753	B3_130715.Mon	493	$\frac{1}{7.5}$	15	475	14	29	314	0	7	680	$\frac{3}{4}$	23
761	B4_140715.Tue	585	8	11	647	14	27	415	0	2	696	$\frac{1}{2}$	17
738	B5_150715.Wed	500	3	7	607	12	34	403	0	3	717	$\frac{7}{3}$	54
724	B6_160715.Thu	540	1	16	630	27	33	398	0	2	740	$\frac{1}{9}$	31
577	B7_170715.Fri	467	7	10	440	42	18	343	2	4	485	8	18
511	B8_180715.Sat	318	4	8	360	18	11	415	8	8.5	390	$\frac{1}{2}$	30
619	B9_190715.Sun	330	2	10	470	24	25	270	1	2	523	$\frac{3}{3}$	19
739	B10_200715.Mon	470	$\frac{1}{8}$	21	680	8	15	415	0.5	2	670	$\frac{1}{9}$	24
746	B11_210715.Tue	547	$\frac{1}{1}$	19	645	19	26	452	0	2.5	745	$\frac{1}{2}$	36
758	B12_220715.Wed	540	4	5	768	20	31	420	1	3.5	780	$\frac{4}{2}$	48
748	B13_230715.Thu	542	1	9.5	625	11	33	362	3.5	2.2	696	8	30
721	B14_240715.Fri	550	8	$\frac{13.5}{5}$	707	8	$\frac{28.8}{8}$	390	8	3.7	680	$\frac{4}{8}$	34
672	B15_250715.Sat	500	$\frac{1}{3}$	15	477	55	$\frac{21.7}{7}$	270	14	1.3	525	$\frac{6}{2}$	$\frac{24.75}{75}$
672	B16_260715.Sun	452	2	7	550	8	$\frac{23.12}{12}$	286	1	$\frac{3.2}{2}$	640	$\frac{5}{1}$	$\frac{33.1}{1}$
736	B17_270715.Mon	492	$\frac{1}{1}$	$\frac{14.4}{4}$	562	7	29	402	5	3.9	610	$\frac{3}{9}$	22
752	B18_280715.Tue	535	2	19	635	8	25	430	0	2.3	678	$\frac{4}{0}$	26
735	B19_290715.Wed	565	2	7	675	6	$\frac{27.6}{6}$	445	1	1.8	700	$\frac{1}{2}$	34
716	B20_300715.Thu	573	$\frac{0.2}{2}$	16	600	$\frac{10.5}{5}$	30	425	0.1	3	698	$\frac{2}{5}$	25
703	B21_310715.Fri	528	3	$\frac{10.5}{5}$	632	6	$\frac{24.5}{5}$	292	0.3	2.7	669	$\frac{3}{3}$	30
661	B22_010815.Sat	526	8	16	575	10	23	423	6	4	640	$\frac{1}{5}$	27
676	B23_020815.Sun	463	$\frac{5.8}{8}$	7.5	385	21	18	423	0.8	1.8	595	$\frac{3}{2}$	21
747	B24_030815.Mon	485	1	8	660	21	27	450	3	2.9	603	$\frac{1}{0}$	32
755	B25_040815.Tue	575	$\frac{1}{8}$	14	632	5	22	417	0.3	2.3	648	$\frac{3}{4}$	$\frac{21.3}{3}$

751	B26_050815.Wed	506	9	12	658	2	21	550	0.2	1	800	7 4	20
737	B27_060815.Thu	475	5	16	688	10. 2	29	465	3.2	4.2	576	1 2	18
713	B28_070815.Fri	470	6	7.2	716	23	20. 25	396	1.1	4.3	745	5 1	35. 5
664	B29_080815.Sat	484	1 6	15	570	26	22	380	0.2	2.2	601	2 2	21. 5
670	B30_090815.Sun	409	6	8.5	500	33	19	366	0	2.8	565	5 4	25. 5
748	B31_100815.Mon	520	0. 5	18. 5	669	20	33. 1	458	3.3	3	624	2 5	27
748	B32_110815.Tue	590	7	9	652	10	26	495	3.5	2.7 5	560	2 3	21
716	B33_120815.Wed	350	2 1	7	460	65	21	360	35	2	370	3 8	10
676	B34_130815.Thu	530	0	10	605	0	23	370	0	1.8	550	1 6	17. 5
552	B35_140815.Fri	480	1. 5	10	626	13	23	400	1.1 5	1.8	542	2 2. 5	17. 5
470	B36_150815.Sat	850	0	0	315	26	5	202	2.3	1.3 4	460	2 5	6
602	B37_160815.Sun	312	2	1.7	438	12. 5	4	292	2	0.6	419	4 1	2.5
735	B38_170815.Mon	485	0. 7	4.5	624	22	7.2	435	4	0.7	1050	2 8	30
749	B39_180815.Tue	514	2 8	17. 7	658	11	14. 7	410	1.6	1.8	595	2 7	10
760	B40_190815.Wed	541	3	4.4 2	790	7	9	480	0.2	1.1	755	3 2	23
743	B41_200815.Thu	520	1 9	16	682	15	13	409	9	1.5 4	660	2 2	6.7 5
736	B42_210815.Fri	483	3. 1	5.4	677	9	20. 5	378	2.1	1.4	664	3 8	15. 4
700	B43_220815.Sat	467	3. 5	13. 3	587	4	14. 16	345	5	3.5 5	610	3 9	17
693	B44_230815.Sun	436	5	5	524	58	15. 5	361	0.1	1.2	600	1 7	19
747	B45_240815.Mon	465	1. 2	7	668	10	26	453	5	4	677	4 7	16. 5
755	B46_250815.Tue	488	5	18. 5	550	6	18. 2	403	0.5	2.2	585	4 4	10
697	B47_260815.Wed	500	2	9	575	7	20	435	9	3.5	640	4 7	22
595	B48_270815.Thu	415	2	16	495	27	17	276	1.5	1.8	380	5 1	8
374	B49_280815.Fri	408	0. 5	2	427	9	11	142	1	0.6	350	3	10. 5

