Call for Participation
The 17ᵗʰ NAPROCK International Programming Contest, Hanoi, Vietnam
(NAPROCK PROCON 2026, Hanoi, Vietnam)

Organizer: NAPROCK

Co-organizers: Japan Federation of KOSEN Association, VNU-University of Engineering and Technology,

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Introduction

The NAPROCK 17th International Programming Contest in Vietnam will be held in accordance with the guidelines provided below. This contest is designed for university and college students to showcase their learning outcomes and compete in both ideation and implementation skills in the field of information and communication technology. Entries will be accepted in both the **Themed Section** and **Competition Section**. This is a great opportunity for teams that have passed the Japanese preliminary round, consisting of top Kosen (National Institute of Technology) students, to compete with international teams. We encourage university students to refine their creative ideas and take on challenges using cutting-edge information and communication technology, which has been rapidly developing in recent years.

We are eagerly looking forward to active participation from university students in this landmark event, the first international programming contest to be held in Vietnam.

Date and Venue

Date: March 8 - 9, 2026 (Sun-Mon)
Venue: Hanoi, Vietnam

Eligibility for Application

Students who are currently enrolled in university at the time of application.

Sections for Application

For each section, please refer to the guidelines and official programming contest (Procon) website for more details.

- **Themed Section**:
  - Up to **2 teams per KOSEN/university/institute**
  - Each team should consist of 3 students and 1 faculty advisor.
- **Competition Section**:
  - **1 team per KOSEN/university/institute**
  - Each team should consist of 3 students and 1 faculty advisor.

Each team can submit **1 project**. Duplicate registration of students is prohibited; a student may not belong to multiple teams. Mixed teams composed of students from different universities are not allowed.

After passing the national preliminary round, changes to registered students are allowed, but changes to the faculty advisor are not allowed. If there are any changes, the faculty advisor must promptly notify the secretariat of the reason and details of the change.

Submission Guidelines

Please submit software projects that can be run on personal computers, tablet devices, etc. and are capable of being demonstrated or presented, or projects that can be used in the competition.

Submission Process

Further details will be provided later.

Judging Criteria

The creativity of the students is highly valued.

Judging Criteria for the Final Round

1. **Themed Section**

 Presentations and demonstrations will be judged comprehensively. The judging criteria will include:

- o   Originality
- o   Usefulness
- o   Usability
- o   Technical skills in system development
- o   Manual creation ability
- o   Presentation skills (including both oral presentation and documentation skills)

 Presentations and demonstrations should be conducted in English. Additionally, the operation manual and program source list will also be part of the evaluation. Participating teams must submit the operation manual and program source list before the final round. Detailed instructions for submission will be provided separately.

2. **Competition Section**

 The winner will be determined by a competitive match. The system overview, program source list, and detailed system documentation must be submitted before the final round. Detailed instructions for submission will be provided separately.

Prizes

Themed Section

- **Grand Prize**: 1 team
- **Second Prize**: 1 team
- **Special Prize**: Several teams

Competition Section

- **Champion**: 1 team
- **First Runner-up Prize**: 1 team
- **Second Runner-up Prize**: 1 team
- **Special Prize**: Several teams

Important Notices

1. Completeness of the System

Teams selected for the final round should make every effort to implement the ideas they proposed in the preliminary round in their home country. If the proposed ideas are not sufficiently realized, the team may be disqualified.

2. Travel, Accommodation, and Networking Event Expenses

The organizers will not cover travel expenses for participants in both the Themed and Competition Section. However, accommodation and the networking event (dinner on the first day) will be arranged by NAPROCK. Please follow the separate instructions provided to participating teams.

3. System Transportation

Participants are responsible for covering the costs of transporting the systems required for demonstrations and competitions in both the Themed and Competition Sections. Additionally, please note that the organizers will not provide computers or other equipment for the teams.

4. Exhibition Space for Demonstrations and Internet Access

In previous contests, the exhibition space has been assigned in the following way. **The following conditions are for reference only and are subject to change.**

Each system's exhibition space is limited to **240 cm (width) × 180 cm (depth) × 210 cm (height)**, including the presenter (see the figure below). An identification label (A4 size) will be placed on the top left corner of the panel, so please ensure that the system does not overlap with it. Up to two tables may be used. Further details will be available on the Procon official website, so please ensure compliance with the regulations.

