

BITS Pilani - Goa Campus



1-3 February 2019

quark

COGNITIVE OVERDRIVE

EVENTS RULEBOOK



EVENTS

OpenShowcase	3	Specials	55
		Paper Presentation	56
Design & Build	5	Stratazenith	59
Burnout	6	School Bag	60
TrailBlazers	10		
MortarKombat	12	Corporate	62
Search & Rescue	14	Market Kshetra	63
		Alpha Tickers	64
Roboficial	15	Bullion Beatdown	65
Robowars	16	AD Mad Show	66
Line Following Bot	34	Novatia	67
Roborace	36		
Robosoccer	38	Elixir	68
Robo Clench	40	Quark National Quiz	69
		Ganimatoonics	70
Electrify	46		
µC Mania	47	Cubix	71
Digilogica	48	Mætka	72
Programmers Inc	50		
CodeJam	51		
BITS CTF	52		
Reverse Coding	53		
Hackathon	54		



OPENSHOWCASE

Total Prize Pool : INR 80,000

With this event, we wish to provide a platform to recognize innovative ideas and projects, which can make a mark in the upcoming future. Open Showcase during Quark 2019 is a platform where you get to promulgate your projects and models, and make your amazing skills of design and innovation known to the world and send the audience into a state of cognitive overdrive.

This event is divided into two categories :

Expo

This expo is for students, start-ups, companies, corporate partners, innovation labs, teams and individuals to showcase their innovations on a common platform and to find the people who share the same interest. Participants will get a chance to interact with eminent professors, tech experts, prospective investors, corporate leaders and bright students from all across the nation

Competition

Quark'19 provides an opportunity for students and small start-ups to showcase their projects in front of diaspora of people including professionals, corporate representative and students. This gives the students an opportunity to find and connect with people doing similar work and create future opportunities and projects for themselves while competing for the glory and grand prizes. Rules for the competition are as follows :

Rules:

- The competition is open for registered college students and small innovative start-ups (launched less than 18 months before).
- The participants have to register through Quark's website in a team or individually.
- A team can register for more than one entry. However, a single participant cannot be in two different teams.



Summary Submission:

- Participants should mail their summary to specials.quark2019@gmail.com with abstract and one minute video demonstrating their project. Students can register in teams or as individuals.
- Last Date for submitting the abstracts 5th Jan 2019. Only entries selected based on their abstracts are eligible to be exhibited at Open Showcase, Quark'19. Participants are also required to mention at the beginning of their abstracts if their idea has a prototype/model. A working prototype/model is not mandatory but would enhance your chance of scoring extra points. A brief idea of how the design would be presented (exhibited) during the exhibition should also be included in the abstracts.
- The abstract should not exceed 600 words. Please ensure that your abstract matches the following: In the first page mention your project title, names of the team members and their respective institutes. Mention the domain of your project The last sheet, following the abstract, may have a list of references – websites, books, journals and so on, which amply support the ideas or solutions implemented or proposed. The information in the abstract should not be very descriptive or vague. It is recommended that vital aspects of the project that require special focus be mentioned as bold points.
- Only the participants who are short-listed in the screening round based on judging of the abstracts shall be invited to Quark 2019 for the final round.
- Qualifying participants will have to make a presentation before a panel of judges explaining the salient points of their idea/innovation.
- At the final presentation during Quark, the teams will be allowed to bring along a working model that gives the judges proof of concept.
- The decision of organizing committee is final and binding.

Judging Criteria:

The participant will be judged on the following criteria:

- Innovation
- Feasibility and Sustainability
- Cost Effectiveness
- Social Viability
- Discipline
- Project Report



2019
quark
COGNITIVE OVERDRIVE

Design & Build

Burnout
TrailBlazers
MortarKombat
Search & Rescue



BURNOUT

General Rules for all the events:

- The cars and the drivers should be same throughout the fest.
- It's the responsibility of the race management team that everyone including the spectators are in their proper positions.
- It's advisable that the participants carry their own fuel.
- Driving off the track is strictly not allowed, taking shortcuts may lead to cancellation of the attempt.
- The number and/or duration of mains and heats may be altered due to weather conditions or time constraints.
- Intentionally driving the car out of track, where it may endanger the spectators will lead to disqualification.
- Taking reverse in competition is not allowed.
- Participants should report strictly one hour prior to the start of the event.
- Students should carry proof of identity issued by their institution.
- Judges and coordinators' decision will be final and binding to all.