301	B50_290815.Sat	220	2. 2	2.2	280	20	12	118	11	2.3	331	1 1	7.5
436	B51_300815.Sun	215	2 0	11	295	11	10	161	0	0.9	397	3 9	6
683	B52_310815.Mon	410	1. 2	6.5	595	21	15	405	7	3.3	636	2 3	20
752	B53_010915.Tue	485	1 5	13	611	12. 5	20. 8	355	3.2	2.5	675	2 0	24
757	B54_020915.Wed	425	1. 1	2	617	21	33	437	9.5	4	700	2 5. 5	29
750	B55_030915.Thu	497	5. 5	9.5	520	11	18	341	3	1.5	625	2 7	20
742	B56_040915.Fri	480	7	11	640	21	15. 5	380	5.8	1.2	675	1 9	21
726	B57_050915.Sat	455	5	11	635	14	28	330	3	0.6 1	730	3 1	25
725	B58_060915.Sun	390	0. 2	6	470	22	21. 5	395	11. 5	3.5	699	2 6	31
756	B59_070915.Mon	270	0. 5	11	615	43	25	450	20	0	408	3 7	18
749	B60_080915.Tue	457	1 5	11	665	8	21. 5	335	1	2	650	9. 5	15
754	B61_090915.Wed	482	1. 1	9	760	11	33	457	3.2	4.7	680	4 2	33
756	B62_100915.Thu	420	3. 2	11. 2	585	19	17. 5	380	0.5	1.8	667	2 7	23
741	B63_110915.Fri	462	1. 5	6	543	15	19	455	41	2.5	627	3 9	30
750	B64_120915.Sat	410	1 0	17	616	30	35	545	0.5	4	647	2 4	19
760	B65_130915.Sun	431	5. 5	5	656	6	25	535	0.8	6	701	1 7. 5	27
767	B66_140915.Mon	520	4	6	602	12	21. 6	564	0.2	4	744	2 0	26. 5
767	B67_150915.Tue	470	5. 5	12	558	11	21	480	0.8	3.5	712	2 1	23
767	B68_160915.Wed	497	0. 1	6	582	28	20. 5	585	2	6	763	4 0	37
767	B69_170915.Thu	460	8	12	560	22	23. 5	430	11	2.1	650	2 5	24
765	B70_180915.Fri	330	1 7	5.2	555	9	19	500	10	2.2	705	3 7	32
633	B71_190915.Sat	430	7	14	600	17	23. 5	365	8	4.5	544	3 7	12
550	B72_200915.Sun	360	4	9	349	16	17	301	15	1.8	488	2 9	20. 5
713	B73_210915.Mon	319	3	5	542	40	30	340	4	2.4	515	1	13.



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740	B74_220915.Tue	450	0.5	2.5	620	2.8	17.8	310	5	2	650	10	15
706	B75_230915.Wed	500	0.1	10.2	756	22	22	322	14.2	2.5	620	18	31
638	B76_240915.Thu	450	9	12	668	4	22	345	0	1	575	11	10
533	B77_250915.Fri	385	1.2	6.3	450	19	13.6	265	4	2.7	476	35	21.7
516	B78_260915.Sat	362	8	10	424	15	9	257	2.5	1.3	392	29	10
576	B79_270915.Sun	356	0.2	4	476	21	15.6	224	0.2	0.6	548	17	11.5
732	B80_280915.Mon	425	0.4	8.4	555	11	20.1	355	6.5	3	800	39	40
730	B81_290915.Tue	460	7	19	519	7	21.1	297	1.2	2.5	647	14	18.8
638	B82_300915.Wed	290	3	10	440	39	22.3	285	3.5	3	368	27	28
722	B83_011015.Thu	481	1	17.1	597	2	23.4	352	3.2	6.5	537	45	18.8
597	B84_021015.Fri	430	4	10.5	800	40	23	107	9	1	480	31	17
549	B85_031015.Sat	335	19	10	470	2	17	222	0	1.3	729	21.5	15.6
635	B86_041015.Sun	405	1	7.2	510	11	26.5	265	0.1	1	615	20	16
734	B87_051015.Mon	500	3	9	735	10	17	332	4	2.2	625	20	12.3
749	B88_061015.Tue	525	4	21	540	8	10.4	350	0	1.5	630	18	17.8
731	B89_071015.Wed	530	0.1	9	554	20	18.7	375	0.1	4.2	613	27	30
700	B90_081015.Thu	607	2	10	610	3	27	388	1	2.6	606	17	19
659	B91_091015.Fri	439	5	10	438	4.6	21.5	273	2.5	1	545	29	19
638	B92_101015.Sat	447	9.3	6.2	540	4.3	25	425	1	2.9	445	31.5	26
638	B93_111015.Sun	385	1.7	2.5	390	10	21	246	12.2	4	550	17	35
740	B94_121015.Mon	390	1.8	10	532	5	33	243	3.7	3.5	700	32	27
750	B95_131015.Tue	460	6	20	636	3.4	17	330	1.4	2.8	730	13.2	29
741	B96_141015.Wed	490	7	12	645	6.3	22	339	1.6	2.2	735	1	32

