National Junior Cybersecurity Olympiad (NJCO)

INTERNATIONAL

INFO PACK 2024

STEAM INTERNATIONAL TOURNAMENT

There is a strong demand globally for STEAM talent led by corporations to get talent for their businesses. Hence, SIT is a great initiative to identify these talents for corporations and also various organisations giving scholarships to prepare talent for STEAM.

STEAM INTERNATIONAL TOURNAMENT (SIT)

SIMCC and Scholastic Trust Singapore (STS) is delighted to launch the STEAM International Tournament (SIT). SIT is a collection of reputable academic competitions in Science, Mathematics, Informatics, and Arts which help distinguish students' achievements in STEAM. Students who win awards in any of the qualifying contests below score points for the SIT Awards:

1. **Science** = Vanda National Junior Science Olympiad (VNJSO)
2. **Informatics** = National Junior Informatics Olympiad (NJIO) / Design thinking with robotics and Computational Thinking (DrCT) International Competition / National Junior Cybersecurity Olympiad(NJCO)
3. **Arts** = National Junior Arts Olympiad (NJAO) / Singapore International Art Tournament (SIAT)
4. **Mathematics** = American Mathematics Olympiad (AMO) and Singapore and Asian Schools Math Olympiad (SASMO)

Rules

1. Each student will be awarded SIMCC Scholarship points from each contest.
2. SIT points must be collected within one academic year from August 1 to July 31.
3. The SIT points collected will determine the SIT Award won for that year.

IJHS Scholarship points

Grant additional IJHS Scholarship points based on the combined awards received from AMO/SASMO, NJIO, NJOS, NJAO, and NJCO.

SIT Star Award ⟶ Earn extra 3 IJHS Scholarship points (SPs)

SIT Platinum Award ⟶ Earn extra 2 IJHS Scholarship points (SPs)

SIT Tri Award ⟶ Earn extra 1 IJHS Scholarship points (SPs)

SIT Award ⟶ Earn extra 0.5 IJHS Scholarship points (SPs)

SIT Star Awardees will be trained as SIMCC STEAM camp leaders in 2024 and awarded S$200 voucher upon completion.

Top 5 SASMO Winners from each grade by country* get Contest Scholarship (CS) to compete in MMT.

No Travel needed, and earn more IJHS Scholarship points to advance to top schools and universities with scholarships

Earn additional scholarship points

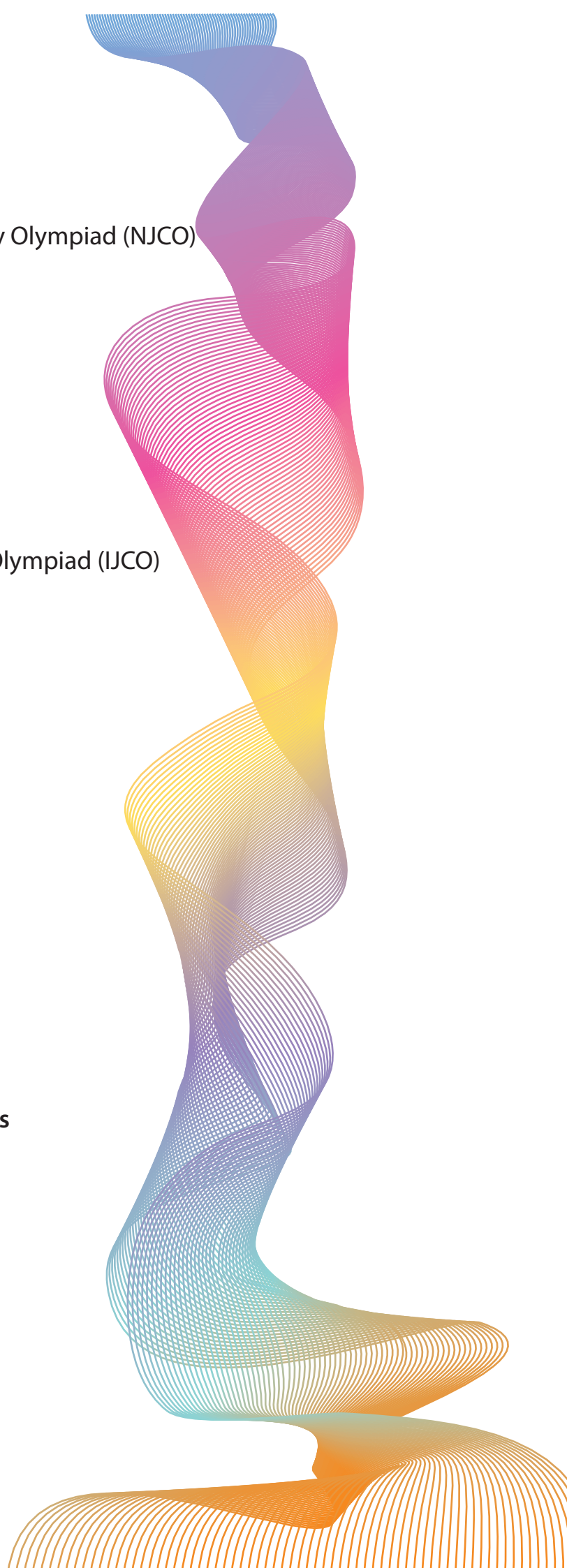**Table of scholarship points from all SIMCC competitions**

