6th Annual International Mathematical Modeling Challenge (IM^2C) Control Sheet

2020

You may NOT copy this Control Sheet to give to a new team, nor may you assign any team a control number.
Only IM^2C may issue a control number to a team entered in the IM^2C.
Please review this page before submitting your solution to ensure that all of the information is correct

Advisor Name: Wasanont Pongsawat
Institution: Kamnoetvidya Science Academy (KVIS)
Department: Mathematics and Computer Science
Address: 999 Moo 1 Payupnai Wangchan
City: Rayong
State:
Zip Code: 21210
Country/Region: Thailand
Phone: +6133013888
Email: wasanont.p@kvis.ac.th

Your team's control number is:

2020009

(Place this control number on all pages of your Solution Paper and on any support material.)

Names of Team Members		Gender	Age	Grade
(Note: names of team members will appear on certificates exactly as they appear on this page)				
Student 1	Thiti Thaloengboonsiri	Male	16	11
Student 2	Krittitee Ratchanan	Male	15	11
Student 3	Peerakarn Thongsata	Male	16	12
Student 4	Touch Sungkawichai	Male	17	12

(*Gender data will be used for statistical purposes only*)

Each team member must sign the statement below:
(Failure to obtain signatures from each team member may result in disqualification of the entire team.)

Each of us hereby testifies that our team abided by all of the contest's rules and did not consult with anyone who was not on this team in developing the Solution Paper.

Signature of Student 1: Thiti Thaloengboonsiri

Signature of Student 2: Krittitee Ratchanan

Signature of Student 3: Peerakarn Thongsata

Signature of Student 4: Touch Sungkawichai

The team advisor must sign the statement below:

I affirm that the team abided by all of the rules of the contest, did not violate the consecutive 5-day period and the team members did not consult with anyone who was not on this team in developing the Solution Paper.

Signature of Team Advisor: _____

This signed form must be email to forms@immchallenge.org. In the subject line of your email write: Your team's control number. For example: 2020000.
Also include a signed Parental/Guardian Authorization form for each team member.

For office use only	Team Control Number	For office use only
T1 _____	**2020009**	F1 _____
T2 _____		F2 _____
T3 _____		F3 _____
T4 _____		F4 _____

2020

The International Mathematical Modeling Challenge (IM^2C) Summary Sheet

(Your team's summary should be included as the first page of your electronic submission.)

Flash sale is an event where the owners of the stores aim to attract buyers by giving a huge discount on the products which couldn't be easily found elsewhere. Obviously, people somehow want to save money by buying discounted products, and since there's a limited amount of products, people stampede in to buy products and usually damage other products accidentally. It'll be beneficial if we could alter the floor layout to minimize the damage caused by the buyers to the products, while keep being able to make a high potential profit or earning from the event. Hosting the flash sale with some specific layout will help increase the utility of the store, and increase the profit of the host.

In this report, we identified how damage would be caused by the buyers by creating a model of chaos and messiness of floor layout, we showed that the popularity of a product depends on some properties of products; price (affordability), discount, demands, and brand. The messiness of the store depends on the popularity of the product that is selling in that store and the area of the store. To find the model of damage, we consider chaos instead of messiness. Chaos is defined around every path and corner. To compare two floor-layouts, we can simply compare the chaos of each model.

From the given layout, we analyze the chaos of the floor plan and found that the problem of this floor plan is the fact that there are too many corners, and corners contribute large value to chaos. It's sensible that more corners cause more damage since when people are running uncontrollably, collision and damage will occur. In order to minimize the damage, we propose a new floor plan and provided proof that the proposed floor plan definitely gives small chaos and smaller potential damage from buyers' clumsiness.

The proposed floor plan uses the structure of the layout to force the people to walk systematically with an overall corner being reduced and with all corners having the products that can be damaged all removed. We can confirm that less collision will happen and as a result, lower potential damage dealt with the product. We consider all permutation of the department and choose the permutation giving the best result. Then for each department, we organize it the way that the store switch between the one with more messiness and the one with less messiness. This would make the damage be minimized and make this floor plan the best one we can generate.

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Team Control Number:

2020009

Parental/Guardian Authorization Form

I _____(Parent/Guardian Name*)

give permission for my son/daughter/ward

_____(Student Name)

to participate in the 6th Annual International Mathematical Modeling Challenge (IM^2C). In the event that my son's/daughter's/ward's team is designated as an Outstanding winner, I give permission to disclose his/her name in the June 2020 IM^2C press release, and to publish their resulting solution paper or solution abstract. I also give permission to release

_____(Student Name)

to local newspapers, radio or television outlets in recognition of his/her outstanding achievement.

Signature:_____(Parent/Guardian Name*)

Date:_____

*School administrators may sign in the case of residential schools.