BITS GOA GRAND PRIX (BURNOUT MAIN EVENT):

Round 1 - TIME TRIAL

Rules:

1. Two trials will be given to a participant. Best of two is selected.
2. Every time a cone is touched or the path is not followed a penalty of 0.5s is given which is added to the time taken by participant.
3. All the general rule applies.
4. For Any mechanical failure of the car one extra try will be given to the participant

Round 2 – BITS GOA GRAND PRIX RACE

Rules:

The number and/or duration of mains and heats may be altered due to weather conditions or time constraints.

All drivers are responsible for the actions of their pit crew.

It is the responsibility of the race director, race management, and track crew's team to insure that everyone, including spectators, are in the proper places and not in danger at any time.



Any of the following actions by a driver or his pit crew may result in disqualification from the event:

- Operating a car anywhere that endangers others.
- Drinking alcoholic beverages, use of illegal substances or showing evidence of being under the influence of an illegal substance in the race or pit area.
- Entering scoring areas or restricted areas without permission.
- Assaulting another individual.
- Using improper language or actions with directors, participants, or spectators
- Using improper language, yelling, or actions with corner marshals.
- Rough driving or intentional hacking.

Any driver who does not have complete control over his vehicle must immediately pull his car off the racing surface.

Any car that loses its body must pull off the track until a pit crew can secure the body back onto the car.

In case of a collision which results in the change of direction the driver responsible for the collision will be penalized with 50 points. The final decision on who the guilty person is would be decided by the Event Heads and Coordinators who would analyse the video evidence made at that point.

8. A pit area will be provided on the outside of the primary racing surface where repairs are allowed.

9. A driver's stand will be provided that gives all drivers an equal view of the track.

10. Turn marshals are not permitted to repair vehicles. Marshals will take disabled vehicles to the closest outer edge of the race track as soon as possible. When marshalling a vehicle, it should be returned to the point where it left the racing surface. Care must be exercised not to interfere with oncoming

vehicles. Only the designated marshals are permitted to handle vehicles on the racetrack during a race. No one else may enter the racetrack to repair or retrieve a vehicle.

11. A vehicle running on the track has the right of way over a vehicle that has become disabled.

12. Students should carry proof of identity issued by their institution.

Draws:

The sets will be decided on the bases of standings in time trials.

The sets will be as follows

- [1 5 9 13]- SET 1
- [2 6 10 14]- SET 2
- [3 7 11 15]- SET 3



iv. [4 8 12 16]- SET 4

The race for these sets will have 3 laps each. The standings of the above sets will then race against each other for e.g.

a) 1st position of all SETs will race against each other and so on

b) The race of these sets will have 5 laps each .

c) Point distribution for each race is:

1st - 150 2nd - 125 3rd - 100

DRAG RACE (BURNOUT STRAIGHT ROAD SPRINT EVENT):

Rules:

1. Participants should report strictly one hour prior to the start of the event.

2. Preparation time of forty-five minutes will be given before the start of the event.

3. The draws are to be announced thirty minutes prior to the start of the event.

4. No practice runs or trials of any sort for this event. Participants may warm up their cars on the

outside of the drag strip or in the run off areas.

5. Absolutely no rolling starts, cars will start the Drag from a standstill.

6. Any challenge or appeal with regard to any decision made by the organizing party will only

be entertained if submitted as a formal written document.

7. All drivers are responsible for the actions of their pit-crew/teammates.

8. Change of driver at any point during any event will result in a disqualification.

9. Change of RC car at any point during any event will result in a disqualification.

10. Any discrepancy or spot ruling that may be required to be made by the organizing party will be

done as they see fit, and their ruling is final and not subject to appeal.

11. A driver's stand will be provided that gives all drivers an equal view of the track.

12. Participants should carry proof of identity issued by their institution.

Draw:

1. Based on the standings of the Sprint the contestants will be arranged into sets of four from fastest to slowest times.

2. Each set of four participants will include four races in the following order:

i. 1st and 2nd place.

ii. 3rd and 4th place.

iii. Winner (i) and Winner (ii)

iv. Loser (i) and Loser (ii)



Points:

1. Points to be accorded for only one case out of three:

i. Winner: 25 points.

ii. Loser: 10 points.

iii. DNF: 0 points

Note :

- DNF stands for Did Not Finish
- Drag Race is Burnout's special STRAIGHT SPRINT race.



