PROPOSAL

NextGen Innovator 2027

Robotics Hackathon for upper-secondary students in Vietnam. Timeline version: February to September 2027.

3 rounds	**Top 10** finalist teams	**2** Final events	**USD 15,000** total budget

Hosted by the Embassy of Israel in Vietnam
Organised by HANISA and GRASP JSC

17 November 2026

Draft for Embassy review

Programme page: video, rules and documents
https://nextgen-innovator-2027.pages.dev

01 Summary

NextGen Innovator 2027 is a robotics hackathon for upper-secondary students (grades 10-12) across Vietnam. Teams of 2-5 students enter free of charge. The theme is autonomous line-following robots, and English is the working language of submissions.

The programme has three rounds: a simulation round in an online lab (up to 50 teams, Top 10 advance), a Round 2 of 4-5 weeks of training with a real base robot and mentors followed by a real-robot indoor delivery competition (indoor event only), and a Grand Final with two events, outdoor racing and indoor racing. The organisers equip each finalist team with a base robot; teams build the rest. The main controller must be an Arduino.

The programme is hosted and supported by the Embassy of Israel in Vietnam and organised by HANISA (Hanoi Innovation and Startup Association) and GRASP JSC (GRASP Education, Science, Technology and Innovation Services Joint Stock Company, trading as GRASP Education). The total budget is USD 15,000. The Grand Final date and venue are to be confirmed with the Embassy, with September 2027 as the target.

Up to 50	Top 10	2	USD 15,000
teams in Round 1	finalist teams	Final events	total budget

02 Background and 2026 results

The 2026 edition was organised by HANISA and VICEE with the Embassy of Israel in Vietnam, on the theme of AI for real-world problems. The edition produced the following results.

119	104	30	9	13
team submissions	valid submissions	to Round 2	finalists	prizes

The Grand Final of the 2026 edition took place on 18 October 2026 at BK Holdings, Hanoi.

The 2027 edition keeps the arrangement of the 2026 edition, with HANISA and GRASP JSC as organisers and the Embassy as host, and moves from a software theme to a hardware and software theme built around a physical robot.

03 Objectives

- Give upper-secondary students across Vietnam a hands-on introduction to robotics, sensing, control and programming on an Arduino platform.
- Run a fair national competition in which every finalist team starts from the same base robot and the same rules.
- Require engineering documentation in English, through the engineering notebook and English-language submissions.
- Provide a verified entry route: a team reaches the race only with a valid certificate from the online lab.

- Strengthen the link between Vietnamese schools and the Embassy of Israel through a public Grand Final.

04 Programme design

ROUND 1
Online lab
Simulation in the online lab, up to 50 teams. The Top 10 advance.

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ROUND 2
Train and compete
4-5 weeks of mentor training with the base robot, then a real-robot indoor delivery competition.

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ROUND 3
Grand Final
Outdoor racing and indoor racing, with a Champion, Runner-up and Third.

4.1 Rounds

Round	Format	Participants	Output
Round 1	Simulation in the online lab (GRASP JSC)	Up to 50 teams	Top 10 advance
Round 2	Training with a real base robot and mentors, 4-5 weeks, then a real-robot indoor delivery competition on the physical 1.5 m x 1.5 m wooden grid (indoor event only)	Top 10 teams	Teams build and tune their robots; engineering notebook; indoor delivery competition result
Round 3	Grand Final: outdoor racing and indoor racing	10 finalist teams	Champion, Runner-up, Third; Engineering Notebook Award

Events take place on weekends
All organised events take place on weekends (Saturday or Sunday): the training kick-off, live mentor sessions, the Round 2 real-robot indoor competition day, any Round 1 awards or announcement event, and the Grand Final. Online-lab activity for teams may run on any day.

4.2 Base robot and team additions

The organisers supply a base robot with a 3D-printed body, four driven wheels with encoders, an H-bridge, a 3S lithium pack with protection and charger, and an Arduino Uno. Teams add a line-sensor array (5-8 IR sensors), collision-avoidance sensors (ultrasonic or IR, at least one type), a delivery mechanism (for example a servo two-finger gripper with a palm sensor for the indoor event), and optional extra boards such as an ESP32, which may not serve as the main controller.