SIT awards will be announced together with the induction of IJHS Scholars annually on September 15, 2024.

National Contest award	Perfect Score	Gold	Silver	Bronze
IJHS Scholarship Point	3	2	1	0.5

Combined Qualifying National Contest IJHS Scholarship Points	≥ 10 points	8 to 9 points	6 to 7 points	5 points
Award	SIT Star	SIT Platinum	SIT Tri	SIT Award
Extra IJHS Scholarship Point For Award	3	2	1	0.5

Contents

About

National Junior Cybersecurity Olympiad (NJCO)

Overview

Cybersecurity is no longer a geek hobby but a global safety concern. With the rapid digitalization of the world in recent years, people, companies, and governments have become targets of a new threat: cyber attacks.

In 2023, the FBI reported receiving 880,418 complaints of Internet scams, which caused a loss of US$ 37.5 billion. Faced with this scenario, companies and governments worldwide urgently seek professionals capable of protecting their systems from anonymous international attackers.

"When it comes to the reasons for non-adoption of cybersecurity measures, organizations cited a lack of knowledge/experience as the top challenge (59% for businesses, 56% for non-profits). This is understandable given the increasing and fast-evolving cyber risks, which has also contributed to the shortfall in cyber professionals."

- Singapore Cybersecurity Health Report 2023

The National Junior Cybersecurity Olympiad is designed to introduce young people to the technologies and knowledge they need to become the next generation of cyber professionals. With a certificate accredited by the National Cybersecurity R&D Lab (NCL) and the Centre for Nurturing Computing Excellence (CeNCE), both hosted at the School of Computing, NUS. The NJCO's outstanding students will have the recognition to pursue their futures at the world's best universities.

- S$50 million to be invested by CSA to uplift Singapore's cybersecurity sector.

- As cyber threats continue to escalate and evolve globally, we need a strong cybersecurity workforce to tackle these threats more effectively." - David Koh, Commissioner of Cybersecurity and Chief Executive of Cyber Security Agency of Singapore

- "Resolving the cyber security skills gap will only be achieved with international collaboration." - Lindy Cameron, CEO of the National Cyber Security Centre of the United Kingdom

Mission

Popularize the field of cybersecurity among high school and university students, organize additional training in cybersecurity to enhance students' knowledge and interest in a possible future profession, and stimulate the desire to study additional technology and cybersecurity topics.

Who is NJCO for?

The NJCO is designed for students in grades 8 through 12 and first and second-year undergraduates. The course and the exam will be the same for all students, although the classification will take place within each grade.

Syllabus

• Topic 1: Cryptography

This topic introduces Cryptography, including encryption, hash techniques, pitfalls, and its historical context. These concepts are of fundamental importance in laying the foundations of cybersecurity. Students will learn and experience adversarial thinking through examples, understand what cryptography can achieve, and become familiar with some common types of cryptography and its intriguing techniques.

• Topic 2: Networking Fundamentals

This topic introduces adversarial thinking in networks, network discovery through the Wireshark tool, and the Era of Digitalization. Students will also learn how to trace the network journey from the URL to a webpage, gaining an overview of the source page and exploring the functionalities of the Wireshark network tool.