Wired internet connections will **not** be provided for each booth at the event. A wireless LAN access point will be available in the venue, but there is no guarantee that the connection will work as expected. If your demonstration relies on an internet connection, please prepare your own communication equipment. Even if you bring your own internet connection, network stability may vary depending on the booth location. Therefore, please ensure that your system can function with dummy data in case an internet connection is unavailable.

Each booth is allocated **500W of power**. Power failures or voltage drops may affect surrounding teams. If you plan to use high-power computers or high-output motors, which may result in

excessive or fluctuating power consumption, please prepare an independent power source, such as renting a battery power supply.

5. Intellectual Property Rights

When submitting a project, ensure that it does not infringe on any third-party intellectual property rights and take necessary precautions to protect your own intellectual property.

While the copyright of the submitted project remains with the applicant, the following materials may be published in official records, on the official website, in brochures, and may also be used for educational purposes:

1. Documents and files submitted during application (e.g., project descriptions and application files)
2. Documents and files submitted for the final round (e.g., brochure drafts, user manuals, system overviews, and detailed system documentation)
3. Photos, videos, and presentation materials taken during the event
4. Competition answer data submitted by the team

6. Entry to Similar Competitions

Submitted projects must be original. Projects that have been submitted to other similar competitions are not eligible for entry.

7. Inquiries

Email: procon@naprock.jp

Related Websites

- Official Kosen Procon Website: https://www.procon.gr.jp/
- Official NAPROCK International Procon Website: https://www.naprock.jp/intprocon/

Themed Section Guidelines
"Solving Environmental Issues Using ICT"

Overview of the Themes Section

In recent years, we have experienced record-breaking heatwaves and mild winters. Two years ago, Tokyo recorded the highest number of consecutive heatwave days, with 22 days, breaking the previous record. According to the IPCC (Intergovernmental Panel on Climate Change), it is reported that the global average temperature will increase by 1.5°C compared to pre-industrial levels by 2030 (*1). Climate change caused by global warming has led to major disasters, such as record-breaking torrential rains, large typhoons, and heavy snowfalls in winter due to the JPCZ (Japan Sea Cold Air Mass Convergence Zone). Furthermore, due to temperature increases and changes in the marine environment, fish catches have significantly decreased, and concerns about the depletion of marine resources have arisen (*2). The effects of environmental destruction and global warming are intensifying year by year, and these impacts are becoming increasingly noticeable. Environmental issues have reached a point where urgent action is needed.

In response to this, the government is focusing on initiatives for the development of a green economy, such as the introduction of renewable energy, the spread of energy-saving technologies, and the reduction of carbon emissions (Green Transformation; GX), aiming for carbon neutrality by 2050, which will reduce overall greenhouse gas emissions to zero. To promote such activities, robust digital infrastructure is required (*3), and the use of ICT is recognized as essential.

In addition to government and corporate efforts, individual and community-level activities related to environmental issues are also important. For example, promoting the use of electric vehicles (EVs), bicycles, and public transportation, energy-saving activities in homes and schools, reducing food waste, forest protection and afforestation activities, and proper recycling and waste disposal are representative activities. Education and awareness-raising to increase environmental consciousness are also crucial. Such activities could be more effectively realized by actively utilizing ICT.

(*1) Ministry of the Environment: IPCC Sixth Assessment Report (AR6) Cycle

https://www.env.go.jp/earth/ipcc/6th/index.html

(*2) COOL CHOICE: The Impact of Global Warming on Autumn and Winter Foods and the "Locally Produced, Locally Consumed" Choice

https://ondankataisaku.env.go.jp/coolchoice/weather/article03.html

(*3) Cabinet Secretariat, others: 2050 Carbon Neutral Green Growth Strategy

https://www.meti.go.jp/press/2022/02/20230210002/20230210002_1.pdf

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Important Notes

1.   **Creative Use of Peripheral Devices**

The use of creative peripheral devices is allowed, but the evaluation will focus on how effectively they are handled through programming. However, the system must fit within the designated display space. Additionally, the setup must be completed within the specified time frame (approximately 40 minutes).

2.   **Relevance of the Theme to the Project**

The relevance of the project to the challenge theme will also be evaluated. While the originality of the project will be the primary focus of the evaluation, the usefulness, feasibility (method of realization), and overall completeness of the project, including programming techniques, will also be considered.