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723	B97_151015.Thu	467	6.5	11	586	2	16	386	2.7	1.8	620	19	22
649	B98_161015.Fri	526	3	13.3	580	4	26.2	320	5	3	540	25	23
622	B99_171015.Sat	423	9	15	540	6	15	167	0	1.1	547	24	17
631	B100_181015.Sun	350	7	7	475	27	17	240	1	1.05	573	10.5	20
700	B101_191015.Mon	472	2	8	630	6.5	2.5	340	0.2	3.4	639	7.5	26.6
660	B102_201015.Tue	470	14	19	628	14	20	240	1	2.7	576	10	20
546	B103_211015.Wed	480	6	18	535	12	22.5	270	1	2.9	440	23	20
488	B104_221015.Thu	303	8	14.5	403	16	15	95	0.8	0.6	410	17.5	15
613	B105_231015.Fri	315	3	9	389	13	21	200	0	1.9	538	25	26
675	B106_241015.Sat	370	2	37	455	16	20	177	2	1.2	430	6	10
706	B107_251015.Sun	510	0.5	5	546	60	16	224	0	0.7	515	7	12
748	B108_261015.Mon	479	2	7.8	660	12	31	381	0	3.6	685	29.5	27.5
762	B109_271015.Tue	608	3.2	15.6	636	14	27.5	475	2	2	670	17	24.7
763	B110_281015.Wed	620	0	14.7	496	22	24	423	6	1.9	647	25	37
749	B111_291015.Thu	540	1	19	610	0	22.5	438	0.5	3.3	567	32	23
735	B112_301015.Fri	531	1	13	580	11	21.5	275	8	3.5	572	23	23.7
692	B113_311015.Sat	528	3	14	595	6	33.5	285	1.5	2	580	17	16
700	B114_011115.Sun	440	0.5	9	475	12	15.8	308	0	1.7	570	10	19
725	B115_021115.Mon	430	0	11.2	530	10	19.5	350	27	3	645	16	23
757	B116_031115.Tue	497	3	8.5	595	4	23	453	4	4.1	542	17	20
747	B117_041115.Wed	500	1	9	568	2	20.6	395	3	2.5	665	23	34
701	B118_051115.Thu	480	2	26	470	2	14.5	366	3	2.5	510	27	19.5
528	B119_061115.Fri	430	7	9.5	495	7.5	29	237	0	1	404	17	23

325	B120_071115.Sat	300	0	10	356	3	13	195	5	0.5	265	3	9
257	B121_081115.Sun	214	3.5	2.5	202	5	4	117	1	0.3	252	1.8	7.8
205	B122_091115.Mon	219	0	7	233	1.5	10.5	60	1	1	151	9	7
152	B123_101115.Tue	134	0	4.6	110	0	2.5	50	0.5	0.5	125	7	3.2
131	B124_111115.Wed	87	4	1.8	115	0.1	10	55	0.2	0.5	120	5	8
133	B125_121115.Thu	123	6	5	153	6.5	2.4	113	0.1	0.5	120	2	3.6
180	B126_131115.Fri	99	0	1.7	109	0.5	5.6	84	0.6	1.3	140	1.7	5.5
187	B127_141115.Sat	158	0.5	3.7	177	6	5	130	1.3	0.5	206	7.5	6.2
343	B128_151115.Sun	205	2	2.6	280	0.5	7.3	209	0.5	0.5	380	1.2	6.5
638	B129_161115.Mon	370	4	5.2	457	6	11.3	303	5.5	3.5	580	6	25
687	B130_171115.Tue	496	1.0	11	603	15	23.5	410	5.5	2.5	569	2.6.5	23
721	B131_181115.Wed	500	1	6	560	11	19.4	345	4	3.8	614	2.0	26
741	B132_191115.Thu	460	2	10	487	12	14.8	380	3	6	550	1.4	25
720	B133_201115.Fri	507	0.5	16	526	0	23	315	0.5	7	565	1.1	32
679	B134_211115.Sat	465	0	11.5	477	7	17.5	307	2.5	2.6	485	1.5	18
679	B135_221115.Sun	355	7.5	8	425	19	20.3	305	0	3.2	538	5	20.5
698	B136_231115.Mon	450	3	13.5	600	6	24.4	300	0	2.6	490	2.1	26
706	B137_241115.Tue	476	5	11	560	8	19.4	358	0	1.2	605	2.5	18.8
706	B138_251115.Wed	350	1	7	310	41	23	226	13	2.6	600	1.4	29.4
717	B139_261115.Thu	370	2	13	580	10	24	381	6	10	533	5	19.8
663	B140_271115.Fri	420	3	5.6	416	23	20.8	483	3	1	490	2.8.5	19
706	B141_281115.Sat	335	4	16	455	17	28	290	0	3	470	2.4	15
706	B142_291115.Sun	315	0	9.7	368	28	12	240	0	1.6	504	1.6	18.6
706	B143_301115.Mon	401	7	6.5	690	10	23.7	430	6	2.5	540	5.7	27
706	B144_011215.Tue	401	7	6.5	690	10	23.7	430	6	2.5	540	5.7	27

679	B145_021215.Wed	455	2	6.3	505	8	20	367	0	0.7	492	2 0	30. 9
705	B146_031215.Thu	430	0. 5	17. 5	570	18	21	355	2	2.3	520	9	24. 4
695	B147_041215.Fri	436	0	8.6	480	10	16. 8	400	3	2.6	640	2 8. 5	34
653	B148_051215.Sat	410	5	20	490	7	21. 7	323	0	2.4	500	2 0. 2	26. 6
702	B149_061215.Sun	355	1 0	6.5	506	19	30	400	5	15	1000	2 0	30
724	B150_071215.Mon	448	5	11. 4	587	2	22	435	1.5	2.4	530	5	25. 7
749	B151_081215.Tue	465	0. 5	18	570	8	22. 6	385	0.5	3	680	5	22
747	B152_091215.Wed	430	2	11. 6	576	3.5	13	440	2	1.7	710	1 2	33. 5
724	B153_101215.Thu	380	3	13	559	23	27. 5	420	2	2.4	620	1 3. 5	2.4
713	B154_111215.Fri	395	2	10. 5	700	10	40. 2	425	0.9	7.1	590	3 4	32
624	B155_121215.Sat	400	9. 5	17	675	18	29	487	9	2.2	630	1 4	39. 3
752	B156_131215.Sun	410	1	7	680	20	26	460	2	4	612	2 8	37. 4
770	B157_141215.Mon	425	0	9	680	9.5	23	520	3	6.7	565	3 4	30
724	B158_151215.Tue	350	3. 5	15	652	0.5	24	563	0	9	616	2 2	27
777	B159_161215.Wed	410	0	8	590	4	23	426	0.5	1.9	690	1 1	37. 5
773	B160_171215.Thu	500	3	16	609	13	28	421	1	2	671	1 1	27
767	B161_181215.Fri	400	2	6	604	7	24	420	0.3	2.5	677	2 6	36. 2
766	B162_191215.Sat	440	3	17	661	4	19	476	0.5	3.2	590	1 8	25
718	B163_201215.Sun	440	0	10	560	20	21	460	0	4	590	1 9	25
631	B164_211215.Mon	410	7	12	528	16	22	335	0	2	528	1 2	14
474	B165_221215.Tue	356	9	10	435	11	15. 5	236	2.5	1.2	373	6	14
372	B166_231215.Wed	251	0	8	335	6	11. 5	130	3.5	1	293	1 3	20. 5
301	B167_241215.Thu	241	4	9	230	9	11	135	0.2	0.1	233	1 5.	10

