For office use only	Team Control Number	For office use only
T1 ________________	**77281**	F1 ________________
T2 ________________		F2 ________________
T3 ________________	Problem Chosen	F3 ________________
T4 ________________	**A**	F4 ________________

2018
MCM/ICM
Summary Sheet

The LaTeX Template for MCM Version v6.2

Summary

Summary Sheet: The summary is an essential part of your MCM/ICM paper. The judges place considerable weight on the summary, and winning papers are often distinguished from other papers based on the quality of the summary.

To write a good summary, imagine that a reader will choose whether to read the body of the paper based on your summary: Your concise presentation in the summary should inspire a reader to learn about the details of your work. Thus, a summary should clearly describe your approach to the problem and, most prominently, your most important conclusions. Summaries that are mere restatements of the contest problem, or are a cut-and-paste boilerplate from the Introduction are generally considered to be weak.

Besides the summary sheet as described each paper should contain the following sections:

- Restatement and clarification of the problem: State in your own words what you are going to do.
- Explain assumptions and rationale/justification: Emphasize the assumptions that bear on the problem. Clearly list all variables used in your model.
- Include your model design and justification for type model used or developed.
- Describe model testing and sensitivity analysis, including error analysis, etc.
- Discuss the strengths and weaknesses of your model or approach.

Keywords: keyword1; keyword2

The LaTeX Template for MCM Version v6.2

February 8, 2018

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1 Introduction

- minimizes the discomfort to the hands, or
- maximizes the outgoing velocity of the ball.

We focus exclusively on the second definition.

- the initial velocity and rotation of the ball,
- the initial velocity and rotation of the bat,
- the relative position and orientation of the bat and ball, and
- the force over time that the hitter hands applies on the handle.

- the angular velocity of the bat,
- the velocity of the ball, and
- the position of impact along the bat.

center of percussion [Brody 1986],

Theorem 1.1. *LaTeX*

Lemma 1.2. *TeX.*

Proof. The proof of theorem. □

1.1 Other Assumptions

-
-
-
-

2 Analysis of the Problem

(1)

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

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

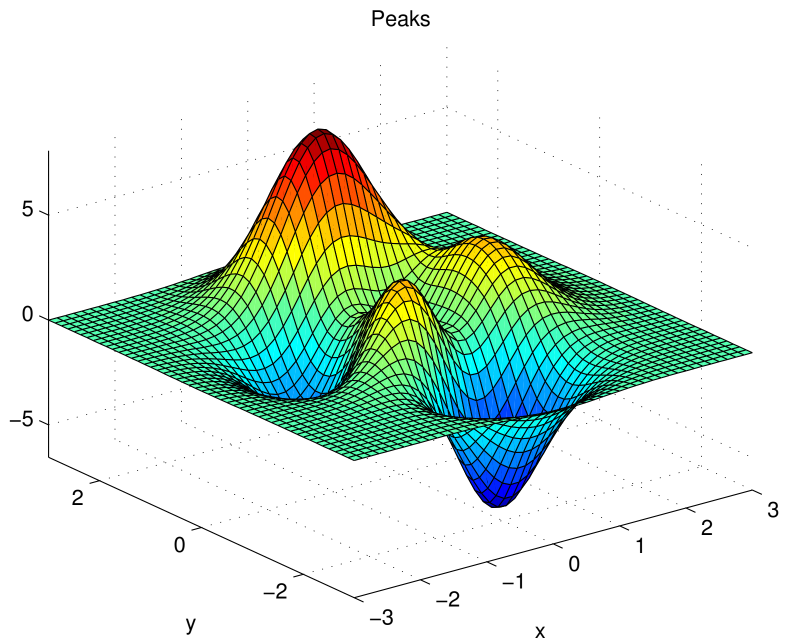

Figure 1: aa

$$p_i = \begin{cases} 0, & \text{if } j \text{ is odd} \\ 3r!\,(-1)^i\,, & \text{if } j \text{ is even} \end{cases}$$

```
http://webdemo.myscript.com/views/math.html
```