TRAILBLAZER

Trailblazers is an RC plane flying competition.

Rules:

1. Participants should report strictly one hour prior to the start of the event.
2. Each team can have a maximum of four members.
3. It is open for both students and professionals.
4. This competition will consist of 3 rounds.
 - Manoeuvres
 - Drag race
 - Stunts and passes
5. Participants have to bring a plane built from scratch and meeting the constraints mentioned for each round. Planes should be electrically powered. No other fuel is allowed.
6. No ready to assemble planes are allowed.
7. The arena provided will be an open field of approximately 50m radius.
8. Teams have to come up with a design which can perform better for all the rounds as no change of parts is allowed for different rounds.
9. Changes in schedule will be made depending on weather condition.
10. Any discrepancy or spot ruling that may be required to be made by the organizing party will be done as they see fit, and their ruling is final and not subject to appeal.

Round 1: Manoeuvres

This would be the first round of the competition. In this round, the plane will be tested according to the constraints mentioned below. The flyer has to fly the plane through a series of hoops, positioned to test his manoeuvre skills. Marking scheme The marking will be done on both the time taken and the total number of hoops passed successfully. For every successful pass the team gets 20 points and on finishing, an additional $\{ 1/(\text{time taken (mins)}) * 200 \}$ points will be given.

Additional Instructions

- The thrust to weight ratio of the plane should be 1:1 or less.
- It is not mandatory to cover every hoop; points will be awarded only for the successful passes.

Round 2 : Drag Race



The name itself says about the round. In this round every plane will have to cover a simple path in the minimum time possible. Points will be awarded according to the ranking in the race. There are no constraints except that the flyer has to use the same plane for all 3 rounds (changing wing is not allowed). The marking will be relative: 200 points for the 1st and 0 for last, on a linear basis.

Round 3 : Acrobatics.

- In this round, flyers will have to perform 3 - 4 acrobatic moves from a list of 6 pre-defined stunts. In this round, timeouts are allowed (optional) between each stunt performed. The flyer or his teammate has to intimate the event managers/judges before performing any stunt. Every successful stunt earns the team 75 points.
 - The list of stunts:
 - Cuban 8 :- 5/8s of a loop to the 45 degree line, 1/2 roll, 3/4s of a loop to the 45 degree line, 1/2 roll, 1/8s of a loop to level flight (half of the Cuban Eight is called a "half Cuban Eight", and the figure can be flown backwards, known as a "Reverse Cuban Eight").
 - Immelmann turn:- 1/2 looping up followed by half a roll. There should be no pause between the end of the looping section and the start of the roll to erect flight.
 - Bell tail side: - 1/4 looping up, straight vertical (full power) until the aircraft loses momentum. The aircraft falls backwards, tail first, until the nose drops through the horizon to a vertical down position. 1/4 loop (push or pull) to recover to level flight.
 - Stall turn or hammerhead:- 1/4 loop (pull or push) to vertical, as momentum/airspeed decreases, rudder is applied and the aircraft rotates around its yaw axis, the nose falls through the horizon and points towards the ground, a momentary pause is made to draw the vertical down line, and 1/4 loop to level flight. This figure is sometimes called a stall turn which is a misnomer because the aircraft never actually stalls.
 - Split S:- Essentially an Immelmann in reverse. Half roll (from erect to inverted) followed by positive pitch to give a half loop. Converts altitude to airspeed, and reverses direction.
- Rolling loop :- involves 3 roll in a inner or outer loop 1 before start next in mid of loop (bottom or top of loop) and third immediately at the end of loop



MORTARKOMBAT

Task:

Design and build a spud gun. Use it to compete in different challenges, adhering to the rules and regulations of the game.

Model Specifications and Rules:

1. You may use a spud gun made of PVC, built from scratch by your team and bring it during the event.
2. Use of metallic pipes are prohibited.
3. Your gun should work using electric sparks for ignition of the gas chamber.
4. You should not use LPG, CNG, vaporized fossil fuels for aiding the ignition of gas chamber. Deodorant and perfumes are allowed.
5. Your gun should use paper, potato, or clothes only as ammo.
6. Decide the dimensions of your spud gun keeping in mind the arena and rules of various rounds
7. Your team must consist of maximum 5 members.
8. Maximum length of the spud gun should be 3 meters
9. For all rounds, a line will be marked on the arena, behind which the team members have to stand while shooting the target(s).
10. Participants should report strictly one hour prior to the start of the event.
11. Participants should carry proof of identity issued by their institution.
12. Any discrepancy or spot ruling that may be required to be made by the organizing party will be done as they see fit, and their ruling is final and not subject to appeal.

