

Call for Participation

The 15th NAPROCK International Programming Contest



(Nourishment Association for Programming Contest KOSEN)

April, 2023

Overview

The 15th NAPROCK International Programming Contest, Fukui, Japan (NAPROCK PROCON 2023)

NAPROCK (Nourishment Association for Programming Contest KOSEN) has co-sponsored the College of Technology Programming Contest (KOSEN PROCON) since 2008, and has sponsored the NAPROCK International Programming Contest in Japan since 2009. This year, the 14th NAPROCK International Programming Contest is held with the 34th KOSEN PROCON. This contest aims to promote flexibility of thinking through programming, at a very high level. At the contest, students from KOSENs or universities compete with each other by utilizing knowledge and ideas in information processing technology they have learned everyday of their lives. It is required for them to make full use of the latest and evolving information processing technology.

Sponsor:NAPROCK

Co-sponsors: Technical College Association, Japan

Supporters: Companies/institutes supporting 33rd KOSEN PROCON

Date: Oct. 14(Sat.) – 15(Sun.), 2023

Venue: Sundome Fukui (5-1-1, Uryucho, Echizen-shi, Fukui, 915-0096 Japan)

Sections: Themed Section / Original Section / Competition Section
(2 students and a teacher for 1 team in each section)

Participants: KOSEN students (who participant in KOSEN Programming Contest) and students in domestic/foreign universities/KOSENs/institutes

Note: For foreign participants, only one team can enter each section from a country. In other words, three teams can enter the whole contest from a country at the maximum (one team for each section).

Examination Method:

Themed Section / Original Section:

Both of the presentation and demonstration will be examined by the judges. The examination standard includes originality, technical capabilities of systems development, usefulness, ease of use, manual/documentation preparation, speech and presentation skills, and so on. The operation manual and program source list will also be reviewed.

Competition Section:

Each team competes in a progressive tournament for victory.

Awards: Themed / Original Section:

Grand Prize (1), Second Prize (1), Special Prize (several)

Competition Section:

Champion (1), First Runner-up Prize (1), Special Prize (several)

Registration: Initial registration should be finished **before May 29 (Mon.), 2023.** Please fill the designated online registration form before the deadline.

Websites: NAPROCK: <http://www.naprock.jp/>
Facebook: <https://www.facebook.com/naprock2008>
KOSEN-PROCON: <http://www.procon.gr.jp/>

The 15th NAPROCK International Programming Contest

Competition Section

“Ready for Battle in *n*-Jo-dani¹ Castle!”

Overview of Competition

This year, for the competition division, we would like to conduct the game we could not do in the 12th NAPROCK PROCON in 2020, which is a territorial game fought by two teams. We have removed the points per tile to make the game simpler. In addition, we add the component called “Castle,” which is given higher points than others.

Echizen, the host city of the contest, was the home to many famous feudal lords during the Civil War era in the 17th century Japan. Now that we are in that land, everyone be ready for a battle to the top of PROCON!

Competition Field

- The competition field consists of a rectangular area divided horizontally and vertically into small areas. The whole competition field itself has a rectangular shape.
- The competition field is divided into **maximum of 25 and minimum of 11 areas horizontally and vertically**, respectively. The numbers of horizontal division and vertical division may differ. The number of divided areas on the field will be different for each match.
- **Craftsmen** from each team are preset on the competition field. The number of Craftsmen differs according to the competition field. **Maximum number of Craftsmen per board is 5, and the minimum is 2.**
- In some divided areas, **Castles and Ponds** are preset. **If a team obtained the area with Castle as Territory, it can get a higher point** than other areas. **Craftsmen can never move to the area with Pond.** Land with neither of these are called **Plain**.
- **There are no symmetry** in the initial positions of Ponds, Castles and Craftsmen.
- Competition fields will be **disclosed in advance**. We are planning to disclose them in mid-July. Some will be disclosed earlier. One of the disclosed fields will be used at the match on the day of the contest.
- A property is added to each divided area depending on the game progress: **Neutral**, **Territory** and **Wall**. There are also team properties for Territories and Walls, so there are six different types² among these. All divided areas are Neutral at the initial setting.

Craftsmen’s Movements

Each Craftsman can do take of the following movements per turn:

- (1) **Stay**: Craftsman stays in the same position. No action done.
- (2) **Move**: Craftsman moves to one of the eight directions around the current position (up/ down/ left/ right/ upper left/ upper right/ lower left/ lower right). However, **they are not allowed to move to where the Wall of the other team is positioned as well as Ponds**. Also, only one Craftsman is allowed on one divided area. Any Craftsmen cannot move to the area where any Craftsmen is positioned at one turn before the current turn. If any two Craftsmen coincidentally announce to move to the same area, any of them cannot move to that area. If any Craftsmen announce to move to the area where they are not allowed to move, the action allowed to that Craftsmen is “Stay” only.