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300	B168_251215.Fri	200	2	3.5	213	1	10. 5	103	1	1.1	350	1 3. 5	25
541	B169_261215.Sat	210	5	7	285	22	11	170	0	0.7	341	1 3	15
524	B170_271215.Sun	214	3	3.5	227	18	12	218	0	1.3	350	1 3. 2	13
557	B171_281215.Mon	310	0	4.5	395	6	17	275	0.3	3	430	1 9. 5	10
564	B172_291215.Tue	442	9	11	410	0	13. 7	285	0.3	3.1	455	2	14
552	B173_301215.Wed	320	0	5.4	455	2	20. 5	275	4.5	3	445	9	19. 7
403	B174_311215.Thu	300	0	12	313	12	19	184	0	3	280	1 8	7
360	B175_010116.Fri	220	0	2.7	210	6	7.5	150	2	1.5	350	2 0	12
484	B176_020116.Sat	225	4	9.5	340	4	17	181	1	3.1	293	3 7	16
587	B177_030116.Sun	262	0	3	260	1	2	220	1	0.6	355	1 6	19
628	B178_040116.Mon	370	0. 5	11	451	3	13. 4	293	0.3	1.8	494	7	17
662	B179_050116.Tue	410	1 1	17	485	3	19	338	0.5	1.4	548	1 2	19
665	B180_060116.Wed	462	0. 5	4.5	520	25	23	327	0	4	635	1 1	23
645	B181_070116.Thu	435	0. 5	13	430	3	16	600	0	5	640	1 7	20
637	B182_080116.Fri	467	1	7	430	24	17	315	1	4.5	500	1 3	26
592	B183_090116.Sat	400	5	15	407	14	14	265	0	2.5	463	1 0	25
615	B184_100116.Sun	345	0	4.6	320	12	13	330	1	2.3	430	1 2	16
665	B185_110116.Mon	410	2	7.3	535	29	22	336	2.5	4.1	490	7	19. 8
655	B186_120116.Tue	425	4	15	453	12	20	277	4	2.6	495	5	21. 3
638	B187_130116.Wed	420	2	11	400	7	18. 2	300	0	4	670	1 9	15
617	B188_140116.Thu	405	3. 5	20. 6	500	5	25. 6	245	0.2	2	495	9	20
617	B189_150116.Fri	405	3. 5	20. 6	500	5	25. 6	245	0.2	2	495	9	20
533	B190_160116.Sat	325	1	11	420	8	15.	250	1	5.7	420	3	18

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547	B191_170116.Sun	330	9	6.8	420	10	14	310	0	2.5	520	1 2	17. 3
639	B192_180116.Mon	410	1	10. 3	585	4	19	328	1	2.5	565	9	15
652	B193_190116.Tue	390	0	11	535	7.5	21. 6	374	1.5	3	570	6	23. 7
642	B194_200116.Wed	460	0	6	517	4	17. 5	335	0.2	1.7	600	1 3	28
626	B195_210116.Thu	465	2	10	493	3	17	316	0	1.6	620	2	23
642	B196_220116.Fri	460	3	7	487	3	16. 5	320	0.1	2.3	560	1 1	31
538	B197_230116.Sat	440	9	10	468	9	12. 5	330	6.8	4.5	540	8	35
540	B198_240116.Sun	329	1. 8	1.5	459	7	9	280	0.2	2.5	480	1 6	24
559	B199_250116.Mon	351	3. 6	5	435	19. 5	14	255	0.4	0.4	450	1 2	17
571	B200_260116.Tue	900	0	10	345	13	19	277	0.9	1	485	1 7. 9	17
630	B201_270116.Wed	343	0	8	506	10	20. 2	360	0	3	540	2 0	27. 8
651	B202_280116.Thu	430	0	11	420	14	20. 5	300	0.5	2.8	420	2 5	19
611	B203_290116.Fri	415	0	7.8	400	17	17	320	1	3.3	540	4	21
569	B204_300116.Sat	380	0	11	465	24	17	287	2	2.3	355	3 3	15
573	B205_310116.Sun	336	1	5.3	450	7	18	225	0.5	1.3	380	3 5	21. 5
634	B206_010216.Mon	400	1 4	8.5	475	24	23	261	0.5	3.7	590	1 1	22. 5
639	B207_020216.Tue	414	1. 5	15	445	9	9.3 8	291	0	7.8	515	1 7	19
629	B208_030216.Wed	445	1. 5	6.2	405	9.5	18. 5	225	2	1.7	505	1 9	24
629	B209_040216.Thu	402	4	12. 5	450	10	25	305	0	2	490	7	24. 5
631	B210_050216.Fri	390	3	7.8	485	5	19. 3	307	0	1.4	580	4	32
605	B211_060216.Sat	436	0	7.5	360	4	15. 2	273	0	1.4	375	6	18
598	B212_070216.Sun	380	0	16	343	14	16. 5	324	3.5	1.2	470	1 9	19
669	B213_080216.Mon	465	1	6.5	440	11	12. 5	348	1.5	3.1	495	1 9	17
663	B214_090216.Tue	463	2	14. 2	413	6	16	203	0	1.8	360	7	20. 3
663	B215_100216.Wed	365	1.	8.5	407	5	57	280	1.2	3.2	420	1	17