• Topic 3: Red Teaming & Introduction to CTFs

This topic introduces the fundamental concepts of Capture the Flag (CTF) competitions and their many categories. In addition, students will become familiar with Linux operating systems, including basic commands, file permissions and processing, and how to install software and tools in a Linux environment. Furthermore, students will explore the programming languages commonly used to solve CTF challenges, supplemented with practical CTF demonstrations.

• Topic 4: Digital Forensics

This topic introduces Digital Forensics, covering the main stages of the digital forensics process, such as the identification, preservation, collection, examination, analysis, and presentation of digital evidence. Students will explore various types of digital evidence, such as Network Traffic Logs, Memory Dumps, Data Imaging, and File System Artifacts. Additionally, students will become familiar with the tools commonly used in forensic investigations. Hands-on exercises will provide practical experience in the application of forensic techniques and tools in real-world scenarios.

Format of the course

The NJCO course features 4 pre-recorded online video lessons, each 2 hours long, totaling 8 hours of content, tailored specifically for high school and university students. Designed by the National Cybersecurity R&D Lab (NCL) and the Centre for Nurturing Computing Excellence (CeNCE), both hosted at the School of Computing, NUS, the course allows students to engage with the material at their own pace. This flexible learning format ensures that students can pause, rewind, and revisit lessons any time and from anywhere, maximizing their understanding of the various topics outlined in the syllabus.

Format of the contest

The NJCO contest, taken after the workshop that precedes it, will consist of 40 multiple-choice questions divided into 10 questions for each topic presented in the Syllabus. Each correct answer will be awarded 2.5 points, and no points will be deducted for blank or incorrect answers.

The awards will adhere to CenCE's classification criteria, followed by the NOI. Accordingly, let be the total number of participants in the NJCO competition. Based on the ranking and scores of these participants, the following proportions will determine the distribution of awards:

- **Gold Medals: about 1/12 of the contestants in each grade (Top 8.3%).**

- **Silver Medals: about 1/6 of the contestants in each grade (Next 16.7%).**

- **Bronze Medals: about 1/4 of the contestants in each grade (Next 25%).**

Top 8.3% — Gold Award

Next 16.7% — Silver Award

Next 25% — Bronze Award
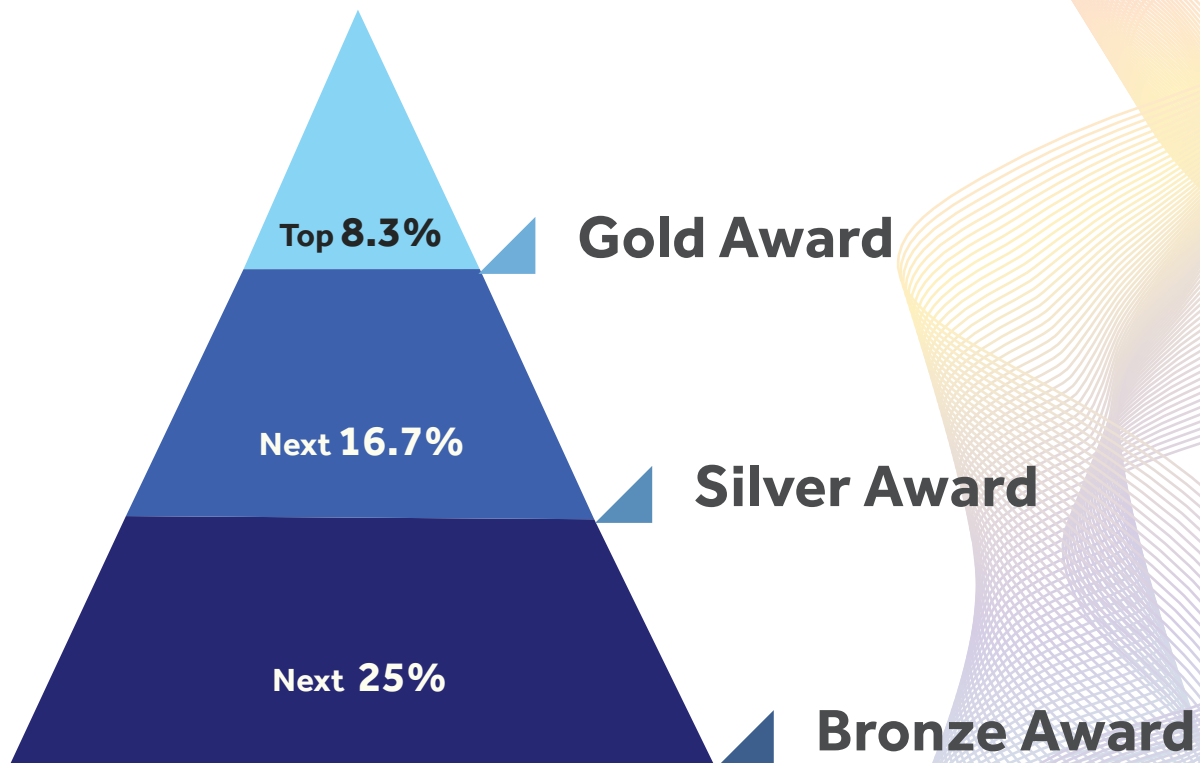
International Junior Cybersecurity Olympiad (IJCO)