¹ “*n*-jo” means “*n*-th power” in Japanese. So “*n*-jo-dani” implies “valley of *n*-th power.”

² It implies that, for example, there are three types of properties for a Territory, say, own territory, opponent’s territory and the territory for both (the details are to be mentioned later).

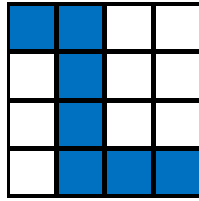


Figure 1: Walls connecting above/ below/ left/ right.

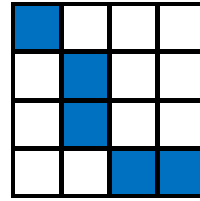


Figure 2: Walls connecting diagonally.

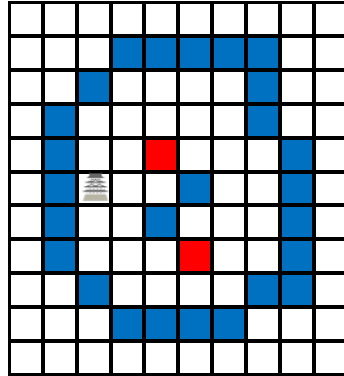


Figure 3: Walls and Enclosure.

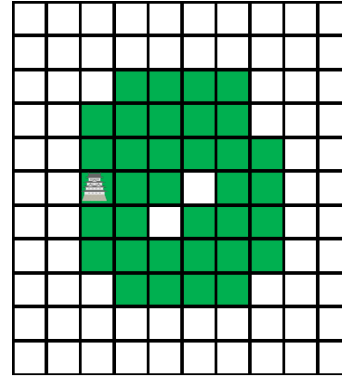


Figure 4: Closed Territory in the case of Fig.3.

- (3) **Build:** Walls can be built in any of the four adjacent areas (above, below, left and right). **Any Walls cannot be built on the area where any Castles, opponent's Walls or Craftsmen is positioned.** If any Craftsmen announce to build a Wall on such an area, the action allowed to that Craftsmen is "Stay" only.
- (4) **Destroy:** You can remove your Wall or the opponent's Wall from any of the four adjacent areas (above, below, left and right). When a Wall is destroyed, that area becomes Neutral or a Territory. The conditions for turning to Neutral or into Territory will be explained later. If any Craftsmen announced to destroy an area where no Walls are built, the action allowed to that Craftsmen is "Stay" only.

Wall, Enclosure and Territory

The Walls can be connected in surrounding **eight (8) directions** (above/ below/ left/ right/ upper left/upper right/ lower left/ lower right) as shown in Fig.1 and 2. The area **surrounded by Walls** becomes the **Enclosure**. Enclosure should be surrounded only by Walls and may not include the edges of the competition field.

The areas that are not your own Enclosure may become your own **Territory**. Especially, Territory surrounded by Enclosure is called **Closed Territory**. As shown in Fig.3, **the opponent's Walls as well as Castles and Ponds** surrounded by your own Enclosure are considered as **a part of your Territory**. However, **the area where your own Wall is positioned is not your Territory**.

Areas may be **the Territories for both teams**. When an opponent's Enclosure is surrounded by your own Enclosure as shown in Fig.5, the areas marked green and yellow in Fig.6 and 7 can be **Territories for "blue" and "red" teams, respectively**.

Once an area becomes your Territory, **it remains your Territory** even if you destroy a part of your Enclosure as shown in Fig.8. Such a Territory not surrounded by Walls is called **Open Territory**. However, the opponent's Walls or Closed Territory among your Territories before opening the Enclosure are **no longer your Territories** as shown in Fig.9. When a Wall is built at an area, the area is not your Territory. **If you destroy such a Wall again, that area is not your Territory**.

Score

Number of Walls and Territories as well as the numbers of **Castles on the Territory** multiplied by **the coefficient for each element** will become the **Wall point, Territory Point, and Castle Point**, respectively. In the case such as

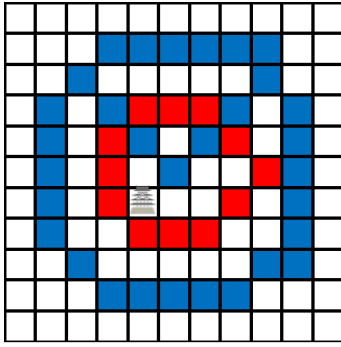


Figure 5: Enclosure surrounded by Enclosure.