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656	B216_110216.Thu	408	2	15. 7	550	5	15. 8	360	0	4.6	367	1 3	20
620	B217_120216.Fri	400	6	11	560	16	15. 7	320	1	1.7	375	1 1	14
585	B218_130216.Sat	320	0	12	394	14	15	231	0.3	2	305	1 6	16
569	B219_140216.Sun	362	4	5.2	392	4	15. 5	320	0	3.3	480	8	15. 45
674	B220_150216.Mon	330	3	11	445	6	16. 5	290	0	3	650	1 7	16
702	B221_160216.Tue	390	3	7.5	505	4	20. 1	375	0	3.2	655	5	18. 5
673	B222_170216.Wed	418	3	4.4	525	19	22. 5	331	2.5	2.1	450	2 6	24
635	B223_180216.Thu	462	0	12	395	5	16	357	1	3	455	1 6	19
558	B224_190216.Fri	390	4	14. 4	450	5	17. 5	277	0	1.6	475	1 6	25
459	B225_200216.Sat	311	2	6.5	340	3	11. 7	228	0	15	380	9	11
418	B226_210216.Sun	290	1	8	348	6	19. 8	200	0.8	0.7	310	1 3	13. 4
434	B227_220216.Mon	326	2	5.6	335	19	14. 5	243	2.2	2.5	331	1 5	9
436	B228_230216.Tue	355	7	10. 6	340	0	10	179	0	1.5	355	2	19. 4
226	B229_240216.Wed	215	4	3.6	196	5	8.5	120	0	0.8 2	265	1 4	10. 4
208	B230_250216.Thu	195	0	8.9	200	2	6.7	115	0.7	0.7	183	1 3	6
158	B231_260216.Fri	158	4	2.6	162	3	5.2	97	2	0.2	170	9	9
312	B232_270216.Sat	195	0	3.3	218	9	3.2	72	1	0.5	207	1 0	3.1
162	B233_280216.Sun	166	1. 2	1	137	7	5	70	0	0	210	8	4
318	B234_290216.Mon	170	0	8	209	0	8	92	0	0.1	227	2	5
298	B235_010316.Tue	179	0	4.9	192	13	9.1	101	0	0.4	273	1 3	8
352	B236_020316.Wed	215	1	5.5	341	0	16	185	0.5	0.7	363	1 9	5.8
406	B237_030316.Thu	300	8	11. 5	326	8	13. 5	219	0	1.8	380	1 4	20
399	B238_040316.Fri	320	2. 5	7.6	268	2	8.4	158	0	1.5	327	2 0	15. 8
329	B239_050316.Sat	219	1 5	14	295	7	14	143	2	2	282	1 5	11
297	B240_060316.Sun	165	0	1.9	245	9	13. 3	140	0	0.9	238	7	9.4

337	B241_070316.Mon	140	0	3.5	198	6.5	8	121	2	0.6	295	7	13
380	B242_080316.Tue	246	0.5	7	290	11	18	197	0	0.8	400	6.5	14
383	B243_090316.Wed	264	0	3.3	338	2	10.5	260	0	1.9	380	2	18
386	B244_100316.Thu	313	0	8	338	1	20.8	240	1	1.1	386	3.5	16.8
389	B245_110316.Fri	300	0	8.8	341	1.5	12	305	0.75	2.2	390	6	25
386	B246_120316.Sat	340	2	6	430	0.5	19	186	6	1.1	320	3	16.3
350	B247_130316.Sun	230	0.5	4.2	270	3	11.7	180	0	0.8	300	5	16
357	B248_140316.Mon	260	4.8	7	410	3	11	215	0.4	1	380	10	13.8
383	B249_150316.Tue	150	0	3	280	0	12	200	0	0.7	175	2.2	8
397	B250_160316.Wed	150	4.4	1.9	260	5.5	20.5	130	0.5	1.5	185	16	22
392	B251_170316.Thu	304	3	10.5	395	19	18	291	0	4	391	11	19
391	B252_180316.Fri	307	14	6.6	336	5	13.5	196	0	0.8	370	17	14
372	B253_190316.Sat	260	6	9	309	6	11.2	235	1.5	1.9	315	13	12
365	B254_200316.Sun	285	1	4	278	7	16	197	0.2	0.7	360	1	16
387	B255_210316.Mon	255	0	5	338	6	12	181	1	0.6	330	8	6
379	B256_220316.Tue	275	8.5	8	358	7	11	210	0.3	2	315	14	5
377	B257_230316.Wed	250	2	2	303	6	7	187	0	1	380	11	6
378	B258_240316.Thu	128	5	2.5	240	17	28	175	1.3	0.5	365	14	6
386	B259_250316.Fri	285	1	3	275	2	10	212	20	0.5	313	6	5
386	B260_260316.Sat	248	2	7.5	312	0	17.5	243	1.5	2	290	5	10
384	B261_270316.Sun	265	3	3.5	337	8	16	240	0	1.8	314	11	20
392	B262_280316.Mon	271	4	9.5	398	3.5	16.6	232	0	1.4	387	19	16
393	B263_290316.Tue	267	0.5	5.9	334	8	14	231	2	2.2	394	5	18
395	B264_300316.Wed	265	1	9	404	5.5	19.7	190	1.5	1.6	421	7.5	22
345	B265_310316.Thu	297	1	8	353	16	19.2	177	0.5	2	295	11	12.7
345	B266_010416.Fri	259	0.5	6	298	6	18	207	2.1	3.1	361	9	19
306	B267_020416.Sat	335	4.	13	382	7	16	175	4.4	2.4	401	8	18