The International Junior Cybersecurity Olympiad (IJCO) is the global round of the NJCO and is part of the STEAM AHEAD event, which will take place in December 2024 in Istanbul, Turkey.

IJCO is a course-based competition available to NJCO and DrCT medalists who wish to compete with outstanding students world-wide for globally recognized awards.
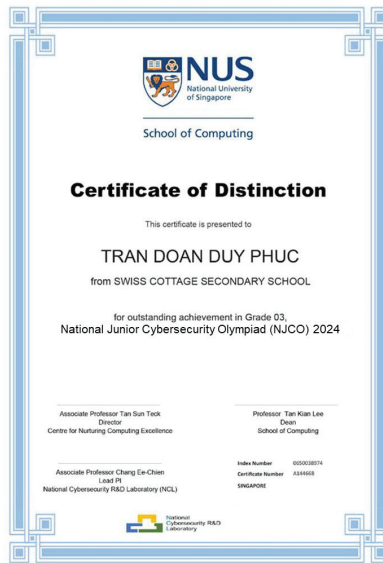
ELITE COMPUTING COURSES & COMPETITIONS CERTIFICATES AND MEDALS

School of Computing

Certificate of Participation

This certificate is presented to

TRAN DOAN DUY PHUC

from SWISS COTTAGE SECONDARY SCHOOL

for outstanding achievement in Grade 03,
National Junior Cybersecurity Olympiad (NJCO) 2024

Associate Professor Tan Sun Teck
Director
Centre for Nurturing Computing Excellence

Professor Tan Kian Lee
Dean
School of Computing

Associate Professor Chang Ee-Chien
Lead PI
National Cybersecurity R&D Laboratory (NCL)

Index Number 0050038074
Certificate Number A344668
SINGAPORE

School of Computing

Certificate of Merit

This certificate is presented to

TRAN DOAN DUY PHUC

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for outstanding achievement in Grade 03,
National Junior Cybersecurity Olympiad (NJCO) 2024

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School of Computing

Certificate of Proficiency

This certificate is presented to

TRAN DOAN DUY PHUC

from SWISS COTTAGE SECONDARY SCHOOL

for outstanding achievement in Grade 03,
National Junior Cybersecurity Olympiad (NJCO) 2024

Associate Professor Tan Sun Teck
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Professor Tan Kian Lee
Dean
School of Computing

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Lead PI
National Cybersecurity R&D Laboratory (NCL)

Index Number 0050038074
Certificate Number A344668
SINGAPORE

School of Computing

Certificate of Distinction

This certificate is presented to

TRAN DOAN DUY PHUC

from SWISS COTTAGE SECONDARY SCHOOL

for outstanding achievement in Grade 03,
National Junior Cybersecurity Olympiad (NJCO) 2024

Associate Professor Tan Sun Teck
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Associate Professor Chang Ee-Chien
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Index Number 0050038074
Certificate Number A344668
SINGAPORE

GOLD

SILVER

BRONZE

Timeline

Registration Open Date	Video Recorded Workshop Available	Registration Close Date
25 May 2024	1 June 2024	25 August 2024 2359 hours singapore time

Registrations open May 25, 2024

Video recorded workshop available from June 1, 2024

Registrations close August 25, 2024, 2359 hours Singapore time.