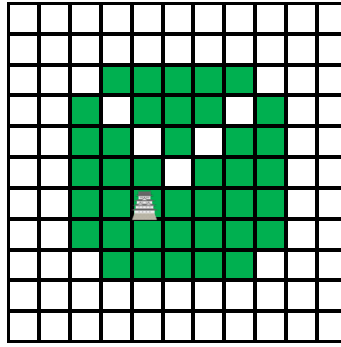


Figure 6: Blue team's Territory.

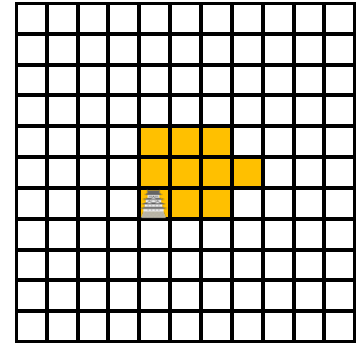


Figure 7: Red Team's Territory.

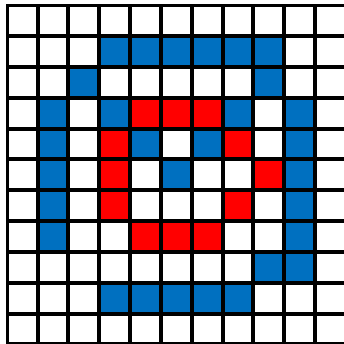


Figure 8: Disconnected Walls (blue) and Enclosure (red).

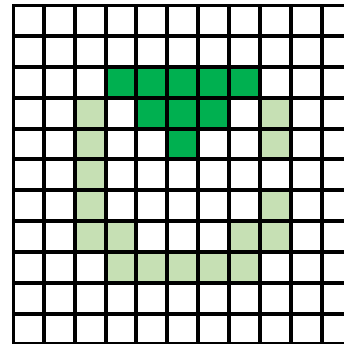


Figure 9: Open Territory for blue team in the case of Fig.8.

Turn	1	2	3	4	End
First team	Send actions	Send actions			
Status	Initial state	1 (First team's turn)	2 (Second team's turn)	3 (First team's turn)	4 (Second team's turn)
Second team	Send actions		Send actions		

Figure 10: An example of the progress of each team's turns and the period to send Craftsmen's actions.

Fig.5, 6 and 7, Castle points are given to both teams since an area with Castle (🏰) is both teams' Territories at the same time. The coefficients for Walls, Territories and Castles on the Territory are integers from 1 to 100.

Progression of the Game

- (1) **The two teams take turns** in playing the game. A single turn corresponds to each team's action.
- (2) A match consists of **two games where each team takes the first turn**. The same competition field is used for two games in the match. The field to be used in that match will be announced on the day of the contest before the match starts.
- (3) As shown in **Fig.10**, each team has to determine **the actions of all Craftsmen** and send them to the competition system before the next turn of the team starts. If the actions cannot be received appropriately by the system, all the Craftsmen of the team cannot take any actions and have to stay at the current area.
- (4) The duration of a turn is planned to be 3 to 15 seconds. The duration time may vary according to the match, but will remain the same within one match.
- (5) Each team can freely obtain the competition field information from the competition system during the match.
- (6) After each turn, the status is swiftly shifted to the other team. Time lag may occur for the status shift, so Turn Information will be added to the competition field information so the players can determine if the status has been shifted.
- (7) The competition field information includes all of the Craftsmen's actions taken at each turn.

- (8) After the specified turns are completed, the game ends and the winner is judged. The number of turns per game is planned to be 30 to 100 turns, but will vary according to the game.
- (9) Two games in the match where each team takes first turn **may be played at the same time**.

Judgement of Winner

Winner is determined according to the following priority based on the Wall Points, Territory Points, and Castle Points obtained through 2 games in the match:

- (1) The team with greatest **total points** wins.
- (2) When the total points of the two teams are the same, the team with the greater **Castle Point** wins.
- (3) When both the total points and the Castle Point of the two teams are the same, the team with the greater **Territory Point** wins.
- (4) If all of the above points are the same, throw a die to decide on the winner or declare a draw.

Application and Conflict of Craftsmen's Actions

The four (4) phases of the Craftsmen's actions: **Stay, Destroy, Build and Move, are applied in this order**. For example, when one Craftsman announce "Destroy" for an area with Wall and another Craftsman announce "Build" at the same area, the action "Destroy" is applied first, and then, "Build" is applied at the same area. In a similar way, when one Craftsman announce "Destroy" for an area and another Craftsman announce "Move" at the same area, the action "Move" is applied after "Destroy" is applied.

