For office use only	Team Control Number	For office use only
T1 _____	**0038**	F1 _____
T2 _____		F2 _____
T3 _____	Problem Chosen	F3 _____
T4 _____	**C**	F4 _____

2019
MCM/ICM
Summary Sheet

The LaTeX Template for MCM Version v6.2.1

Summary

fhakfhw

Keywords: keyword1; keyword2

The LaTeX Template for MCM Version v6.2.1

January 21, 2019

Summary

fhakfhw

Keywords: keyword1; keyword2

Contents

1 Introduction

1.1 Problem Statement

In the modern life, people would like to live in a healthy lifestyle. Then it is unavoidable to buy fresh and cheap fruits. Fruit prices fluctuate significantly from week to week. Consumers sometimes may be sensitive to these changes while sometimes not, leading to some fruits selling well while some do not. Besides, when seasons change, the popularity of some fruits also decline. Other factors can also influence the selling of fruits. When customers buy less fruits, those redundant fruits may soon become rotted and cause merchants loss. To avoid too many orders, fruit merchants have to predict how much fruits to be sold during the following days and try to make these predictions as close to the reality as possible. Moreover, when the selling of fruits does not live up to their expectations, they may use various strategies to promote, such as discount, combination, VIP benefits and etc.

1.2 Related Work

2 Assumptions and Notations

2.1 Assumptions

We make the following basic assumptions in order to simplify the problem. Each of our assumptions is justified and is consistent with the basic fact.

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-
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Table 1: Notations

Symbol	Definition	Notes
h	hh	hhh

2.2 Notations

3 Model Construction

3.1 Model 1

3.2 Model 2

Figure 1: aa

$$a^2 \tag{1}$$

$$\begin{pmatrix} *20ca_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} = \frac{Opposite}{Hypotenuse} \cos^{-1}\theta \arcsin\theta$$

$$p_j = \begin{cases} 0, & \text{if } j \text{ is odd} \\ r!\,(-1)^{j/2}, & \text{if } j \text{ is even} \end{cases}$$

$$\arcsin\theta = \oiiint_{\varphi} \lim_{x\to\infty} \frac{n!}{r!\,(n-r)!} \tag{1}$$

4 Data Processing

4.1 Data Analysis

All fruit selling data are limited as two comma separated value files, hence all the following analyses are based on that two files.

The first file contains all purchasing records between the end of 2017 and the beginning of 2018, whereas 81445 records in approximately 3 months. Each record has a unique number as a ticket bill, carrying its purchasing time, merchant ID, paying method and special bonus.

The second file contains all 182868 goods that matches the ticket bills above, carrying the good's primary kind, selling amount and the discount information.

First thing needs to be done would be making connections between the bills and the goods. Since the unique ID, we can find all goods purchased in a single bill. The final data would be fitted in the following structure:

Table 2: The data example

ID	28221526017700008
Time	2018-02-28 22:15:26
PayMethod	Cash
Price	[0.982] Unit [Hainan Cherry Tomatoes] as [Season Fruit], Origin price [12.90] Discount Price [12.90]
isVip	False
SolderId	Merchant 22

4.2 Error Data Fix

Some of the purchasing method were mistagged or missed entirely. Those data are either moved in the correct type or in a special "unmarked" type.

Some fruit type are not marked correctly as so, and the similar solution is made, too.

Because of the binary stored float numbers can't be exact, all current numbers (the origin price, discount price, special bonus) are all truncated to 2 digits after the decimal dots.

5 Model Extension and Simulation Analysis

5.1 Problem 1

5.1.1 Sensitivity Analysis

6 Strengths and weaknesses

7 Conclusion

7.1 Strengths

- **Applies widely**
  This system can be used for many types of airplanes, and it also solves the interference during the procedure of the boarding airplane,as described above we can get to the optimization boarding time.We also know that all the service is automate.

- **Improve the quality of the airport service**
  Balancing the cost of the cost and the benefit, it will bring in more conve-

nient for airport and passengers.It also saves many human resources for the airline.

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7.2 Weaknesses

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References

[1] D. E. KNUTH The TEXbook the American Mathematical Society and Addison-Wesley Publishing Company , 1984-1986.

[2] Lamport, Leslie, LATEX: " A Document Preparation System ", Addison-Wesley Publishing Company, 1986.

[3] `http://www.latexstudio.net/`

[4] `http://www.chinatex.org/`

Appendices

Appendix A First appendix

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl.

Here are simulation programmes we used in our model as follow.

Input matlab source:

Appendix B Second appendix

some more text **Input C++ source:**