Contest will be hosted globally on September 15, 2024.

Registration Information

For information on registration and fees, please consult your respective country partner: https://simcc.org/country-partners/

Singapore school contestants must sign up through their schools, Singapore and foreign (from countries where SIMCC does not have a country council partner) private candidates must sign up via: https://form.simcc.org/
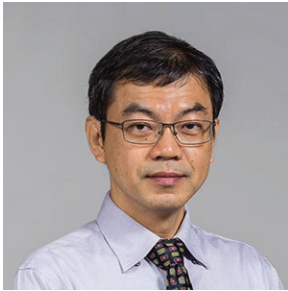
If your country/territory does not have a SIMCC representative, contact us directly at admin@simcc.org for more information

National Cybersecurity R&D Laboratory

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PI, NCL

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Member (Core Curriculum)

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Member (Core Curriculum)

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Member (Core Curriculum,
Gender Balance in Computing)

Dr Sanka Rasnayaka
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Gender Balance in Computing)

Ms Irene Ong Hwei Nee
Management Assistant Officer

About NCL

National Cybersecurity R&D Lab (NCL) in Singapore was established in 2015 and funded under the National Cybersecurity R&D (NCR) Programme. NCL offers computing resources and controlled experimentation environments to facilitate collaborative research among academia, government bodies, and industry. NCL supports a wide range of training and cyber exercises including Capture the Flag contests. The NCL Cybersecurity Compute Infrastructure (CCI) comprises a cluster of 300+ nodes with diverse provisioning mechanisms, security data, and security services. The NCL CCI provides a realistic and safe environment to test and validate before the systems are deployed in production. NCL Testbed is a computing facility for cyber-security researchers engaged in the research, development, experimentation, and testing of innovative cybersecurity technology.

NCL's cloud services include:

- Compute & Baremetal
- GPUs
- Training, CTFs, and Cyber exercises
- Custom Cybersecurity environments such as replaying APTs & various cyber-attacks.

About CeNCE

The Centre for Nurturing Computing Excellence (CeNCE) was established in 2022 to promote computing excellence among both pre-university and university-level students. It is thus concerned with educating students of all ages in the Fundamentals of Computational Thinking, Introductory Programming Methodology, Data Structures and Algorithms, Competitive Programming, etc. We envision multiple pathways of computing excellence as shown in the diagram below:
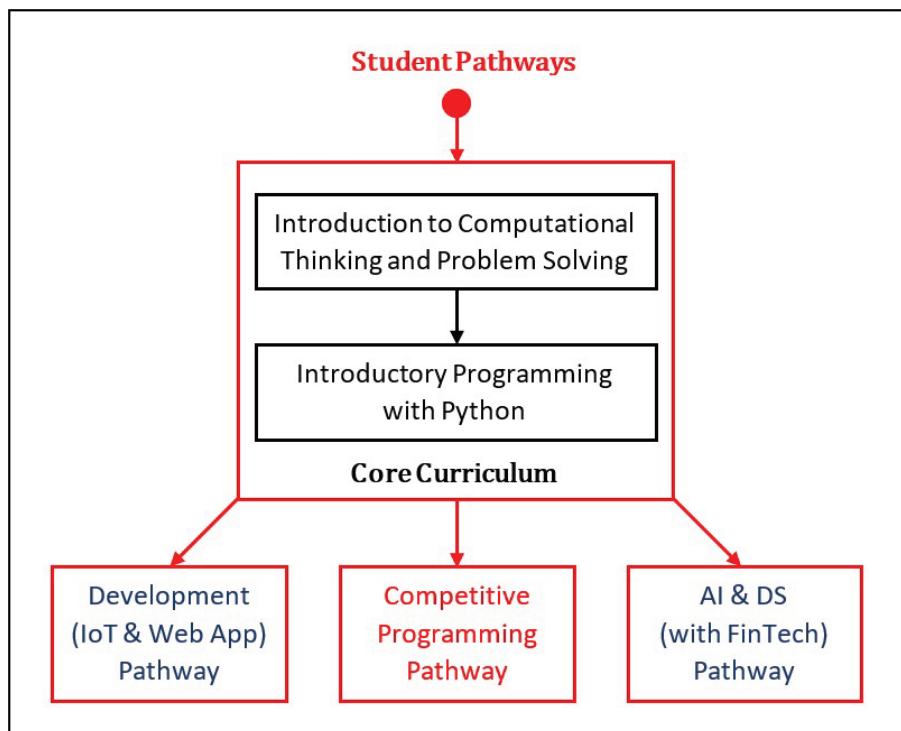
As of early 2023, CeNCE focuses on the Competitive Programming pathway: preparing (i) students at the secondary and junior college level for Informatics Olympiad competitions, including the National Olympiad in Informatics (NOI), the Asia-Pacific Informatics Olympiad (APIO), and the International Olympiad in Informatics (IOI), as well as preparing (ii) students at the National University of Singapore (NUS) for the International Collegiate Programming Contest (ICPC). Refer to Contests for more information about the mentioned competitions.