Delivery mechanism is mandatory
Every robot must carry a delivery mechanism, for example the servo two-finger gripper with a palm sensor. It is checked at certification, and a robot without a delivery mechanism cannot enter.

Limits: mass 1,500 g, bounding box 25 x 20 x 15 cm at start, lithium pack at most 12.6 V (3S) and 3,000 mAh. There is no remote control during runs and no price cap on parts. Inspection (weighing, measuring, battery check) takes place before every run.

4.3 Online lab and certificate gating

The online lab, built by GRASP JSC, works in five steps: choose parts; workshop (3D robot, body shell, stickers, wiring to Arduino pins); test room; programming (block coding or Arduino C++); and racing.

The test room has six SOP gates: Gate 0 operation, Gate 1 traction and grip, Gate 2 braking and inertia, Gate 3 sensor calibration, Gate 4 rain and mud, Gate 5 program test. A team that passes all six gates, with a delivery mechanism fitted to the robot, earns an entry certificate. Any design change invalidates the certificate and the tests restart from Gate 0. The race button is locked until a valid certificate exists. The same certificate logic applies to the real events: a robot whose certificate does not cover a weather condition may not run it.

05 The two Final events

5.1 Outdoor racing (speed and flag race)

Item	Rule
Course	Black-line city loop about 7.3 m long on hard ground; start and finish share one line
Flags	Flag 1 at 1/5 of the loop: 10 points; Flag 2 at 2/5: 15; Flag 3 at 3/5: 20; Flag 4 at 4/5: 25; finish flag: 50 (counts only when the robot finishes)
Flag scoring	A flag scores when the robot passes within 20 cm of its base
Weather	Dry, wet (water sprayed) or mud (artificial mud on some sections); drawn before the day and equal for all teams in that run
Time limit and runs	2 minutes; two runs, best run counts
Ranking	Most points; ties broken by the shorter time to the last flag
Penalty	5 points each time the robot leaves the line for more than 3 seconds or is lifted after a flip

5.2 Indoor racing (delivery race)

Item	Rule
Arena	Plywood board 1.5 m x 1.5 m, 5 x 5 grid of black lines (2 cm wide, 30 cm between nodes); no weather
Cargo	Four cubes of 4 x 4 x 4 cm, about 30 g, worth 10, 20, 30 and 50 points, on eight allowed nodes; layout drawn and published 30 minutes before the run
Depots	A x1 near the start; B x2 at the far end of the bottom row; C x3 at the far corner (24 cm squares around a node)
Score	Cargo value x depot multiplier, counted when the cargo rests inside the square and is not held; maximum 330 points
Obstacles	An organiser robot crosses the grid and another team's robot runs on its own path; each collision costs 10 points
Time limit and runs	3 minutes; two runs on two layouts, best run counts
Ranking	Most points; tie broken by the earlier time of the last cargo delivered

A robot carries one cargo at a time, so teams choose which cargo to take, which depot to use and in what order.

06 Judging and awards

Each event converts to rank points: 1st = 10, 2nd = 8, 3rd = 6, 4th = 5, 5th = 4, 6th = 3, 7th = 2, others = 1. The sum of the two events decides Champion, Runner-up and Third. A tie is broken by the raw score of the indoor event.

The engineering notebook, written in English, is judged separately for the Engineering Notebook Award and does not change the ranking. Prizes and the ceremony are to be agreed with the Embassy.

07 Organisation and roles

Party	Role
Embassy of Israel in Vietnam	Host and supporter; approval of the proposal, rules and Grand Final arrangements
HANISA	Organiser and holder of the organisation contract; programme management, communications, registration, events
GRASP JSC	Organiser; builds and runs the online lab; technical support for robots, arenas and scoring
Mentors	Support the Top 10 teams during Round 2 training and review engineering notebooks

08 Budget

The total budget is USD 15,000, in two parts.

