International Robowars

Problem Statement: Weight Category 60 kgs

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Task

Design and construct a remote-controlled robot capable of fighting a tournament against other robot(s).

Design Specifications

a) Basic Specifications

1. There will be no restrictions on the dimensions of the bot(s).

2. The weight of the machine should not exceed 60 Kgs (132.28 Lbs.), which includes the weight of any pneumatic source/tank. All pneumatic tanks/sources and batteries should be on board. Only the weight of the remote controller will not be counted.

3. A bot can be in a "Cluster Bot" formation. Each bot must meet the requirements described in this problem statement. The total weight of all the bots and the dimensions of the combination of bots must satisfy the above two points.

4. Robots with pneumatic or hydraulic mechanisms, or electric lifters, are allowed.

5. Both active weapon and inactive (wedge-type) bots are allowed.

b) Mobility

All robots must have easily visible and controlled mobility in order to compete.

Methods of mobility include:

1. Rolling: Wheels, tracks or the whole robot.

2. Non-wheeled: Non-wheeled robots have no rolling elements in contact with the floor and no continuous rolling or cam-operated motion in contact with the floor, either directly or via a linkage. However, they are not true walkers as defined below. Motion is "continuous" if continuous operation of the drive motor(s) produces continuous motion of the robot. Linear-actuated legs and novel non-wheeled drive systems are also allowed under this category.

3. Manually operated jumping and hopping are allowed. However, the maximum height of any part of the machine should not exceed 6 ft during any stage of its jumping/hopping, and any damage caused to the robot due to this mechanism is solely the responsibility of the team.

Mobility methods that are NOT allowed:

1. Flying (using airfoils, helium balloons, ornithopters, etc.) is not allowed.

2. The robots should not secure themselves on the ring surface by using suction cups, diaphragms, sticky treads, glue or other such devices.

c) Robot Control Requirements

1. The robot must be controlled only through a wireless remote, while all power supply(ies) must be on board.

2. Control must be exhibited over all of its functions and positions. Although autonomous functions within the bot are acceptable, the controller must be able to remotely disable

or override these functions at any time. Note that any damage resulting from this function is the responsibility of the team. A manual emergency stop (E-stop) function must be present and accessible from the radio controller, allowing for manual override of this autonomous function in the event of an emergency.

3. There should be a binding capability between transmitters and receivers, and they must be able to connect between polycarbonate (20 mm), metal bars and barriers. Only remotes with this facility will be allowed.

4. The team must have at least four frequency wireless remote-control circuits or two dual-control circuits, which may be interchanged before the start of the race to avoid frequency interference with other teams. Cases of any interference in the wireless systems will not be considered for rematch or results.

5. Remote control systems, such as those found in toys, may be used. Remote control systems available on the market may also be used, while non-standard or self-made remote control systems can be used only after approval from the organisers.

6. The team should pair the wireless remote with the machine before placing it in the arena. No extra time will be provided once the machines are placed inside the arena. Failure to connect the remote to the machine prior to this may result in a penalty for the team.

d) Battery and Power

1. The machine must be powered electrically. Use of an IC engine in any form is not allowed. Onboard batteries must be sealed, immobilised-electrolyte types (such as gel cells, lithium, NiCad, NiMH, or dry cells).

2. The electric voltage between any 2 points on the machine should not exceed 72V DC at any point in time. Participants will need to bring their own converters for the standard power supply, which complies with Indian standards.

3. Participants must protect the battery terminals from a direct short circuit and prevent a battery fire; failure to do so will result in immediate disqualification.

4. Use of damaged, non-leak-proof batteries may result in disqualification.

5. Special care should be taken to protect the onboard batteries. If the judges find that the battery is insufficiently protected, the team will be disqualified immediately.

6. Change of battery will not be allowed during the match.

7. Only bots with onboard batteries will be allowed.

8. If a team participates in a category with multiple bots, it must have a number of batteries equal to the number of bots involved in the Robowars. The same requirement applies if the team has taken part in more than one weight

category. Failure to do so might lead to disqualification if the team is late to a match due to a lesser number of batteries as compared to the number of their bots. (The final decision lies with the organising committee.)

9. A team cannot use the same bot with different names in the same categories more than once by just modifying certain components of the bots.