The other pathways of computing excellence will be introduced as and when they are ready.

About STS

Scholastic Trust Singapore Ltd (STS) is a non-profit foundation that supports international academic and cultural competitions. With donations from revenue generated from these contests, STS awards scholarships and mentorship programs for students and teachers to transform lives. Using knowledge-building pedagogies and Singapore's expertise in education, STS supports and mentors teachers and students through ACAs. We provide leading-edge professional development for teachers in the areas of English, Mathematics, Science, IT, Pedagogy, and School Leadership to improve education in many developing countries.

STS manages the International Junior Honor Society (IJHS), the Young Achievers Leadership Academy (YALA) - a live-in 5-day, 4-night leadership camp -, the Southern Illinois University (SIU) Dr. Jared Dorn Scholarship, and the SIU International Student Tuition Grants.

About SIMCC

SIMCC is a social enterprise dedicated to promoting education by organizing some of the largest academic competitions in Singapore and across Asia. We are committed to enhancing learning through thinking games and competitions, allowing students to interact, cooperate, and build lasting bonds of friendship that transcend borders.

SIMCC donates 20% of its contest revenues to support students and teachers. With sales offices in Cambodia (Phnom Penh), Indonesia (Jakarta), and Singapore, our SASMO competitions have already reached more than 300,000 participants from over 13,469 schools.

OVER 13,469 SCHOOLS

YALA Scholarships

YALA YOUNG ACHIEVERS LEADERSHIP ACADEMY
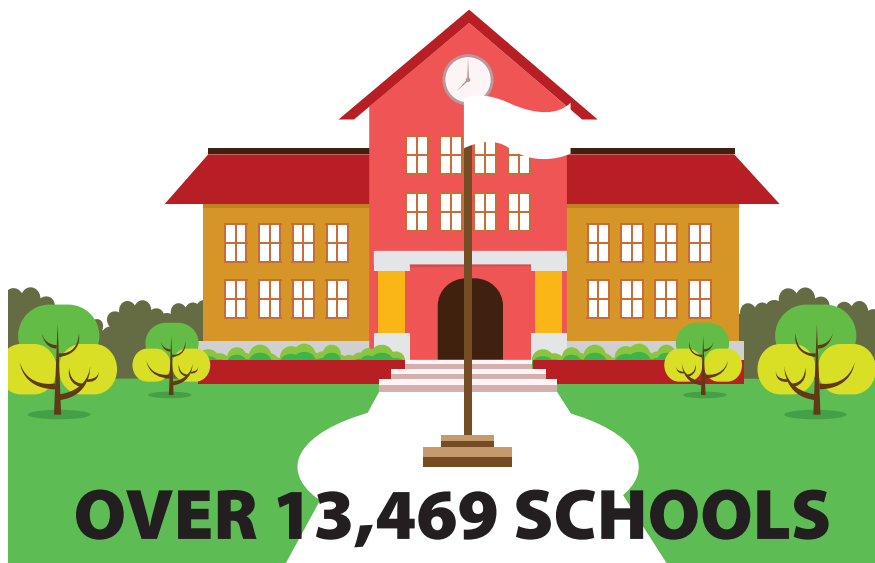
Every member of IJHS (grades 4 and above) will automatically receive a scholarship to join the YALA Camp every year.