Event Structure:

1. The event consists of three rounds. Teams qualifying in a round will progress to subsequent rounds.
2. The rounds have been designed to accommodate every aspect needed to build a spud gun like design and accuracy.

Round 1:

Objective: Shoot a stationary target above the ground.

Task:

- i) Use the spud gun designed by your team to shoot a target kept at a height of about 10 meters above the ground.



- ii) The target will be a square with concentric circles on it.
- iii) Hitting the innermost circle will fetch most points and the outermost carries the least.
- iv) Not hitting the target will get zero points.

Maximum number of shots - 3 Time limit – 2 minutes per shot

Points:

- i) Point for this round will be given based on your accuracy.
- ii) Innermost circle: 100 points
- iii) Middle circle: 70 points
- iv) Outermost Circle: 50 points
- v) Outside all circles, but within the square: 30 points.
- vi) Hitting the circumference of any circle will fetch the points for the outer one.
- vii) Points achieved from each shot will be added to the total points.

Round 2:

Objective: Shoot the targets kept on the ground at different levels. Points vary from target to target.

Task:

1. The targets will be arranged in three levels in the form of an equilateral triangle with the apex facing away from you.
2. Farther the target, more the points.
3. Targets along the same level will have the same points.
4. There are no restrictions on the number of shots in this round. The teams can shoot as many times they need in the prescribed time limit. Time limit – 6 minutes.

Points:

- i) First level carry 50 points
- ii) Second level carry 100 points
- iii) Third level carry 200 points.
- iv) Points achieved from each shot will be added to the total points.

Round 3:

Objective: Shoot a moving target suspended from a height.

Task :

1. Use the spud gun designed by your team to shoot a target suspended from a height of about 10 meters above the ground.
2. The target will have concentric circles on it.
3. Hitting the innermost circle will fetch most points and the outermost carries the least.
4. Not hitting the target will get zero points. Maximum number of shots - 3 Time limit- 2 minutes per shot



SEARCH & RESCUE

Design a wireless remote controlled flying platform to carry and drop a medical kit for trapped refugees in a disaster affected area through an obstracle course in minimum time without crashing

Rules of the event will be available on 23rd November 2018 at: <http://bits-quark.org/Quark-2019/index.html>



Roboficial

Robowars
Line Following Bot
Robosoccer
Roborace
Robo Clench



ROBOWARS

One of the Flagship event of Quark'19 where two powerful bots will battle against each other to achieve the ultimate glory

Categories :

1. 15 Kg.
2. 30 Kg.

PROBLEM STATEMENT (15 Kg)

Task:

Design and construct a wireless remote-controlled robot capable of fighting one on one in 15Kg category Fighting Robots Competition.

RULEBOOK:

1. General

1.1 Participation: All participants build and operate Robots at their own risk. Fighting Robots is inherently dangerous. There is no amount of regulation that can encompass all of the dangers involved. Please take care not to hurt yourself or others when building, testing and competing. Compliance with all event rules and competition regulations is mandatory. It is expected that competitors stay within the rules and procedures of their own accord and do not require constant policing.

1.2 Loopholes: If you have a robot or weapon design that does not fit within the categories set forth in these rules or is in some way ambiguous or borderline, please contact the coordinators. Safe innovation is always encouraged, but surprising the event staff with your brilliant exploitation of a loophole may cause



your robot to be disqualified before it ever competes.

1.3 Safety Inspections: Each event has safety inspections known as Tech checks. It is at the coordinator's sole discretion that your Robot is allowed to compete. As a builder, you are obligated to disclose all operating principles and potential dangers to the coordinators.

1.4 Activation: Robots must only be activated in the arena, testing areas, or with the expressed consent of the event organizer and the safety officials. All activation and de-activation of robots must be completed from outside the arena barrier or within specially designated areas. You must never enter the arena with live robots without the express permission and supervision of the event .

1.5 Power Tools: It is expected that builders will follow all basic safety practices such as shoes, gloves, and goggles when operating any machinery. The use of welders, grinders and other equipment that may produce smoke, debris or other harmful substances is only permitted in dedicated workshop areas. Please take care of yourself and others around you.