Competition Section Guidelines
"Bond: On the Guide for the Matchmaking"

Overview of the Competition Section

In the traditional Japanese lunar calendar, the month of October (corresponding to November in the modern calendar) is known as the time when eight million gods gather in Izumo, Shimane Prefecture. In regions where the gods are absent, this month is referred to as "Kaminazuki" (the month without gods), but in Izumo, where the gods assemble, it is called "Kanzan-zuki" (the month with gods). At Izumo Taisha Shrine, the gods write their names on wooden plaques and match pairs of plaques through **divine consultations**, symbolizing the formation of fateful connections. This year's competition is based on this concept of "Enmusubi." — the binding of destinies.
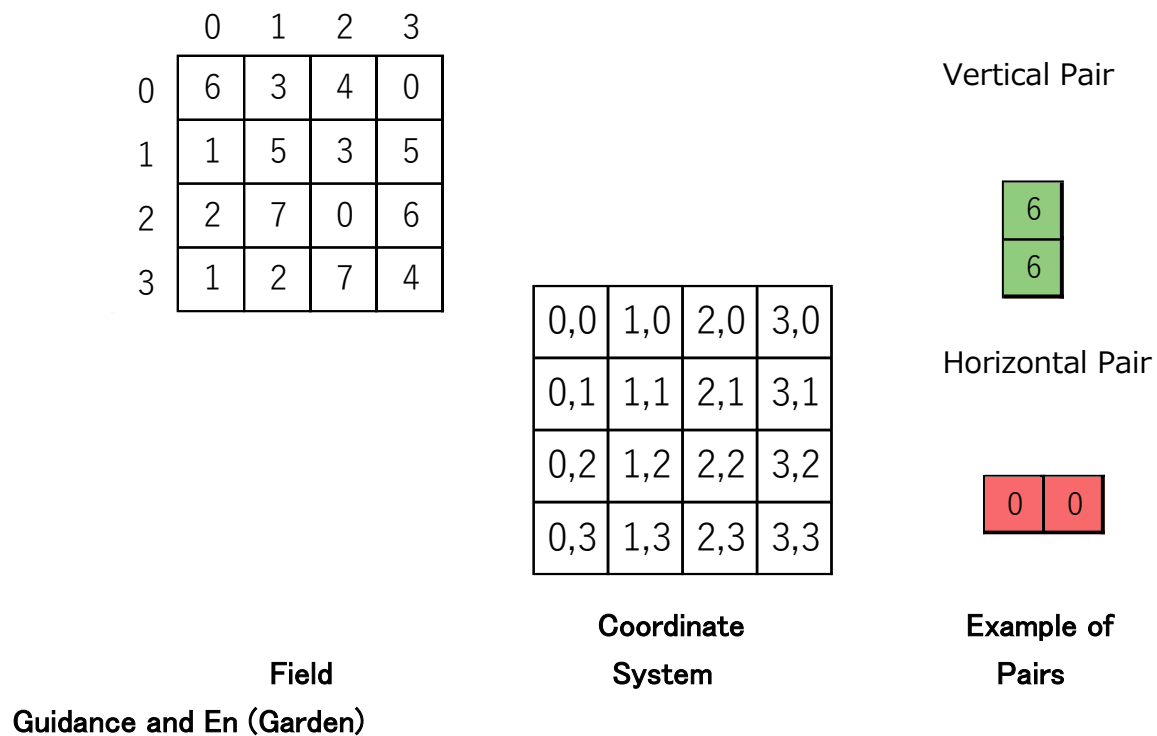
Entities **represented by numbered values** are scattered across a grid-like **field**, and each has a destined partner with the same number. However, the destined partner may not necessarily be nearby.

To bring them together, players can define a square region on the field known as an **En** (meaning "garden") and rotate it. Entities within this region shift positions accordingly. The goal is to strategically guide the entities so that as many matching pairs as possible become adjacent. The player who forms the most pairs through these rotations wins the game.

In this competition, you will rotate the "En" (garden) in advance of the gods' gathering in Kanzan-zuki, forming the "Enmusubi" (binding of fates) for the entities.