There are 4 levels of scholarships based on IJHS Scholarship Points (SPs).
1. **Platinum Scholarship (100%)**
2. **Palladium Scholarship (75%)**
   New class of scholarships for IJHS members to apply for YALA scholarships
3. **Gold Scholarship (50%)**
4. **Silver Scholarship (30%)**
   Open to all IJHS members to apply

Gained >= 4 IJHS SPs

Member of IJHS

Gained more IJHS SPs

Better and more scholarships

Young Achievers Leadership Academy (YALA) Camp
Watch a video of YALA 2023 hosted in Bali, Indonesia and see the exciting skills and recognition IJHS members have acquired through the YALA Scholarship and how they have contributed back to their local and global communities through the Community Support Projects (CSPs).
https://simccorg.sharepoint.com/:v:/s/CompetitionContestPapersCountrypartnersandPrintedversion/EWTGH59emOhDkW_Xfs3iUgIBPxt_615k1oRCQihWkFFyrA?e=FcX6ZK

The Value of SIMCC and STS

01 — Many internationally recognized competitions

02 — IJHS, YALA, GMOS Internships
Passion with a purpose UGS

03 — Best Fit University with Scholarships

National Contests - Lowest Cost.
Country Awards :-
Top 8% - Gold,
Next 12% - Silver
Next 20% - Bronze
Next 10% - Honorable Mention

Global Finals Online - Lower Cost.
Global Awards :
Top 10% - Gold,
Next 15% - Silver
Next 25% - Bronze
Next 20% - Honorable Mention

Global Finals - Travel Required, Reasonable Cost
Top 10% - Gold,
Next 15% - Silver
Next 25% - Bronze
Next 20% - Honorable Mention

45 countries and territories

18 competitions and challenge

Over half a million contestants

National Contests conducted in respective SIMCC Countries

VANDA INTERNATIONAL SCIENCE COMPETITION

American Mathematics Olympiad

SASMO — Singapore & Asian Schools Math Olympiad

SINGAPORE MATH CHALLENGE — SMC

Dr CT — Design thinking with robotics and Computational Thinking Global Final

SIAT — Singapore International Arts Tournament

Global Competitions conducted Online

CTPS

SINGAPORE MATH GLOBAL FINALS

Mustang Math Tournament

SOAR students who have achieved a Silver award in SASMO or AMO are eligible to participate in these global finals, at no cost

Global Competitions hosted in Singapore (SIMOC) and rotated to one SIMCC Country annually (STEAM AHEAD)

SIMOC

STEAM AHEAD

VANDA SCIENCE GLOBAL FINALS

Dr CT Informatics Global Finals

SIAT

IJMO — International Junior Math Olympiad

Scholarship Enhancement Initiatives

YALA — Young Achievers Leadership Academy

GMOS — Global Math Olympiad Scholarships

SOAR

IJHS

STEAM INTERNATIONAL TOURNAMENT

Countries with more than 1,000 or more SASMO 2024 Contestants will be awarded a SIMOC Scholarship to represent their country at SIMOC 2024, which includes SIMOC online training, contest fee, and 4 day hotel package in Singapore worth S$1300.:

A. One award for every 1000 SASMO contestant, for Top Scorer(S) based on ranking
B. One award for the Top Scoring SOAR student
C. One award for the Most Motivated student based on 300-500 word Essay submitted, and not IJHS Member, and not won higher than silver award in any SIMCC contest.