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

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

3 Calculating and Simplifying the Model

4 The Model Results

5 Validating the Model

6 Conclusions

7 A Summary

8 Evaluate of the Mode

9 Strengths and weaknesses

9.1 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

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
```

Here is the ball simulation:

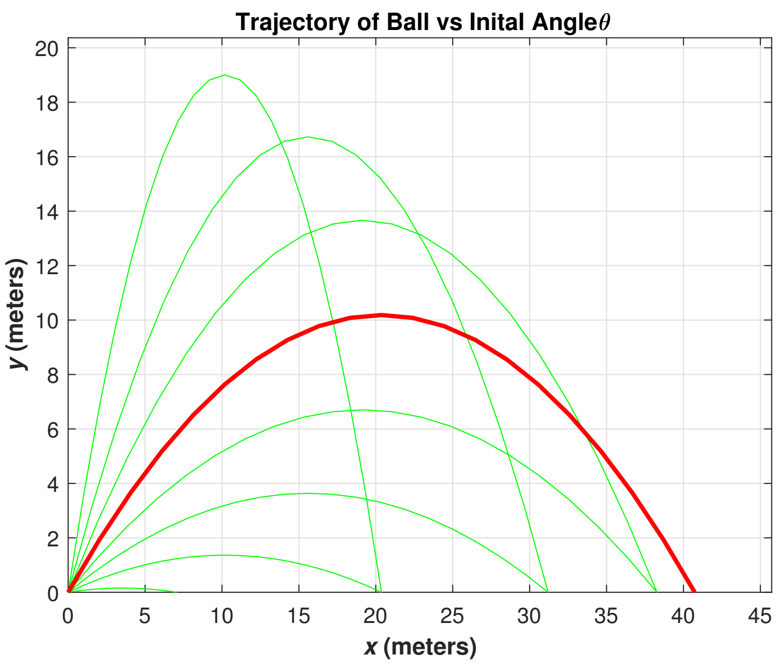

Figure 2: range

The Ball matlab source:

```
%Script file ball.m
%
%Purpose:
%  This program calculates the distance traveled by a ball
%throw at a speciified angle "theta" and a specified velocity
%"vo" from a point,ignoring air friction.It calculates the angle
%yeileding maximun range,and also plots selected trajectories.
```

```
%
%Define variable:
%conv        degrees to radians conv factor
%grav        The gravity accel
%ii,jj       Loop index
%index       The maximum range in array
%maxangle    The angle that gives the maximum range
%maxrange    Maximum range
%range       ranghe for a specified angle
%time        Time
%theta       Inital angle
%fly_time    the totle trajectory time
%vo          The initial velocity
%vxo         x-component of the initial velocity
%vyo         y-component of the initial velocity
%x           x-position of ball
%y           y-position of ball
%űÍÒåşčÊýÊýÖţ
conv=pi/180;
grav=-9.82;
vo=input('Enter the initial velocity:');

range=zeros(1,91);
 %ijÆËãŒît'óţÄËőÆ¡¿àÀë
for ii=1:91
    theta =ii-1;
    vxo=vo*cos(theta*conv);
    vyo=vo*sin(theta*conv);
    max_time=-2*vyo/grav;
    range(ii)=vxo*max_time;
end
%ÏÔÊ¿ijÆËãËőÆ¡¿àÀëţÄÁÐśí
fprintf('Range versus angle theta"\n');
for ii=1:5:91
    theta=ii-1;
    fprintf('%2d %8.4f\n',theta,range(ii));    %  %4.2fśíÊ¿ÊäşöÒżÿöÊţÊýčňÄňÈÏ£íűÈÊÇ4čňÓÐÁ¡ÎżÐąÊý
end
%ijÆËãŒît'óţÄ¡ÇűÈžÍËőÆ¡¿àÀë
[maxrange, index]=max(range);
maxangle = index-1;
fprintf('\n Max range is %8.4f at %2d degress.\n',maxrange,maxangle);
%żæÖÆźìijčÍijÐÎ
for ii=5:10:80
    theta=ii;
    vxo=vo*cos(theta*conv);
    vyo=vo*sin(theta*conv);
    max_time=-2*vyo/grav;
    %ijÆËãÐąÇòźìijčţÄx,yŒøśêÊýÖţ
    x=zeros(1,21);
    y=zeros(1,21);
    for jj=1:21
        time=(jj-1)*max_time/20;
        x(jj)=vxo*time;
        y(jj)=vyo*time+0.5*grav*time^2;
    end
    plot(x,y,'g');
    if ii==5
        hold on;
    end
end
    %ÌííijÓÍijÐÎţÄśêÌâžÍŒøśêÖáÃûşÆ
```

```
    title('\bf Trajectory of Ball vs Inital Angle\theta');
    xlabel('\bf\itx \rm\bf(meters)');
    ylabel('\bf\ity \rm\bf(meters)');
    axis([0 max(range)+5 0 -vo^2/2/grav]);
    grid on;
    %żæÖÆŒÈît'óËőÆ¡ţÄźìijčÍijÐÎ
    vxo=vo*cos(maxangle*conv);
    vyo=vo*sin(maxangle*conv);
    max_time=-2*vyo/grav;
        %Calculate the (x,y)
        x=zeros(1,21);
        y=zeros(1,21);
        for jj=1:21
            time=(jj-1)*max_time/20;
            x(jj)=vxo*time;
            y(jj)=vyo*time+0.5*grav*time^2;
        end
        plot(x,y,'r','Linewidth',2);
        hold off
```

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;
}
```