Field and Entities

- The entire board is referred to as the "field," and each cell on the field contains an entity represented by an integer.
- The field has equal vertical and horizontal dimensions, which are even numbers.
- The range of entity values is from 0 to (field size / 2 − 1). For example, if the field size is 4x4 as shown in the diagram, the integer values range from 0 to 7.
- There are always exactly two entities with the same integer value on the field, neither more nor fewer.
- The coordinate system for the field is shown in the diagram. Coordinates are represented as (x, y), with (0, 0) at the top-left corner.
- Entities with the same integer value that are adjacent in any of the four cardinal directions (up, down, left, right) form a "pair." The pairs can either be arranged vertically or horizontally, as shown in the example.

8

	0	1	2	3
0	6	3	4	0
1	1	5	3	5
2	2	7	0	6
3	1	2	7	4

Vertical Pair

6
6

0,0	1,0	2,0	3,0
0,1	1,1	2,1	3,1
0,2	1,2	2,2	3,2
0,3	1,3	2,3	3,3

Horizontal Pair

0	0

Field

Coordinate System

Example of Pairs

Guidance and En (Garden)

- The act of moving entities on the field to create pairs is referred to as "guidance," and each guidance action is counted as one "move."
- The area where the guidance takes place is called "En." When guiding, you specify a square region of size n × n on the field.
- By rotating the "En" by 90 degrees clockwise, entities within that square are moved accordingly.
- The example in the diagram shows how the field changes when guidance is applied to various areas.

90度回転
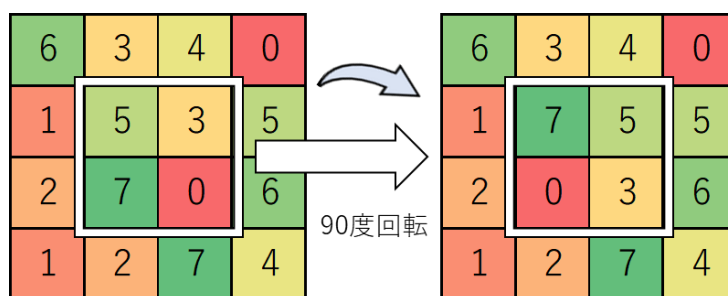
Guiding with 2×2 Rotation

Guiding with 3×3 Rotation
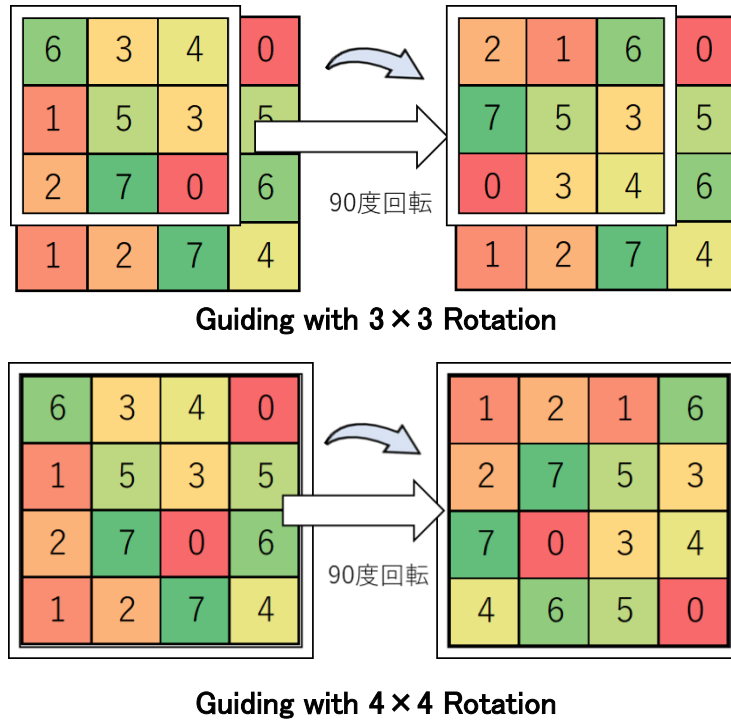

Guiding with 4×4 Rotation

Figure 2: Example of Field Changes Due to Guidance

Guidance Steps

1.   Choose the position where the top-left corner of the square "En" will be placed.
2.   Decide the size of the "En."

The "En" can be applied to any position on the field, but it must not extend beyond the borders of the field.

