物理

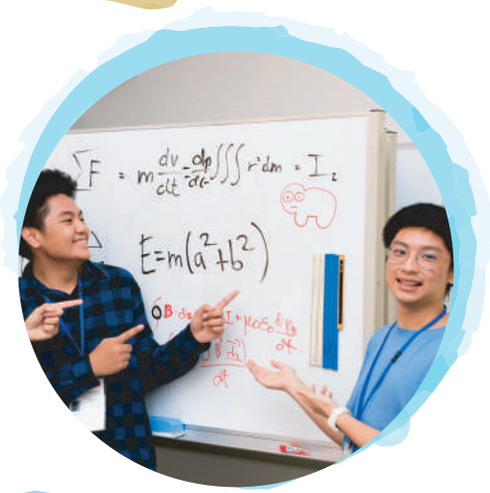
— BUTSURI —

ISSUE 2

Monday,July 10th

Contents

Registration and Get-Together Party



Comments from Participants

USA: YEVTUSHENKO Feodor

It's really nice what I have seen so far; everything is so much better than in the United States. The vending machines are amazing, like several times cheaper. People are very very nice. The food is also better. This is actually my first time in all of Asia. It's pretty fun from what I have seen so far and I'm pretty thrilled that Japan is well organized.

Slovenia: KREJAN Samo

It's my first time in Japan. I like here, the National Olympic Memorial Youth Center. I like its architecture and surroundings, especially trees. That's nice! But the weather is quite humid for me. I'm not used to that.
(About competition) I'm excited. It's first time for me to compete in international physics olympiad, though I've competed in european olympiad before. I'm here not only for the competition but also for meeting people from all over the world.

France: FAUCHEU Hannah

It's my first time to come to IPhO and also to Japan. It's quite pretty. There are more trees and greens here than in Paris. And I quite like eating more rice and Asian food. Today's lunch was also good. I'm quite nervous because some teams are very very prepared compared to us. They had a one-month camp, while we had only a four-day camp and then a two-day camp. It's quite exciting to see many students from other countries. I am enjoying it for now.

Brazil: TAVARES VITORIANO Lucas

Hello everyone! I'm from the other side of the world, so I'm looking forward to learning more about Japanese culture very different from ours. During the excursion, I'm interested in visiting Ghibli Studio and Cupnoodles Museum in Yokohama. I'm really excited for the competition. My favorite physics laws are Ampere's law and Maxwell's equations describing electromagnetism.

South Africa: GIRARD NGUETSOP Serena Angele

I traveled for about 27 hours from South Africa. I've found that Japan is an exciting country and I like its nature and everything. The people are really nice. I'm definitely nervous about exams, but excited about the competition, because I think it is an interesting experience to have this kind of test. You need to use basic knowledge learned at school and then to look for methods for solving the problem in different ways from what you've learned.

Kosovo: THAQI Era

All of us are definitely excited by the opportunity to solve experimental and theoretical problems at IPhO2023. It is amazing that I can expand my perspective and meet many other cultures and people, because physics enthusiasts from more than 80 countries are participating. Also I'm looking forward to getting to know participants and becoming friends!

China: JIANG, Daibing

It is my first time to come to Japan. I think it is a good country and people here are friendly. It is very good chance to get together with a lot of students from all over the world and I'm sure that we can communicate with each other a lot. I want to make a lot of friends. I'm really excited about competition but a little bit nervous. We have prepared for one month in the University, practiced some questions, and done a lot of experiments.

Japanese Language

01 ひらがな (hiragana)

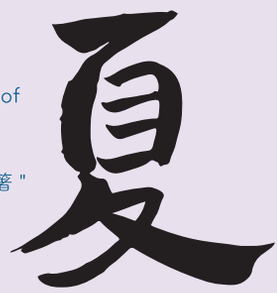
Hiragana are phonetic characters of the Japanese language with 46 letters by combining vowels "a, i, u, e, o" and consonants.

02 カタカナ (katakana)

Katakana are other phonetic characters with 46 characters and are mainly used for foreign words, foreign names, and scientific and technical terms.

03 漢字 (kanji)

Kanji are characters introduced from China to express meaning. There are thousands of kanji in the Japanese language. Kanji are more complex than hiragana and katakana, with a single kanji representing a word or concept. Some kanji have the same pronunciation but different meanings. For example, the pronunciation of "hashi" is " 橋 " (bridge), " 端 " (edge), and " 箸 " (chopsticks).



To read Japanese newspapers or books, you need to memorize hiragana, katakana, and kanji. To fully understand what is written, you need to know 2,500 kanji characters. Beginners in Japanese are advised to study katakana first, since many foreign-origin (loan) words are written in katakana. Also, many physics terms are written in katakana. For example, try reading " モーメント " using the table shown below. Here, " ー " means that the " モ " is pronounced with an extension. Have you figured out what モーメント is? How about " エレクトロニクス "?

Now, let's memorize katakana using the following table.