10. The supply from the battery to all the weapons and power systems should qualify the following fail-safes:

    a. A manual disconnect (switch) that can be turned off without harming the person doing it, i.e., no body parts or weapons should come in the way of the switch.

    b. A manual emergency stop that can be triggered through the radio controller.

11. The teams are advised to have at least one extra battery ready and charged during the competition, so that when advancing to the next level, they won't have to wait or suffer due to an uncharged battery (refer to section "Match Frequency"). If teams fail to appear during their allotted time slot, they will be disqualified. (The final decision lies with the organising committee.)

e) Pneumatics

1. A robot can use pressurised non-flammable gases to actuate pneumatic devices. The maximum allowed outlet nozzle

pressure is 50 bars*. The storage tank and pressure regulators used by teams must be certified. Teams using pneumatics are required to produce the Safety and Security letters at the Registration Desk at the venue. Failure to do so will lead to direct disqualification. Techfest, IIT Bombay, will not provide any mechanism to refill pneumatic cylinders/containers with a maximum pressure exceeding the specified limit.

2. Participants must be able to indicate the pressure used with an integrated or temporarily fitted pressure gauge. There must also be a provision to check the cylinder pressure on the bot.

3. The maximum pressure in a cylinder must not exceed its rated pressure at any point in time. All pneumatic components must be rated to at least the value of the maximum pressure.

4. Participants must have a safe way of refilling the system and determining the onboard pressure.

5. All pneumatic components on board a robot must be securely mounted. Care must be taken while mounting the pressure vessel and armour to ensure that, if ruptured, nothing escapes the robot. The terms 'pressure vessel', 'bottle', and 'source tank' are used interchangeably.

6. The entire pneumatic setup must be onboard. No external input from outside the arena can be given to the robot for the functioning of its pneumatic system.

f) Hydraulics

1. A robot can use non-flammable liquid to actuate hydraulic devices, such as cylinders.

2. All hydraulic components onboard must be securely mounted. Special care must be taken while mounting the pump, accumulator, and armour to ensure that, if ruptured, direct fluid streams do not escape the robot.

3. All hydraulic liquids must be non-corrosive, and the device must be leakproof.

4. The maximum allowed pressure is 50 bars*.

5. Participants must be able to indicate the pressure used with an integrated or temporarily fitted pressure gauge.

6. The entire hydraulic setup must be onboard. No external input from outside the arena can be given to the robot for the functioning of its hydraulic system.

g) Weapon Systems

1. Robots can possess any type of magnetic weapon, cutter, flipper, saw, lifting device, or spinning hammer (if they meet the criteria mentioned below) as a weapon.

2. The following weapons cannot be used:

    a. Liquid projectiles (foam, liquefied gases).
    b. Any kind of inflammable liquids.

c. Weapons causing invisible damage (electrical weapons, RF jamming weapons and others).
d. Weapons causing opponents' weapons (spinners) to entangle in them (chains, ropes or loose fabrics).

3. Spinning weapons:

a. The weapon must come to a full stop within 60 seconds of the power being removed using a self-contained braking system.

4. Spring-loaded or flywheels:

a. Under no circumstances should a large spring be loaded when the robot is outside the arena or testing area.

b. All springs, flywheels, and similar kinetic energy-storing devices must fail to a safe position on loss of radio contact or power.

5. Flame-based:

a. Flame rules may change, subject to infrastructural and safety limitations.

b. Fuel must exit the robot and be ignited as a gas. It cannot leave the robot in a liquid or gelled form or use oxidisers.

c. Fuel types allowed are propane and butane; the maximum quantity allowed is 16 fl oz (473.18 mL).

d. The ignition system must have a remotely operated shut-off that allows the controller to disable it using the radio control system.

Competition Rules and Specifications

a) Team Specifications

1. Any team can participate in International Robowars, Techfest. A team may consist of a maximum of 5 participants. These participants can be from the same or different institutes.

2. Team Name: Every team must have a unique name. Techfest Organisers reserve the right to reject entries from any team whose name they deem inappropriate, offensive, or conflicting. Organisers must be notified if a team's name has been changed.

3. Team Representative: Each team must specify their team representative (leader) at the time of registration on the website. All important communications between Techfest organisers and registered teams will be conducted through their team representative. The team representative must submit valid contact details (phone no., email ID, etc.) at the time of registration.