Problem

- The field size can range from 4 to 24 for both the vertical and horizontal dimensions. The maximum size for the "En" is the same as the field width, and the minimum size is 2×2.

Problem Format

The problem is provided in the following JSON format. An example of the field data for the 4×4 field is shown below.

- "startsAt" represents the UNIX time for the start of the match. In the example, it is set to 2025/4/1 15:30:20. If the exact match start time is not confirmed, it will be 0.
- "problem" holds the problem information, which is null before the match starts, but becomes valid after the match begins.
- "field" contains the field information.
- "size" represents the field size (4 to 24).

- "entities" holds the entity information in a 2D array.

```
{
  "startsAt": 1743489020,
  "problem": {
    "field": {
      "size": 4,
      "entities": [
        [6, 3, 4, 0],
        [1, 5, 3, 5],
        [2, 7, 0, 6],
        [1, 2, 7, 4]
      ]
    }
  }
}
```

Answer Format

The response should follow this JSON format:

- "ops" is an array of guidance operations.
- "x" and "y" represent the coordinates of the top-left corner of the "En."
- "n" is the side length of the "En."

If any invalid guidance is included in the response, the entire submission will be considered invalid.

Example of Response:
Guiding with 2×2 at (0,0) and 2×2 at (2,2).

```
{
  "ops": [
    {"x": 0, "y": 0, "n": 2},
    {"x": 2, "y": 2, "n": 2}
  ]
}
```

Match Progress

1. Each match will involve multiple teams. The number of teams will vary depending on the matchups.
2. The number of teams per match will be communicated separately.
3. Each match will have a time limit, typically around 5 minutes.
4. The field size will be communicated before the match starts.
5. The problem will be provided via network as soon as the match begins.
6. Each team must solve the problem within the time limit and submit their answer over the network.
7. Once an answer is received, the server will return feedback on whether the answer was successfully accepted or invalid (due to format errors).
8. Resubmissions are allowed within the time limit, but each team may submit a maximum of 30 times. The 31st submission or any subsequent ones will be rejected.
9. The final valid submission will be considered as the answer.

Winner Determination

The winner will be determined based on the following priorities:

1. The team with the most pairs on the field wins.
2. The team with the fewest moves wins.
3. The team that submits their final answer first wins.
4. In case of a tie, the winner will be determined by a dice roll or declared a draw.

Communication

- Teams will connect their PCs to the provided wired LAN at the competition booth and use HTTP POST/GET methods to send and receive data.

Notes:

- The computers and devices allowed to be brought into the competition must be portable and programmable, limited to a maximum of three devices. At least one device must have an RJ45 wired LAN port supporting 10BASE-T/100BASE-TX/1000BASE-T and be capable of TCP/IP connection, used for submitting answers.
- Each team will be provided with at least four power outlets in the competition booth. Please ensure that the total power consumption does not exceed 500W.

- Each team will be provided with one LAN cable to connect to the competition network, and three IP addresses will be assigned via DHCP. If multiple computers need to be connected to the competition network, each team should bring a switching hub or similar equipment.

- Wireless communication via Bluetooth or similar technologies between devices brought into the competition is allowed, but Wi-Fi communication is not permitted.

- During the competition, exchanging information within the team is allowed, but communication with teams outside the competition is prohibited. Additionally, communication with devices other than the ones brought into the competition is not allowed.

- Actions that interfere with the server or the progress of other teams' matches are not allowed. If an act of interference, disruption of the match, or any prohibited behavior is determined, disqualification may occur.

- Sending data in a quantity or frequency that disrupts the progress of the match may be regarded as interference, resulting in disqualification.

- In case of any technical issues with the system on the organizer's side, the competition may proceed offline. In this case, the match schedule may be subject to change.

- If the organizers experience any issues, alternative problems may be provided for a re-match.

- The data used in the competition, as well as data submitted by each team to the server, may be published on the official Procon website after the competition. Additionally, some of the answer information may be displayed on the competition visualizer during the event.

- During the competition, players and the items on their desks (such as computer screens, operations, and notes on the desk) may be filmed or recorded with video cameras and displayed on screens.

- During the competition, judges may review the player and the items on the desk (such as computer screens, operations, and notes) for evaluation purposes.

- Additional information may be obtained by accessing the problem server that will be publicly available on the official website.