Transmission method

- Each team will connect their PC to the wired LAN prepared for each competition booth and send the actions using http POST format.
- Details concerning the transmission method and the competition system will be disclosed early June through NAPROCK official website and the MS Teams for NAPROCK PROCON.

Formats for Competition Field and Craftsmen's Action Information

- Formats for the competition field and Craftsmen's action will be in text format. Details will be released by early May.

Information on Software to be Used in the Competition

- Replying protocol, software and source for simplified competition system will be released late June.
- Information on the above software will be available on the NAPROCK official website and the MS Teams for NAPROCK PROCON as soon as they are ready.

Miscellaneous Notes

- Up to three (3) programmable and portable computers can be brought into the competition booth. At least one out of these three should be for responding and must be connectable via TCP/IP and be equipped with 10BASE-T/100BASE-TX/1000BASE-T RJ45 wired LAN port.
- There will be a minimum of four (4) power outlets per competition booth. The total power used per booth should not exceed 500W.
- We are planning to provide one LAN cable for each team to connect to the competition network. If it is necessary for you to connect more than one device to the network, please prepare the necessary devices such as a switching hub on your own.
- Bluetooth communication along the devices you bring in is allowed but communication via Wi-Fi is prohibited.
- Communication of information among the team members are allowed during the match, but information may not be exchanged with any party outside the team. Also, any communications with the devices other than the ones you bring in for the match is not allowed.

- Any actions that interfere with the progress of the game or other teams are not allowed. If any interferences with the progress of the game or interferences with the referees and other teams, or any actions that is prohibited are found, the team may be disqualified from the competition.
- If any defects in data communications occur due to the organizer's system malfunction, the game may be held offline. In this case, the game duration time and number of turns may be changed.
- If any troubles occur to the organizer, a rematch may be held with a different assignment.
- Data used in the competition and those sent to the server by each team during the competition may be disclosed later in the KOSEN PROCON official website etc.
- Players, the players' desks (i.e. computer screen, operation status, memo on the desk, etc.) may be taken by camera or video, etc. and may be displayed in real time on the screen in the venue.
- During the competition, the referees may monitor the players and the player's desks (i.e. computer screen, operation status, memo on the desk, etc.) for the purpose of the judgement.

Inquiries

If you have any inquiries, please send them to the organizer by e-mails, or post them to "QandA" channel at "00_NAPROCK_PROCON" team in MS Teams. The replies to the inquiries given will be shared with other foreign competitors. Even ideas that may affect the result of the match will be shared equally.

We will register the teacher and all student members to MS Teams soon after the team submits the registration information from the online registration form. Teachers as well as student members registered at MS Teams can post inquiries on Teams.

Tentative Deadline for inquiries: 5:00pm (JST) on Monday, May 15, 2023

Contact address: procon@naprock.jp

The 15th NAPROCK International Programming Contest

Themed Section

“Creating Online Fun”

Overview of the Original Section

Until recently, many people could imagine only an “online computer game” as an “online entertainment” but how has it changed now?

Our lives have changed greatly due to the spread of the new virus. Not only have our ways of living and working changed, but also the ways of how we conduct entertainments and events. Many of them are now prefixed with the words “remote”, “tele-” and “online” and have settled into our lives. Remote classes and remote working are becoming the norms in schools and workplaces to decrease contact with others. Also in our private lives, many new ideas have emerged such as visiting family members virtually so we could stay connected while avoiding contact. Some people are working on making more out of the advantages of online beyond just avoiding contact.

For example, since we have to avoid gathering people in one place, various festivals and fireworks events are currently difficult to be held. However, on the other hand, many famous festivals and fireworks events were held virtually^{*1 *2 *3} allowing easier participation while staying at home, thus increasing our choices for entertainment. In area of sports too, new implementations are being tried out such as LiveRun^{*4} that allows runners in different places to connect in real time through apps installed on their smart phones.

Many concerts are now held in forms of online live streaming to avoid crowd. Also, by using “Social Tipping” functions, many distributors and creators have constructed a system to monetize the events. This has allowed distributors and creators to enjoy such events, as well as the viewers.

In the 15th NAPROCK International Programming Contest Themed Division, we will spotlight on “a new type of fun” we have never seen before. We expect to see projects that provide such fun “online” utilizing ICT. We are looking forward to the students’ flexible imagination and creativeness in how to interpret the new and fun “life”, new “fun” based on new types of “values” and “events” and on how to construct a new system to create such fun.