NOTE: During any conversation, registration, communication, email, or submission, the team must identify themselves by their Team ID, which is provided at the time of registration and not by their team's name. Please DO NOT use your team's name as your identification in any kind of communication with us.

b) Registration

Start preparing your bots for the competition. An email will be sent when the registration portal goes live.

The last date for registration is 8th November 2026.

Since there may be updates to the Problem Statement (see the closing section, "Important Note"), Techfest organisers will ensure that registrants are informed about any updates via email/SMS.

c) Submission of Abstract

Participants must submit a portfolio of their machine prior to the competition. This portfolio will be used to seed teams for the competition, and only shortlisted teams will be eligible to participate in International Robowars at Techfest 2026.

After registering their team, participants will find an Abstract Submission Portal on the registration platform. Teams must submit a Google Drive link containing all the required submission materials through this portal. The link-sharing settings must be set to 'anyone with the link' to ensure that the organisers can access and review the submitted materials without requiring additional permission. Teams must ensure that all required files and videos are uploaded to the Drive before submitting the link. Submissions through any other mode will not be accepted.

The last date for portfolio submission is 8th November 2026.

d) Details Regarding the Abstract

(This section pertains to the general abstract to be submitted by every team.)

Participants must submit a Google Drive link through the Abstract Submission Portal. The submitted Drive link must contain two separate sections: Written Abstract and Video Abstract, as detailed below. All required documents and videos must be uploaded before submission, and the link-sharing settings must be set to 'Anyone with the link' to ensure that the organisers can access all materials without requiring additional permission.

Written Abstract:

1. The weapon systems and power supply method must be explained in detail, along with proper diagrams and pictures.

2. The functioning of the wireless remote or any other wireless module used for wireless remote control, along with its frequency, must be explained in detail.

3. A description of any unusual or advantageous mechanism used must be provided. The specifications of all components used, including motors, suspension springs, remote controller, wires, battery, etc., must be mentioned.

4. The written abstract and other required portfolio materials must be uploaded to the Google Drive link submitted through the Abstract Submission Portal. Teams must ensure that all required materials are included and accessible before submitting the link. In case of multiple submissions, only the first submission will be considered for judging purposes.

5. All submissions must be made online before the deadline.

6. A soft copy of the permission regarding pneumatics and hydraulics capacity must be submitted before the deadline. A hard copy of the permission must be brought to the competition. Teams failing to fulfil both requirements will not be allowed to participate.

7. The deadline for submitting abstracts is 8th November 2026. Further instructions regarding abstract submission will be communicated to registered participants.

Video Abstract:

1. The video must be at least 1 minute long and should be an unedited clip showcasing the machine's performance to its fullest extent. All destructive mechanisms being used must be demonstrated in operation. An additional clip may be requested from participants who qualify for Round One at a later stage. Instructions for the same will be communicated to the concerned teams.

2. Participants are not required to explain the mechanisms in the video. All portfolios will be used strictly for seeding purposes. The elimination procedure will be objective, and the evaluation of every participant will be published on the website.

3. Techfest assures the privacy of the submitted material. The portfolio of your machine will serve as evidence of your hard work and will also help determine your position in the competition. Hence, please pay adequate attention to its preparation.

4. The video abstract must be uploaded to the same Google Drive link submitted through the Abstract Submission Portal. Teams must ensure that the video is uploaded successfully and is accessible to the organisers before submitting the link.

All submissions must be made online through the Abstract Submission Portal before the deadline of 8th November 2026.

NOTE: The video abstract will not be the sole criterion for selecting robots to participate in International Robowars at Techfest 2026. Judges will thoroughly review both the written and video abstracts before shortlisting the robots eligible to compete. The portfolio is intended to evaluate the efforts made by participants. Therefore, even if your machine is incomplete or you are unable to meet all the requirements outlined in the portfolio, please submit the portfolio reflecting the current state of your machine before the deadline rather than leaving it incomplete or submitting it late.

e) Match Duration and Type

Matches will consist of 3 minutes of active fight time, exclusive of any time-outs. Hence, it is not binding but advisable to keep battery capacity, power usage and machine defences such that they can sustain a 3-minute fight.