Part	Item	Amount (USD)	Basis
1	Ten base robots	8,000	USD 800 per robot; simplified direct appointment with three quotations
2	Organisation contract with HANISA, GRASP JSC accompanying	7,000	Advance USD 3,500; payment on completion USD 3,500
	Total	15,000	

Payment schedule

Payment	Amount (USD)	Timing
Part 1: ten base robots	8,000	Completed in December 2026
Part 2: advance	3,500	Completed in December 2026
Part 2: payment on completion	3,500	After completion of the programme, from the 2027 budget, which becomes available in September 2027

09 Timeline February to September 2027

PREPARATION			ROUND 1		ROUND 2		GRAND FINAL
Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Concept note	Approval; rules freeze	Design freeze; lab release candidate	Launch; Round 1 opens	Round 1 closes; Top 10	Training kick-off; mentoring	Real-robot indoor competition	Grand Final

Month	Activities
Nov-Dec 2026	Ten base robots procured; Part 2 advance paid (both completed in December 2026)
Feb 2027	Concept note and proposal submitted to the Embassy for approval
Mar 2027	Proposal approval; rules freeze
Apr 2027	Base-robot design freeze; online lab release candidate
May 2027	Delivery starts: programme launch and registration; online lab opens; Round 1 begins
Jun 2027	Round 1 completes; Top 10 announced
Jul 2027	Round 2 starts: base robots handed to the Top 10 teams; training kick-off on a weekend in July; mentoring (live sessions on weekends)
Aug 2027	Round 2 training continues (4-5 weeks in total); engineering notebooks; indoor board preparation; Round 2 real-robot indoor delivery competition on a weekend in August, at the end of Round 2
Sep 2027	Grand Final on a weekend in September (target month; date and venue to be confirmed with the Embassy); reporting; the 2027 budget becomes available and the remaining USD 3,500 is paid after completion

The Grand Final keeps both events, outdoor racing and indoor racing, as the current plan. The original proposal assumed February to September 2027 for the concept note, preparation and delivery. In practice delivery runs from May to September 2027; the delivery months above are detailed in the separate Master Plan.

10 Risks and mitigations

Risk	Mitigation
Late approval or rule changes delay preparation	Rules freeze in March; changes after the freeze only with Embassy approval
Base-robot or sensor supply issues	Ten base robots procured in December 2026; spare parts and a reserve kit held by the organisers
Lithium battery handling	3S pack with protection; charger supplied; battery check before every run; charging only under supervision
Team builds a robot without a delivery mechanism	Rules and the online lab workshop state the requirement; the mechanism is checked at certification, before the race button unlocks
Weekend venue availability: fixed weekend dates limit venue and staff options	Book venues early for the Round 2 competition day and the Grand Final; agree weekend dates with the Embassy in advance; reserve alternative weekends
Weather on the Grand Final day	Weather condition drawn before the day and equal for all teams; indoor event unaffected; fallback schedule
Team drop-out between rounds	Reserve list from Round 1; mentor follow-up during Round 2
Online lab load or defects at peak registration	Release candidate in April; load test before launch; technical support by GRASP JSC
Timing of the final payment	Remaining USD 3,500 paid after completion from the 2027 budget available in September 2027; schedule agreed in advance

11 Decisions requested from the Embassy

1. Approve the programme format, the two Final events and the rules summary in Appendix A.
2. Approve the budget of USD 15,000 and the payment schedule in section 8.
3. Approve the timeline, with the rules freeze in March 2027 and delivery from May to September 2027.
4. Confirm the Grand Final date (a weekend, Saturday or Sunday) and venue, with September 2027 as the target.
5. Confirm the Embassy's role in the ceremony and awards.
6. Nominate an Embassy contact for approvals and communications.
7. Approve the use of the Embassy logo and the communication materials.

Programme page
Video, rules and documents:
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Programme page: video, rules and documents

A Rules summary

A.1 Programme

Item	Rule
Participants	Upper-secondary students, grades 10-12, across Vietnam; teams of 2-5; free to enter
Theme	Autonomous line-following robots
Language	English is the working language of submissions
Controller	The main controller must be an Arduino
Scheduling	All organised events take place on weekends (Saturday or Sunday): training kick-off, live mentor sessions, the Round 2 indoor competition day, any Round 1 awards or announcement event, and the Grand Final. Online-lab activity for teams may run on any day
Rounds	Round 1: simulation in the online lab, up to 50 teams, Top 10 advance Round 2: training with a real base robot and mentors (4-5 weeks), then a real-robot indoor delivery competition on the physical 1.5 m x 1.5 m wooden grid (indoor event only; no outdoor event in Round 2) Round 3: Grand Final with two events, outdoor racing and indoor racing