*1 “Maebashi Tanabata Festival” <https://maebashi-tanabata.jp/>

*2 “Sapporo Online Summer Festival” <https://sapporo-online-fes.com/>

*3 “Rinku Smile Project” <https://rinkusmile-p.com/>

*4 “LiveRun” <https://www.liverunapp.com/>

Demonstration Booth

1. The work should be located within the space of the size 1800mm(W)*1800mm (D)*2100mm (H) approximately including where the speaker stands.
2. A panel can be displayed within the above space. The panel can be set by adhesive tapes or hooks.
3. Each team can use up to two tables for demonstration. The size of a table is approximately 1800mm(W)*600mm(D)*700mm(H).
4. Any wired internet access will not be prepared by the organizers. There are WiFi connection on the demonstration room, but there are some limitations to use it. If you need any internet access for the demonstration, please prepare your own devices such as portable WiFi routers.
5. The electric power consumption for the work should not excess approximately 500W.

Miscellaneous Notes

1. The participating teams can use their original peripheral devices. However, effectiveness of device usage will also be evaluated. Please make sure to set up your devices within the designated space. The device should fit into the exhibit space. Also, for the final round, please make sure that the setup is completed within the designated time (approx. 40 minutes).
2. The highest priority is set on the originality of the proposed system for the evaluation. At the same time, we will also evaluate the level of programming skill based on its applicability, completeness and other factors. In the themed section, adequacy for the theme will be also assessed.
3. Shipping fees for the systems and devices required for the demonstration are not covered by the organizers.

4. The organizers never provide any computers for the teams.
5. Each team should deeply concern any intellectual property rights issues.

Inquiries

If you have any inquiries, please send them to the organizer by e-mails, or post them to “QandA” channel at “00_NAPROCK_PROCON” team in MS Teams. The replies to the inquiries given will be shared with other foreign competitors. Even ideas that may affect the result of the match will be shared equally.

We will register the teacher and all student members to MS Teams soon after the team submits the registration information from the online registration form. Teachers as well as student members registered at MS Teams can post inquiries on Teams.

Contact address: procon@naprock.jp

The 15th NAPROCK International Programming Contest

Original Section

Overview of the Original Section

In the Original Section, we call original software that are developed based on the competitors' original and unique creativity.

Along with the widespread use of smartphones and tablets, new devices such as wearable computers are also emerging. In addition, the Internet environment is undergoing significant changes, such as cloud computing, the use of open data, and the need for cyber security, and significant changes are undergoing in our lifestyles. How will open data and ICT technology be utilized in our lives across various domains of space (where we work, live, take rest etc.) and time (by day or night, seasons, era etc.)? These technologies have the potential to significantly address many of today's issues in education, ecology, food security, telemedicine, and the new normal brought about by infectious diseases.

In the Original Section, considering the current state of society, we call for unique and out-of-the-box works beyond any predetermined frameworks. We are looking forward to seeing your creativeness and originality.

Demonstration Booth

6. The work should be located within the space of the size 1800mm(W)*1800mm (D)*2100mm (H) approximately including where the speaker stands.
7. A panel can be displayed within the above space. The panel can be set by adhesive tapes or hooks.
8. Each team can use up to two tables for demonstration. The size of a table is approximately 1800mm(W)*600mm(D)*700mm(H).
9. Any wired internet access will not be prepared by the organizers. There are WiFi connection on the demonstration room, but there are some limitations to use it. If you need any internet access for the demonstration, please prepare your own devices such as portable WiFi routers.
10. The electric power consumption for the work should not exceed approximately 500W.

Miscellaneous Notes

6. The participating teams can use their original peripheral devices. However, effectiveness of device usage will also be evaluated. Please make sure to set up your devices within the designated space. The device should fit into the exhibit space. Also, for the final round, please make sure that the setup is completed within the designated time (approx. 40 minutes).
7. The highest priority is set on the originality of the proposed system for the evaluation. At the same time, we will also evaluate the level of programming skill based on its applicability, completeness and other factors.
8. Shipping fees for the systems and devices required for the demonstration are not covered by the organizers.
9. The organizers never provide any computers for the teams.
10. Each team should deeply concern any intellectual property rights issues.

Inquiries

If you have any inquiries, please send them to the organizer by e-mails, or post them to “QandA” channel at “00_NAPROCK_PROCON” team in MS Teams. The replies to the inquiries given will be shared with other foreign competitors. Even ideas that may affect the result of the match will be shared equally.

We will register the teacher and all student members to MS Teams soon after the team submits the registration information from the online registration form. Teachers as well as student members registered at MS Teams can post inquiries on Teams.

Contact address: procon@naprock.jp