The matches can be of the following types:

1. Match: A regular 1-on-1 combat between 2 robots.
2. Resurrection Match: A combat involving robots, each of which has previously lost at least one match.

3. Rumble: A combat between more than 2 robots simultaneously.

A detailed document outlining the rules regarding the event format and procedures to be followed will be uploaded later, and participants will be informed accordingly.

f) Match Frequency

A team is allowed to prepare for the next match for a period of 20 minutes. This time is calculated from the time the robot leaves the post-match staging area of its previous match. If the team fails to return with the robot ready to the pre-match staging area when called after the allotted time, the team may be forced to forfeit.

It is recommended that any routine maintenance (i.e., battery charging) should be capable of being performed well within this time period, or backup should be kept. In extreme cases, the 20-minute time period may be lengthened at the discretion of the event organisers.

g) Criteria for VICTORY

1. A robot is declared victorious if its opponent is immobilised.

2. A robot will be declared immobile if it cannot display the linear motion of at least one inch in a time period of 10 seconds. A bot with one side of its drivetrain disabled will not be counted out if it can demonstrate some degree of controlled movement. In the event that both robots remain mobile after the end of the round, the winner will be decided

subjectively.

3. A robot that is deemed unsafe by the judges after the match has begun will be disqualified and therefore declared the loser. The match will be immediately halted, and the opponent will be awarded a win.

4. If a robot is thrown out of the arena, the match will be stopped immediately, and the robot remaining inside the arena will be automatically declared the winner.

5. Robots cannot win by pinning or lifting their opponents. Organisers will allow pinning or lifting for a maximum of 20 seconds per pin/lift, then the attacker robot will be instructed to release the opponent. If, after being instructed to do so, the attacker is able to release but fails to do so, their robot may be disqualified. If two or more robots become entangled or a crushing or gripping weapon is employed and becomes trapped within another robot, the competitors should notify the timekeeper, the fight should be stopped, and the robots separated by the safest means.

6. If a bot gets stuck inside the arena due to the arena's deformity, the timer will be stopped, and the bot will be released in the safest manner possible.

7. Points will be awarded based on aggression, damage, and control.

    a. Aggression: Aggression is judged by the frequency, severity, boldness and effectiveness of attacks

deliberately initiated by the robot against its opponent. If a robot appears to have accidentally attacked an opponent, that act will not be considered when judging for aggression.

b. Control: Control is judged in terms of the ability to attack an opponent at its weakest point, using weapons in the most effective way, and minimising the damage caused by the opponent.

c. Damage: Through deliberate action, a robot either directly or indirectly reduces the functionality, effectiveness or defensibility of an opponent. Damage is not considered relevant if a robot inadvertently harms itself. Also, if a pressure vessel or a rapidly spinning device on a robot fragments, any damage to the opponent will not be considered "deliberate".

NOTE: A robot winning in a round against its opponent doesn't guarantee its entrance into the next round. If the judges found the winning robot incompetent to enter the next round, it may be disqualified. Judges can disqualify both robots of a match from advancing to the next round. All the decisions taken by the judge will be final and binding on all. Any queries received after this will not be entertained.

h) Event-Specific Terminology

1. Disabled: A robot is not functioning correctly due to either an internal malfunction or contact with the opposing robot or Arena Hazard.

2. Disqualification: A robot is no longer permitted to compete in the current Robowars tournament.

3. Immobilised: In the judges' opinion, a robot is not responsive for a specified period of time.

4. Knockout: Occurs when the attack or deliberate actions of one robot cause its opponent to become immobilised.

5. Lifting: Occurs when one robot controls an opponent's translational motion by lifting the drive mechanism of the opponent off the Arena floor.

6. No Contact: Neither robot makes contact with the other for a specified period.

7. Pinning: Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilise it.

8. Radio Interference: Refers to a situation where at least one robot becomes unresponsive or non-controllable due to the interference of another robot's remote-control signal.

9. Non-Responsive: In the judges' opinion, the robot cannot display some kind of controlled translational movement along the arena floor.

10. Restart: Occurs after a fault or a timeout has been declared and the competing robots are ready to continue.

11. Stuck: A robot is hung up in a part of the arena, an arena hazard or an opponent, such that it is effectively non-responsive.

12. Tap-Out: Occurs when a robot's operator decides that they no longer want to continue the match and concedes the win to the opposing team.