1.6 Discipline: It is expected that all participants are disciplined and show good behavior towards other participants, judges, and coordinators. Strict actions will be taken on participants not abiding the rules; which may also lead to disqualification of the team.

2. Technical Details:

2.1 Weight limit:

The maximum weight of the COMBOT should not exceed 15 KG.

If a COMBOT using interchangeable panels or weapons, the weight is measured



with the heaviest set-up in place. External controlling device, wires and batteries will not be considered for weight.

2.2-Dimensional limit:

The COMBOT should fit in a box of 1000mm X 1000mm X 1000mm (l X B X h) at any given point of the match. The external controlling device like wires and remote control will not be considered for dimensions.

2.3 Mobility:

All Robots must have (easily visible mobility) in order to compete. Methods of mobility include

1. Rolling on wheels or the whole robot rolling.
2. Walking such as linear actuator operated legs.
3. Shuffling mechanisms such as rotational cam operated legs.
4. Ground effect air cushions such as a hovercraft.
5. Jumping, hopping or flying robots are not allowed.

2.4 Robot Control Requirement:

1. The robot should be controlled using a remote controller and should be completely wireless.
2. It is necessary to have binding capability between transmitters and receivers. The team must have at least four frequency wireless remote control circuit or two dual control circuits which may be interchanged before the start of the match to avoid frequency interference with other teams. In case of any interference in the wireless systems, there will not be any rematch or stoppage.
3. The team should pair up the wireless remote with the machine before putting it into the arena. Nonstandard or self-made remote-control systems must first be approved by the organizers. Remote control systems from toys might be



used. Remote control systems available in the market may also be used.

4. All robots should be having failsafe for the radio.

2.5 Weapon system:

The robots can have any kind of weapon system i.e. wedge; spinners; flippers; cutters; lifters; etc.; except for following:

1. Weapons causing invisible or internal damage like Radio jamming, tazers, tesla coils, or any other high-voltage device
2. Any kind of Tethered or un-tethered projectiles and hammer or thwack bots are not allowed.
3. Flame based and inflammable liquid-based weapons and lasers are not allowed.
5. Weapons used for entangling other bots like nets, cables, glue etc. not allowed. In case used entangler will be disqualified.

6. Any kind of explosive or intentionally ignited solid or potentially ignitable solid.

7. Usage of IC engines, pneumatic & Hydraulic powered devices is not allowed.

*Care should be taken that no weapon causes any sort of intentional damage to the arena; if seen intentionally damaging the arena may lead to disqualification.

2.6 Battery & Power:

The machine can be powered electrically only. Use of an IC engine in any form is not allowed.

1. Onboard Batteries must be adequately protected within the body shell and securely fixed to minimize the chance of being punctured or coming loose during combat; which will be checked in technical inspection.
2. The electrical voltage at any point in time in the machine should not exceed 30V DC. Robots using higher voltage will not be allowed to play the match.
3. 230 V AC source will be provided; for charging of the batteries after the match.
4. All wiring and terminals must be of a suitable size and secured to prevent chaffing and shorting. All terminals should be covered to minimize the risk of



electrical shorts. Failure to do so will cause direct disqualification. (Also checked in technical inspection)

3. TEAM SPECIFICATION:

Any team can participate in Robowars. A team may consist of a maximum of 5 participants. The participation is open to all.

Team Name: Every team must have a name which must be unique. Organizers must be notified during if a Team's name has been changed.

Team Representative: Each team must specify their Team Representative (Leader) at the time of registration on the website. All important communications between organizers and the registered teams will be done through their Team Representative. The Team Representatives must submit valid contact details (phone no., email ID etc.) at the time of registration.

CERTIFICATION POLICY:

Certificate of Excellence will be given to all the winners. Certificate of participation will be given to all the participants. The teams which get disqualified due to disobeying any of the competition rules will not be considered for the certificate.

*It is Mandatory to wear Shoes by each and every team member for the purpose of safety. Care should be taken while handling the bots. Any kind of causality should be reported quickly to the organizer so that first-Aid can be given immediately. Members without shoes will not be allowed to enter the arena nor allowed to stand near the control station.