Over S$3 million in Scholarship Support to help students and teachers strengthen their portfolios and a Powerful Network to help our contestants to win more scholarships
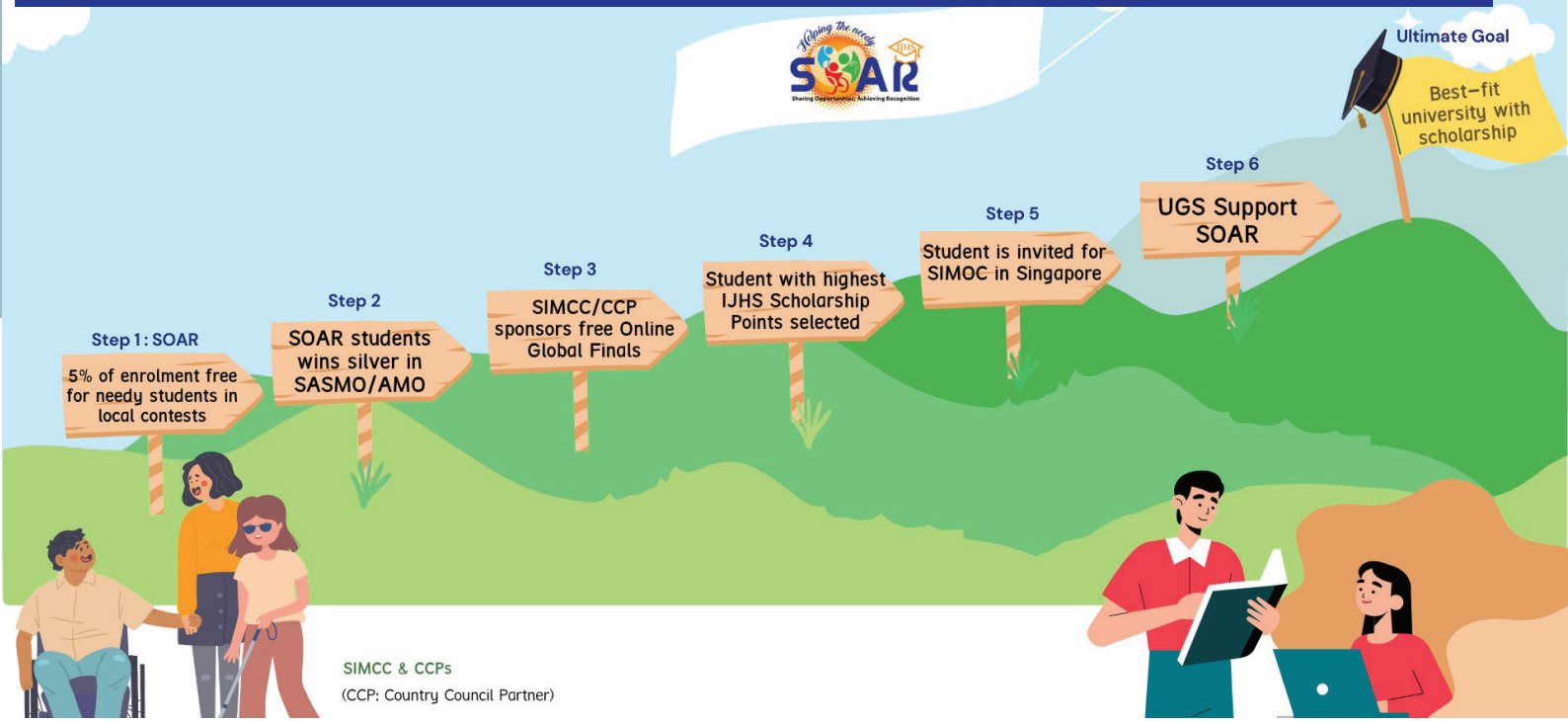
Social Equity/Needy Students – Free entry to SIMCC Competitions

SOAR
Helping the needy
Sharing Opportunities, Achieving Recognition

Our top USG experts will support SOAR students to determine the highest yield valued extra-curricular activities and how to maximize their choices to best demonstrate their skills to create their brand and express their unique personality for

Our goal is to help these students SOAR over an increasingly competitive application crowd — making sure they strengthen their portfolio to gain admission to top universities with scholarships.

Projects under IJHS
CSPs (Community Service Projects) are innovative projects focused on serving the community. They range from technology to social work and can be proposed by anyone with a vision to achieve. The CSP committee is responsible for supporting and managing your CSPs. We provide you with guidance and manpower to make your ideas into a reality. Check out some of our completed CSPs down below!

Support for poor and disadvantaged Students

Ultimate Goal

Best-fit university with scholarship

Step 6
UGS Support SOAR

Step 5
Student is invited for SIMOC in Singapore

Step 4
Student with highest IJHS Scholarship Points selected

Step 3
SIMCC/CCP sponsors free Online Global Finals

Step 2
SOAR students wins silver in SASMO/AMO

Step 1: SOAR
5% of enrolment free for needy students in local contests

SIMCC & CCPs
(CCP: Country Council Partner)

Singapore International Mastery Contests Center

Acquire Skills, Recognition, and Scholarships for SUCCESS

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Opening Hours
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