			5										
274	B268_030416.Sun	489	0	14	1000	11	12	500	0	5	1352	2	27
225	B269_040416.Mon	284	0	6	355	10	11	122	0.2	0.7	212	1 1	10
204	B270_050416.Tue	195	6	7	189	4	7	99	0	1.1	171	3	8
157	B271_060416.Wed	138	0. 8	4	177	3	11	90	0.3	0.1	195	2. 5	5
141	B272_070416.Thu	145	5	3.5	130	3	7	65	0.8	0.4	139	8. 5	9
144	B273_080416.Fri	129	1. 2	2	148	1.6	12	73	0.2	0.1	122	4. 2	7
121	B274_090416.Sat	133	4	5	134	4.6	6	76	0.4	0.5	157	9. 6	7
117	B275_100416.Sun	90	0. 8	1	160	2.6	5	78	0.1	0.2	152	5. 8	10
113	B276_110416.Mon	155	0	2.6	134	7	6.1	72	0	0.2	192	7	7.4
138	B277_120416.Tue	142	5. 5	6	107	3	4.9	58	0.3	0.2	165	9	5
141	B278_130416.Wed	152	0	2.9	142	4	7.5	67	1	0	174	1 1	6
125	B279_140416.Thu	162	7	5.5	198	12	7.9	67	0	0.4	173	1 4	9
128	B280_150416.Fri	187	0	4.2	156	3.5	5.1	69	3	1.3	165	2	11
130	B281_160416.Sat	175	0	5.8	128	1	5.9	90	1	2.2	153	1 3	9
119	B282_170416.Sun	129	1	1.8	139	2	7.5	61	0.5	0.2	169	0. 6	5.5
121	B283_180416.Mon	119	0	1.7	138	4	3.2	52	0	0.6	146	4	5
123	B284_190416.Tue	180	0. 5	3	192	4	5.2	72	0.5	0.2	147	6	5.5
124	B285_200416.Wed	116	1	2	111	7	4.6	63	0	0.4	153	3	14
123	B286_210416.Thu	151	3	5.5	123	6	7.2	57	1	1.1	163	3	9.8
122	B287_220416.Fri	150	0	2	125	4.5	8	72	0	0.8	160	6. 5	9.2
115	B288_230416.Sat	147	0	4	131	1.5	5	58	0	0.2	123	6	8.5
109	B289_240416.Sun	116	0	2	105	2	4.3	100	0.5	1	158	6	8.1
111	B290_250416.Mon	150	6. 5	5	125	0	5	69	0.5	0.0 8	165	0. 5	13
117	B291_260416.Tue	157	0	3.5	90	1	4.7	54	2	1.3	152	2. 5	12. 5
116	B292_270416.Wed	144	0. 5	3.4	110	1	11	73	0.3	0.5	173	0. 5	16. 9
115	B293_280416.Thu	137	2	11	117	0	11	98	0.9	0.8	193	5. 4	5
110	B294_290416.Fri	108	1. 5	2.2	100	1	4.2	57	1	1.5	153	2. 5	5.5
101	B295_300416.Sat	108	0	4	100	3	5.3	60	3.5	1.3	135	1 0	12
96	B296_010516.Sun	133	0	5.6	143	3	10.	72	0.8	1.1	147	6	7

							2						
113	B297_020516.Mon	130	0.8	2	102	4	2.9	68	0.1	0.9	150	1	10
115	B298_030516.Tue	143	3	3	122	5	5	74	2	0.4	114	17.8	6
115	B299_040516.Wed	136	0	2.9	144	0	4	85	0	0.3	193	8	6
113	B300_050516.Thu	143	10	5	158	3	4.8	76	0.5	1.9	172	8	6
109	B301_060516.Fri	135	0	3	120	4	5	55	2	1.2	160	10	9
107	B302_070516.Sat	134	1.5	5	125	7	5.4	63	1	1	164	8	7
102	B303_080516.Sun	133	0.8	3.5	134	0	7	75	0.6	1.5	150	24	6
119	B304_090516.Mon	135	0	4	149	1	6	70	0	1.3	135	4	8
115	B305_100516.Tue	151	1	5.5	135	4.8	4.3	60	1	1	125	9	8
116	B306_110516.Wed	158	0	3.4	130	0	4	45	2	0.8	160	11	5.5
113	B307_120516.Thu	158	5	4.7	143	0	4.6	53	2	0.6	154	14	6.8
110	B308_130516.Fri	149	0.2	3.5	120	2	4.9	73	2.2	4.7	180	6	8
95	B309_140516.Sat	144	5	2	157	3	3	73	0	0.5	152	8	3.5
98	B310_150516.Sun	108	2	2	157	6	5.7	80	0	0.7	160	20	5
112	B311_160516.Mon	157	1	3.4	125	2	6.2	54	0	1.1	140	6	6.4
113	B312_170516.Tue	156	2	5	135	2.5	7.5	58	0.5	0.8	153	8.5	8
115	B313_180516.Wed	145	1.5	3.7	134	6	5	60	0.4	0.6	170	3.5	8
127	B314_190516.Thu	151	2.5	5	170	0	3.8	62	2.8	1	155	1	5
105	B315_200516.Fri	165	1.5	1.5	158	1.2	5.5	65	0.1	0.5	183	7.5	10
97	B316_210516.Sat	145	3.2	2	159	1.5	6	70	0.2	1.4	159	5.4	7
99	B317_220516.Sun	136	0	2	157	1	7.2	77	0.5	0.5	156	2	8
99	B318_230516.Mon	158	0.5	1.7	141	0.5	6	73	0	1.5	169	1	5
99	B319_240516.Tue	156	0	6.5	145	6	3.8	86	0	0.2	160	0.5	5.2
99	B320_250516.Wed	154	0.5	1.8	136	4.5	4.5	82	0	0.6	170	2	8
110	B321_260516.Thu	180	7.5	6	145	2	5.6	48	0.1	0.5	178	1	7.6
113	B322_270516.Fri	180	0	3	152	6	5	65	2	0	205	5	12.2
101	B323_280516.Sat	160	1	5.5	145	3	6.9	58	0.3	0.7	130	3.	6.2