4. ROUNDS

4.1 TECHNICAL INSPECTION:

In this coordinator will check the robot for all technical rules as stated above and will PASS the robot if all the rules are abided if robot fails to do so, necessary changes have to be done in order to participate in the robot else may lead to disqualification. (All rules under section 2 should be abided).

4.2 MATCH & GAMEPLAY:

1. All matches will be deathmatch of 3 minutes. Only 3 participants will be allowed to stay near the control station.
2. No Hand touches will be allowed in between the match; and the match won't be stopped unless two Combots are stuck to each other and hence immobile, in such case Combots will be separated by safest means and the match will be continued for remaining time and position of the robots will be maintained.
3. A robot will be declared victorious on the basis of criteria stated in section 4.4 and will be decided by the Judges. The decision of the Judges will be considered final and no team can object or quarrel on the decision, failure to do so may cause disqualification.
4. All robots will be given at least 30minutes of the break after each match. Time is calculated from the time the robot leaves the arena. If the robot fails to return to the arena when called after the allotted time; the robot may be forced to forfeit.

4.3 Criteria for Victory

1. A robot is declared victorious by knockout if its opponent is immobilized or thrown outside the playing area.
2. A robot will be declared immobile if it cannot display linear motion of at least



one inch in a time period of 15 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 case both the robots remain mobile after the end of the round then the winner will be decided subjectively by the judges.

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. Robots cannot win by pinning or lifting their opponents. Organizers will allow pinning or lifting for a maximum of 10 seconds per pin 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 does not, their robot may be disqualified. If robots become entangled due to a crushing or gripping or any other weapon is employed and becomes trapped within another robot, then the competitors should make the timekeeper aware, the fight should be stopped and the robots separated by the safest means.

5. Points will be given on the basis of aggression, damage, control, and strategy.

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 Aggression.

Control – Control means a robot is able to attack an opponent at its weakest point, use its weapons in the most effective way, and minimize the damage caused by the opponent or its weapons.

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 rapidly spinning device on a robot fragments, any damage to the opponent will not be considered "deliberate".



Strategy – The robot exhibits a combat plan that exploits the robot's strengths against the weaknesses of its opponent. The strategy is also defined as a robot exhibiting a deliberate defense plan that guards its weaknesses against the strengths of the opponent.

6. In case the match is stopped by a participant due to malfunctioning of combat, the stoppage will be considered as a forfeit from the match and opponent will be declared victorious.

4.5 Event specific Terminologies

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

Disqualification – A Robot is no longer permitted to compete in the current Robowars Tournament.

Immobilized – In Judge's opinion, a robot is not responsive for a specified period of time.

Knockout – Occurs when the attack or deliberate actions of one robot causes its opponent to become immobilized or thrown outside the playing arena.

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

No Contact – Occurs when neither robot makes contact with each other for a specified period of time.

Pinning – Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilize it.

Radio Interference – Refers to the situation where at least one robot becomes non-Responsive or non-controllable due to the effect of the other robot's remote-control signal.

Non-Responsive – In a Referee's opinion, the robot cannot display some kind of controlled translational movement along the Arena floor.



Restart – Occurs after a Fault or a Timeout has been declared and the competing robots are ready to continue.

Stuck – A robot is hung-up on a part of the Arena, an Arena Hazard or an opponent, such that it is effectively non-responsive.

Tap-Out – Occurs when a Robot's Operators decide that they no longer want to continue the Match, and concede the win to the opposing Team.

Technical Knockout – Occurs when a robot wins due to immobilization of its opponent even though, in the Judges' opinion, no action of the winning robot caused the opponent's immobilization.

Timeout – A temporary halting of a Match. Timeouts are usually called to separate robots but can be called for other reasons as well.

PROBLEM STATEMENT (30 Kg)

Task:

Design and construct a remote-controlled robot (wired or wireless) capable of fighting one on one in 30Kg category Fighting Robots Competition.

RULEBOOK:

1. General

1.1 Participation: All participants build and operate Robots at their own risk. Fighting Robots is inherently dangerous. There is no amount of regulation that can encompass all of the dangers involved. Please take care not to hurt yourself or others when building, testing and competing. Compliance with all event rules and competition regulations is mandatory. It is expected that competitors stay within the rules and procedures of their own accord and do not require constant policing.

1.2 Loopholes: If you have a robot or weapon design that does not fit within the categories set forth in these rules or is in some way ambiguous or borderline, please contact the coordinators. Safe innovation is always encouraged, but



surprising the event staff with your brilliant exploitation of a loophole may cause your robot to be disqualified before it ever competes.