13. Technical Knockout: Occurs when a robot wins due to immobilisation of its opponent, even though, in the judges' opinion, no action of the winning robot caused the opponent's immobilisation.

14. Timeout: A temporary halting of a match. Timeouts are typically used to separate robots, but can also be invoked for other purposes.

i) Certificate Policy

1. A Certificate of Excellence will be given to all the winners.

2. Certificates of Participation will be given to all the teams that qualify in the first round of the competition.

3. The teams which get disqualified due to disobeying any of the competition rules will not be considered for the certificate.

j) Safety Rules

Compliance with all event rules is mandatory. It is expected that competitors will adhere to the rules and procedures on their own accord and do not require constant policing.

1. Special care should be taken to protect the onboard batteries and pneumatics; bots without proper protection will not be allowed to compete.

2. If you have a robot or weapon design that does not fit within these rules (even if it includes some elements not mentioned as allowed/disallowed in this ruleset) or is somehow ambiguous, please contact Techfest, IIT Bombay, at the earliest. Safe innovation is always encouraged, but surprisingly, the organisers may disqualify your robot due to your brilliant exploitation of a loophole before it even competes.

3. Each event has safety inspections. Your team will be allowed to compete at the sole discretion of Techfest authorities, to whom, as a builder, you are obligated to disclose all operating principles and potential dangers to the inspection staff.

4. Proper activation and deactivation of robots are critical. Robots must only be activated in the arena, testing areas, or with the expressed consent of the event coordinators.

5. All weapons must have a safety cover to protect against sharp edges.

6. All participants build and operate robots at their own risk. Combat robotics is inherently dangerous. There is no amount of regulation that can encompass all the dangers involved. Please take care not to hurt yourself or others when building, testing and competing. Any activity (such as repairing or handling batteries) that may cause damage to the surroundings during the teams' stay in the competition area should not be carried out without the organisers' consent. Failure to follow this rule may result in disqualification.

7. All resources provided by the organisers at the time of the competition should be used strictly with their consent.

8. Once the robots have entered the arena, no team member can enter the arena at any point in time. In the event that a fight needs to be halted and changes are required in the arena or conditions for the robot(s), these will be made by the organisers only.

Arena Specifications

Safety Precautions

The arena is protected by 12mm-thick bulletproof polycarbonate walls on four sides (excluding the top). The top is protected by a 6mm bulletproof polycarbonate sheet.

Arena Diagram

The out-to-out dimensions of the arena will be 12ft × 12ft × 8ft (length × breadth × height) or 32ft × 32ft × 12ft (length × breadth × height). An arena might also be functional.

These figures/parameters are subject to change. The maximum pressure limit may be upgraded depending on the equipment available. The arena size is also subject to the infrastructure. Polycarbonate thickness may be increased. They will be conveyed through updates to this document, as per the "Important Note" below.

Prizes

A cash prize of INR 2,40,000 will be awarded for winning, best design, and other subjective criteria that the organisers deem fit. The prize money will be distributed in the ratio of 5:3:2 of the total cash prize, i.e., 50% to the first, 30% to the second and 20% to the third.

The prize money will be awarded to winners via NEFT and will be processed within 20 working days after receiving the prize money from our sponsors. This process may take several weeks to months. We request all winners to be patient and coordinate with the Techfest team.

The winners will have to mail the following information (immediately after the announcement of results) to om.umekar@techfest.org and avichal@techfest.org strictly in the following format:

i) Subject: Competition Name, Team ID - your position (example: Robowars, RW1003- 3rd Position)

ii) Body of mail: 1. Account Holder's Name 2. Account Number 3. Bank name and Branch name 4. IFSC Code

Important Note

These rules may be changed at any time, even without explicit notification to the teams. However, the document uploaded here is to be followed as the latest problem statement for all the rules and design specifications. Any change can be observed in the name of the document, which will contain a higher version (v2.0, say) if updated.

The teams acknowledge that they have a responsibility to read, understand and abide by the rules and Techfest, IIT Bombay reserves the right to prevent any team from competing at any time for any reason (including but not limited to the reasons specified elsewhere in this document). However, we will inform all registrants in case an updated version becomes available (all registrants as of the date of revision). In case of any queries, participants are encouraged to contact Techfest, IIT Bombay.