			0									5	
96	B324_290516.Sun	159	0.5	1.8	170	0	8.2	70	3.25	0.8	150	4	6.3
100	B325_300516.Mon	160	0	3.8	130	4.5	6.6	60	0	0.5	169	6	9.5
105	B326_310516.Tue	150	3	6.5	139	2	3.9	73	0	0.5	150	11	7.3
117	B327_010616.Wed	158	1	4	137	0.5	8	86	0	1.2	173	5	9
103	B328_020616.Thu	130	2	7	160	0	6	83	0	1.5	143	4	9.3
98	B329_030616.Fri	135	0.5	3	158	1	5.7	75	1	0.9	184	6	9
97	B330_040616.Sat	128	2	3.6	145	8	6	83	0	0.5	165	3	6
105	B331_050616.Sun	126	1.5	2	214	2	9	79	2.5	1	169	4	6.8
123	B332_060616.Mon	120	0.5	2.5	144	2	7	55	1	0.75	143	2	4
121	B333_070616.Tue	122	2.5	4	161	4	6.2	79	0.5	1	141	3	5.8
112	B334_080616.Wed	138	0	3.2	174	3	6	72	0.5	1	165	1	5.5
112	B335_090616.Thu	108	3	5.6	175	5	7.3	67	0.2	1	147	2	8
109	B336_100616.Fri	115	0.5	3.7	167	7	6	68	1.5	2	172	2	6.5
109	B337_110616.Sat	133	5	4.8	176	6	5.5	61	0	0.1	172	6	9
102	B338_120616.Sun	135	0.5	1.5	130	6	5.9	63	0	1	158	5	5.2
102	B339_130616.Mon	162	1	3.6	143	2	5	58	0	0.05	150	6	6
115	B340_140616.Tue	139	4	6	156	1.5	5.6	65	0	0.1	158	5	6.6
112	B341_150616.Wed	148	0	6.9	178	3	4.5	102	0.5	1	194	5	7
118	B342_160616.Thu	240	5	3.5	450	0	7.5	275	5	3.6	600	10	16

**Table 1**

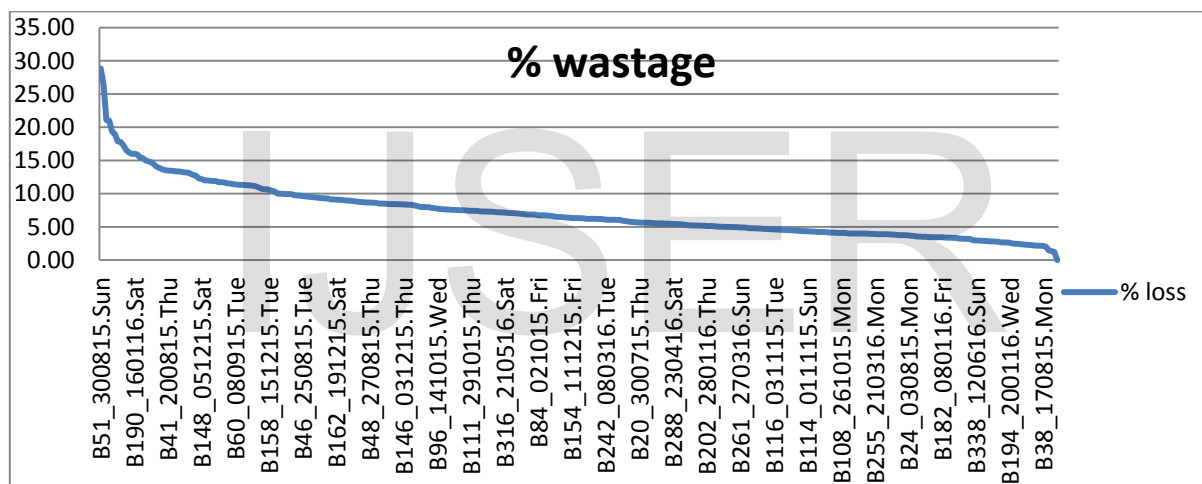
### **Questionnaire**

1. Where do you belong to (native place)?
2. What do you prefer for breakfast, lunch, evening snacks and dinner?
3. How frequently should be there a change in menu items?
4. What is the quantity of food you would like to consume in breakfast, lunch, evening snacks and dinner?
5. What is the ideal time for you for having breakfast, lunch, evening snacks and dinner?
6. What do think of take-away facility in mess?

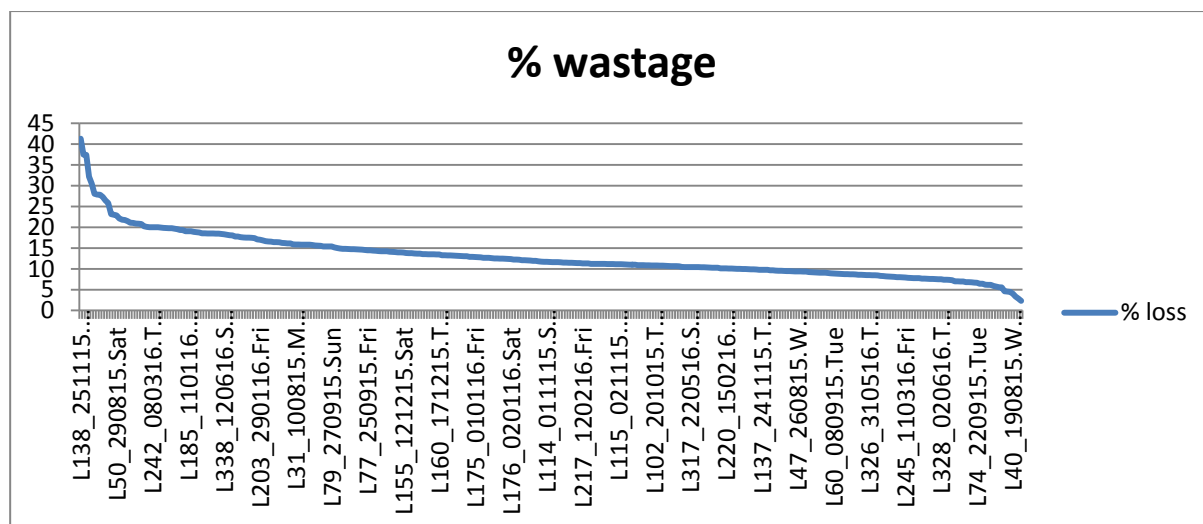
7. What according to you is considered wastage?
8. What are the factors apart from menu that forces you to search for alternatives dinning option;  
for instance early class timing, festivals, going out, taste, food preference, etc.?
9. How frequent would you take food considering the current situation?
10. How often would you have food in the mess if all your recommendations would be implemented?