Katakana Table

ア	イ	ウ	エ	オ
a	i	u	e	o
カ	キ	ク	ケ	コ
ka	ki	ku	ke	ko
サ	シ	ス	セ	ソ
sa	si	su	se	so
タ	チ	ツ	テ	ト
ta	chi	tsu	te	to
ナ	ニ	ヌ	ネ	ノ
na	ni	nu	ne	no
ハ	ヒ	フ	ヘ	ホ
ha	hi	fu	he	ho
マ	ミ	ム	メ	モ
ma	mi	mu	me	mo
ヤ		ユ		ヨ
ya		yu		yo
ラ	リ	ル	レ	ロ
ra	ri	ru	re	ro
ワ		ヲ		ン
wa		wo		n

Answers: モーメント = moment, エレクトロニクス = electronics

Japanese Food

Japan has a rich food culture. The staple food is traditionally rice. Japanese rice is a short-grain variety, which is fluffy and sticky when cooked. For this reason, a lot of Japanese prefer a fluffy type of bread. Tea is an essential part of the Japanese diet. There are many kinds of tea, such as green tea, brown rice tea, oolong tea, and hojicha (toasted tea), and many types are sold in vending machines and stores.

Below are some typical foods that you should try during your stay in Japan.

01 Typical Japanese Dishes

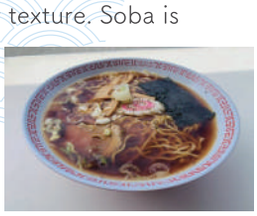
Japanese dishes are characterized by a well-balanced diet with rice, fish, vegetables, tofu, miso, and soy sauce as the main ingredients. Typical Japanese dishes include sushi, tempura, oden, sukiyaki, and shabu-shabu.

02 Grilled Dish

Japanese grilled dishes include grilled fish, yakitori, and okonomiyaki. These dishes are often grilled on a teppan or charcoal grill and are delicious and savory. Teriyaki, which you may have heard of, is grilling fish or chicken while coating it with sauce made from soy

03 Noodles

Ramen is a Japanese adaptation of a Chinese noodle dish, featuring pork bone broth, chicken broth, seafood, soy sauce, or miso soup. Udon noodles are made by kneading wheat flour with water and have a thick, sticky texture. Soba is made by mixing wheat and buckwheat flour, and has a



04 Sweets

Wagashi is a traditional Japanese confectionery made with rice flour, azuki beans, sugar, and other ingredients. Typical wagashi include yokan, daifuku, and anmitsu.

The top three uniquely Japanese foods popular among young people in Japan are probably ramen, sushi, and curry rice (rice topped with curry). Why not try them during your stay in Japan?

Japan's two giants of theoretical physics

In the middle of the 20th century, Japan had two giants who achieved great results in the research of the theoretical physics of quantum physics. They were Hideki Yukawa (1907-1981) and Sin-Itiro Tomonaga (1906-1979). In 1949, Yukawa became the first Japanese to receive the Nobel Prize in Physics for his achievement in theoretically predicting the existence of mesons in 1935, which mediate strong interactions that bind protons and neutrons to each other inside the atomic nucleus. Therefore, an attractive potential between protons and neutrons has been named the Yukawa potential. On the other hand, in 1947 Tomonaga invented a renormalization theory to solve the difficulties of divergence in quantum electrodynamics and performed an accurate theoretical calculation of the so-called Lamb shift seen in the energy levels of hydrogen atoms. In 1965, Tomonaga received the Nobel Prize in Physics, jointly with Julian Schwinger and Richard Feynman. Tomonaga became the second Japanese to win the Nobel Prize. In particular, the Nobel Prize award to Yukawa was a feat that encouraged Japanese people just after the end of World War II. Together with the subsequent award of the Nobel Prize to Tomonaga, physics became a popular subject in Japan.

Photo taken at Kyoto University (1950). Hideki Yukawa and Sin-Itiro Tomonaga (2nd and 3rd from the left in the front row, respectively). Yoichiro Nambu (1st from the right in the back row: Nobel laureate in physics (2008)). Provided by Yukawa Institute for Theoretical Physics, Kyoto University.

Hideki Yukawa (left) and Sin-Itiro Tomonaga (right). Provided by Yukawa Institute for Theoretical Physics, Kyoto University.

Yukawa and Tomonaga were friends but good rivals. They went to the same junior high school, high school, and university (Department of Physics, Kyoto University), and were in the same grade after high school. They shared the same room in the laboratory at Kyoto University, where they worked as assistants after graduation. The two giants were completely different types of physicists: Yukawa emphasized intuition while Tomonaga was the logical type in pursuing his research. Yukawa moved to Osaka University located in the western part of Japan, while Tomonaga moved to the Institute of Physical and Chemical Research (RIKEN) located in the eastern part of Japan. Yukawa published his meson theory during his tenure at Osaka University. However, he did not produce any results immediately after his appointment, and Professor Hidetsugu Yagi, who had hired Yukawa, scolded him, saying, "I hired you instead of Tomonaga, so you have to work hard." The rival spirit in Yukawa must have been ignited. After winning the Nobel Prize, Yukawa founded the Institute for Theoretical Physics at Kyoto University. Tomonaga conducted research at the Tokyo University of Education (now the University of Tsukuba) after RIKEN and perfected the renormalization theory. There is no doubt that the fact that the two giants were separately located in the western and eastern parts of Japan led to the subsequent developments of physics in Japan.

