For office use only	Team Control Number	For office use only
T1 _____	**74159**	F1 _____
T2 _____		F2 _____
T3 _____	Problem Chosen	F3 _____
T4 _____	**D**	F4 _____

2018
MCM/ICM
Summary Sheet

The LaTeX Template for MCM Version v6.2

Summary

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Contents

1 Introduction

1.1 Background

With the improvement of people's awareness of protecting environment, the trend of migrating from traditional vehicles to electric vehicles grows rapidly.In 2016, the sale of electric cars worldwide reach 750 thousand while the registrations break the record in the past. Only in the fourth season in 2017,the sales of electric cars in US has increased 19%, sharing 1.2% of the Light vehicle market.

In order to accelerate to migration from gasoline cars to electric cars, the construction of charging station is one of the significant factors we should take account for. How far can an electric car goes is limited by how many charging station on the road. As one of the major manufacturer of EV(electric car), Tesla constructs quantities of charging station in America. Figure 1 shows the distributions of Tesla's supercharger station in U.S.

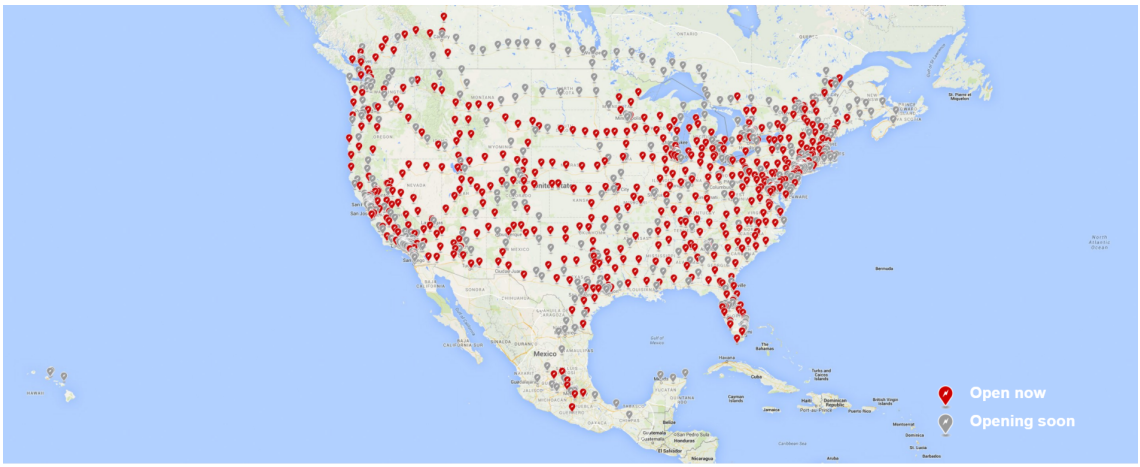

Figure 1: Tesla's supercharger stations in U.S.

Apart from the number of charging station, the location of these stations is worth considering about. For example, cities will have a larger demand of charging station than countries. Elements like geographies, population distributions and etc. should be take into account.

1.2 Problem Restatement and Analysis

In this problem, we are required to accomplish the following five task:

- find out whether Tesla is able to realize the switch to all-electric in US or not. If succeeds, predict the number and distributions charging station.
- discuss optimal number, placement and distributions of charging stations in South Korea, Ireland, or Uruguay and draw a plan to evolving the charging network.
- determine whether the schedule above is suitable for some countries with distinguishing geographies, population density distributions, and wealth distributions. Discuss if it is feasible to establish a classification system which can decide the growth model of switching to -electric in different countries.
- comment how will the advanced technologies including car-share and ride-share services, self-driving cars and so forth affect our analysis.

- write a handout for the leaders of a wide range of countries who will be present at an international energy summit.

f1 To fulfill the tasks above, we can divide our work into three part roughly. First is the prediction about all-electric and the number of charging stations, while the number of station depends on the demand for electricity. Secondly, we need to establish a model to determine how to choose the number and location of stations.Thirdly, we should build a evaluation model to justify whether the charging station model could be applied to different countries.

2 Assumption and Symbol Explanation

2.1 Assumption

-
-
-
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2.2 Symbol Explanation

symbol	explanation

3 Task 1

3.1 Prediction

To determine whether Tesla is able to allow the complete switch to all-electric in U.S., we focus on the proportion of the electric vehicles to all vehicles. Table 1

year	2011	2012	2013	2014

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

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

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetuer a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetuer. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

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

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

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

4 Calculating and Simplifying the Model

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5 The Model Results

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6 Validating the Model

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7 Conclusions

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8 A Summary

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9 Evaluate of the Mode

10 Strengths and weaknesses

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10.1 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 convenient for airport and passengers.It also saves many human resources for the airline.
-

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:

```
function [t,seat,aisle]=OI6Sim(n,target,seated)
pab=rand(1,n);
for i=1:n
    if pab(i)<0.4
       aisleTime(i)=0;
    else
        aisleTime(i)=trirnd(3.2,7.1,38.7);
    end
end
```

Appendix B Second appendix

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

```
//============================================================================
// Name        : Sudoku.cpp
// Author      : wzlf11
// Version     : a.0
// Copyright   : Your copyright notice
// Description : Sudoku in C++.
//============================================================================

#include <iostream>
#include <cstdlib>
#include <ctime>

using namespace std;

int table[9][9];

int main() {

    for(int i = 0; i < 9; i++){
        table[0][i] = i + 1;
```

```
    }

    srand((unsigned int)time(NULL));

    shuffle((int *)&table[0], 9);

    while(!put_line(1))
    {
        shuffle((int *)&table[0], 9);
    }

    for(int x = 0; x < 9; x++){
        for(int y = 0; y < 9; y++){
            cout << table[x][y] << " ";
        }

        cout << endl;
    }

    return 0;
}
```