**Table 2**

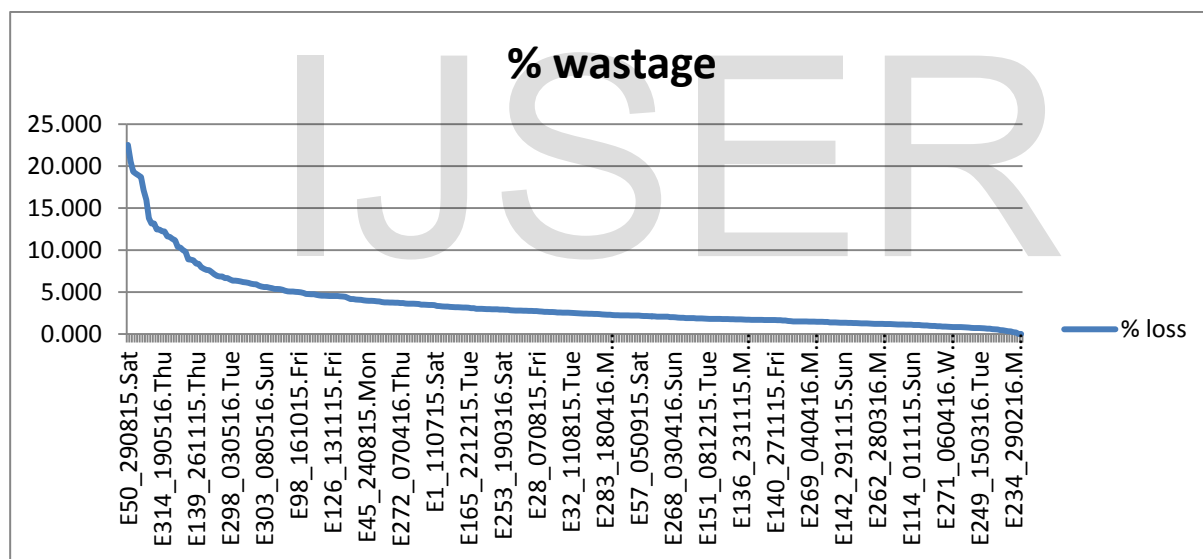
**Figures:**



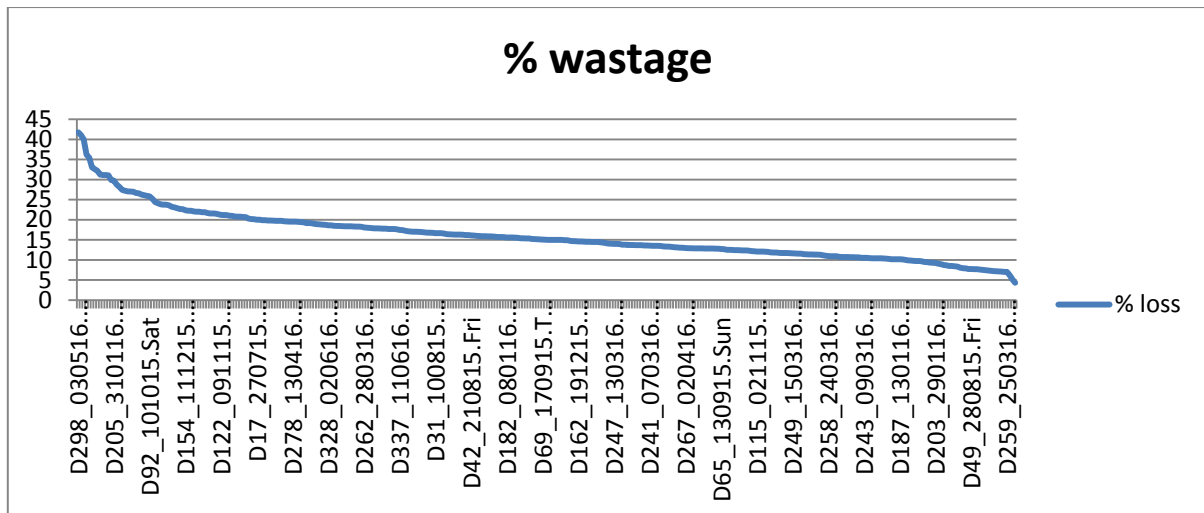
**Graph 1: Graph for reducing % wastage in Breakfast and the time points**



**Graph 2: Graph for reducing % wastage in lunch and the time points**



**Graph 3: Graph for reducing % wastage in evening snacks and the time points**



**Graph 4: Graph for reducing % wastage in Dinner and the time points**

## SUMMARY O/P

Regression Statistics	
Multiple R	0.8186451
R Square	0.6701797
Adjusted R Square	0.6682281
Standard Error	21.148346
Observations	341

## ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	307173.3	153586.7	343.4003	3.88E-82
Residual	338	151171.4	447.2525		
Total	340	458344.7			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	10.251385	2.741552	3.739264	0.000217	4.858732	15.64404	4.858732	15.64404
X Variable 1	0.4433304	0.049413	8.971976	2.05E-17	0.346135	0.540526	0.346135	0.540526
X Variable 2	0.4171803	0.049217	8.476274	7.3E-16	0.320369	0.513991	0.320369	0.513991

**Figure 5:**

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