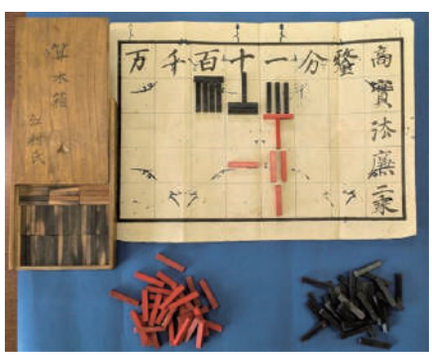
WASAN 和算
---- Japanese Mathematics ----

Like many other cultural activities, Japanese mathematics owes much to China. Historically, an ancient Chinese math book, "Nine Chapters on Mathematical Art 九章算術" was a standard textbook. During the Edo period (1600-1868), the Tokugawa Shogunate maintained a policy of national isolation. In particular, for the first half of the Edo period up to the mid-18th century, Japanese intellectuals did not have access to the latest developments in Western science. In such situations, WASAN 和算 (Japanese mathematics) achieved unique independent development.

The most eminent Japanese mathematician of the period was SEKI Takakazu 関孝和 (1642-1708). SEKI was a contemporary of Isaac Newton and Gottfried Leibnitz. Up to him, the standard calculation technique called Tengenjutu 天元術 utilized sangi' s 算木 (red and black arithmetic sticks) and a sanban 算盤 (a sectioned board) as shown in the picture. SEKI developed a new method later called Tenzanjutsu 点竄術 , a calculation technique on paper for solutions of higher dimensional equations.

WASAN excelled at numerical calculations of algebra. For instance, TAKEBE Katahiro 建部賢弘 (1664-1739), the highest apprentice of SEKI, managed to calculate Pi down to the 41st digit after the decimal point, an accomplishment 15 years ahead of Leonhard Euler.

Although WASAN reached a highly impressive level of achievement, it did not develop into an organized academic system. Part of the reason may lie in the fact that WASAN was practiced in an exclusive master/apprentice relation system. Actually, many of the findings in WASAN were considered secret and protected within each school of mathematics. So, after the Meiji restoration, as Western mathematics was systematically introduced in the newly established universities, WASAN gradually faded out.



Sangi' s (red and black sticks) and a sanban (sectioned board) used for numerical calculations

The tradition of Japanese mathematics was not only among professionals. Indeed, the study of mathematics was very popular among all social classes. "Jinkoki" 塵劫記 , an arithmetic textbook written by YOSHIDA Mitsuyoshi 吉田光由 and published in 1627 continued to be a best-seller throughout the Edo period. Boys and girls learned reading, writing, and arithmetic in Terakoya 寺子屋 , a sort of private elementary school attached to temples. The high level of literacy in the Japanese population was certainly one of the key factors for the rapid modernization of Japan after the Meiji Restoration.

SCHEDULE

TODAY
Monday, July 10th

27℃
36℃

Students

7:15-8:00	Breakfast	NYC
10:00-12:00	Opening Ceremony	NYC
12:30-13:30	Lunch	NYC
14:00-14:45	Brriefing on Calculators	NYC
15:00-18:00	Free Time	
18:00-19:00	Dinner	NYC

Leaders&Observers

7:00-8:00	Breakfast	NSH
10:00-12:00	Opening Ceremony	NYC
12:30-14:30	Lunch	NSH
14:30-18:30	Board Meeting	NSH
18:00-20:00	Dinner	NSH
20:00-23:00	Board Meeting	NSH

TOMORROW
Tuesday, July 11th

27℃
36℃

Students

7:15-8:00	Breakfast	NYC
8:30	Meet at the Exam Room	NYC
9:00-14:00	Exam(Experiment)	NYC
14:30-15:30	Lunch(light meal)	NYC
16:00-19:00	Cultural/Scientific Experience Events	NYC
18:00-19:00	Dinner	NYC

Leaders&Observer

7:00-8:00	Breakfast	NSH
9:00-15:00	Half-day Tokyo Excursion 1	
18:00-19:30	Dinner	NYC

NYC: National Olympics Memorial Youth Center
NSH: Nippon Seinenkan Hotel

The Physical Society of Japan
Japan Society of Applied Physics
The Physics Education Society of Japan
The Biophysical Society of Japan
Japan Science and Technology Agency (JST)
National Institution for Youth Education (NIYE)
National Museum of Nature and Science
Japan Arts Council
Tokyo National Museum
The University of Tokyo
Tokyo University of Science
Tokyo City University
Tokyo University of Foreign Studies
International Christian University
Sophia University
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