A.2 Robot rules

Item	Rule
Base robot supplied by the organisers	3D-printed body, four driven wheels with encoders, H-bridge, 3S lithium pack with protection and charger, Arduino Uno
Teams add	Line-sensor array (5-8 IR sensors); collision-avoidance sensors (ultrasonic or IR, at least one type); delivery mechanism, for example a servo two-finger gripper with a palm sensor for the indoor event (mandatory, see below); optional extra boards (for example ESP32, not as main controller)
Delivery mechanism (mandatory)	Every robot must carry a delivery mechanism. It is checked at certification, and a robot without a delivery mechanism cannot enter
Mass	1,500 g maximum
Size at start	Bounding box 25 x 20 x 15 cm
Battery	Lithium pack at most 12.6 V (3S) and 3,000 mAh
Control during runs	No remote control
Parts cost	No price cap on parts
Inspection	Weighing, measuring and battery check before every run
Engineering notebook	Required, in English; judged separately (Engineering Notebook Award) and does not change the ranking

A.3 Online lab and certificate

The online lab, built by GRASP JSC, has five steps: choose parts; workshop (3D robot, body shell, stickers, wiring to Arduino pins); test room; programming (block coding or Arduino C++); racing. The race button is locked until a valid certificate exists.

Gate	Test
0	Operation
1	Traction and grip
2	Braking and inertia
3	Sensor calibration
4	Rain and mud
5	Program test

All six gates passed, with a delivery mechanism fitted, earns an entry certificate. A robot without a delivery mechanism cannot enter. Any design change invalidates the certificate and the tests restart from Gate 0.

A.4 Outdoor racing (speed and flag race)

Item	Rule
Course	Black-line city loop about 7.3 m long on hard ground; start and finish share one line
Flags	Flag 1 at 1/5 of the loop: 10 points Flag 2 at 2/5: 15 points Flag 3 at 3/5: 20 points Flag 4 at 4/5: 25 points Finish flag: 50 points (the highest; counts only when the robot finishes)
Scoring of a flag	A flag scores when the robot passes within 20 cm of its base
Weather	Each run is dry, wet (water sprayed on the surface) or mud (artificial mud on some sections), drawn before the day and equal for all teams in that run. A robot whose certificate does not cover the condition may not run it
Time limit	2 minutes
Ranking	Most points wins; ties broken by the shorter time to the last flag
Runs	Two runs; the best run counts
Penalty	5 points each time the robot leaves the line for more than 3 seconds or is lifted after a flip

A.5 Indoor racing (delivery race)

Item	Rule
Arena	Plywood board 1.5 m x 1.5 m with a 5 x 5 grid of black lines (2 cm wide, 30 cm between nodes); no weather
Cargo	Four cubes of 4 x 4 x 4 cm, about 30 g, worth 10, 20, 30 and 50 points, each placed on one of eight allowed nodes. The layout is drawn and published 30 minutes before the run
Depots	Three depots (24 cm squares around a node): Depot A x1 near the start; Depot B x2 at the far end of the bottom row; Depot C x3 at the far corner
Score	Value of the cargo x multiplier of the depot in which it rests at the end (inside the square and not held); maximum 330 points
Strategy	A robot carries one cargo at a time; teams choose which cargo to take, which depot to use and in what order
Random obstacles	From time to time an organiser robot crosses the grid and another team's robot runs on its own path inside the grid. Robots need collision avoidance; each collision with another robot costs 10 points
Time limit	3 minutes; the run ends when all four cargo are in depots or time is up
Ranking	Most points; tie broken by the earlier time of the last cargo delivered
Runs	Two runs on two layouts; the best run counts

A.6 Overall Final ranking

Each event converts to rank points: 1st = 10, 2nd = 8, 3rd = 6, 4th = 5, 5th = 4, 6th = 3, 7th = 2, others = 1. The sum decides Champion, Runner-up and Third. A tie is broken by the raw score of the indoor event.