1.3 Safety Inspections: Each event has safety inspections known as Tech checks. It is at the coordinators sole discretion that your Robot is allowed to compete. As a builder, you are obligated to disclose all operating principles and potential dangers to the coordinators.

1.4 Activation: Robots must only be activated in the arena, testing areas, or with the expressed consent of the event and the safety officials. All activation and de-activation of robots must be completed from outside the arena barrier or within specially designated areas. You must never enter the arena with live robots without the express permission and supervision of the event organizer.

1.5 Power Tools: It is expected that builders will follow all basic safety practices such as shoes, gloves, and goggles when operating any machinery. The use of welders, grinders and other equipment that may produce smoke, debris or other harmful substances is only permitted in dedicated workshop areas. Please take care of yourself and others around you.

1.6 Discipline: It is expected that all participants are disciplined and show good behavior towards other participants, judges, and coordinators. Strict actions will be taken on participants not abiding the rules; which may also lead to disqualification of the team.

2. Technical Details:

2.1 Weight limit:

The maximum weight of the COMBOT should not exceed 30kg.

If a COMBOT using interchangeable panels or weapons, the weight is measured with the heaviest set-up in place. The external controlling device, wires, and batteries will not be considered for weight.



2.2-Dimensional limit:

The COMBOT should fit in a box of 1000mm X 1000mm X 1000mm (l X B X h) at any given point of the match. The external controlling device like wires and remote control will not be considered for dimensions.

2.3 Mobility:

All Robots must have (easily visible mobility) in order to compete. Methods of mobility include

1. Rolling on wheels or the whole robot rolling.
2. Walking such as linear actuator operated legs.
3. Shuffling mechanisms such as rotational cam operated legs.
4. Ground effect air cushions such as a hovercraft.
5. Jumping, hopping or flying robots are not allowed.

2.4 Robot Control Requirement:

1. The robot should be controlled using a remote controller wired or wireless method & batteries can be on-board or outside.
2. In the case of a wireless robot, it is necessary to have binding capability between transmitters and receivers. The team must have at least four frequency wireless remote control circuit or two dual control circuits which may be interchanged before the start of the match to avoid frequency interference with other teams. The case of any interference in the wireless systems will not be considered for rematch or results.
3. The team should pair up the wireless remote with the machine before putting it into the arena. Nonstandard or self-made remote-control systems must first be approved by the organizers. Remote control systems from toys might be used. Remote control systems available in the market may also be used.
4. In the case of wired robots, the wires should be at least 10-meter-long between the combat and remote-control so that robot can reach all areas of the arena. (Wire Length < 10 meters will not be allowed to play). It's advisable to have at least 12 meters of wire length.



5. Wired robots are recommended protect their wires with a pipe or any other protection up to 1 meter of wire length at least to prevent from getting damaged. The wire handler should be aware that the wires do not get stuck in other robots' weapon; also, should not use wires to control the movement of the robot.

6. All robots should be having an emergency cut off switch (in case of wired) and failsafe for radio in case of wireless.

2.5 Weapon system:

The robots can have any kind of weapon system i.e. spinners; flippers; cutters; lifters; etc.; except for following:

1. Weapons causing invisible or internal damage like Radio jamming, tazers, tesla coils, or any other high-voltage device
 2. Any kind of Tethered or un-tethered projectiles and hammer or thwack bots are not allowed.
 3. Flame based and inflammable liquid-based weapons and lasers are not allowed.
 4. Weapon for intentional cutting of wires. (Robots not clearing point 4 & 5; in section 2.4 are not eligible to appeal if wires get cut. It will be cleared during the technical inspection by the coordinators.)
 5. Weapons used for entangling other bots like nets, cables, glue etc. not allowed. In case used entangler will be disqualified.
 6. Any kind of explosive or intentionally ignited solid or potentially ignitable solid.
 7. Usage of IC engines, pneumatic & Hydraulic powered devices is not allowed.
- *Care should be taken that no weapon causes any sort of intentional damage to the arena; if seen intentionally damaging the arena may lead to disqualification.

2.6 Battery & Power:

The machine can be powered electrically only. Use of an IC engine in any form is not allowed.

1. Onboard Batteries must be adequately protected within the body shell and securely fixed to minimize the chance of being punctured or coming loose during combat; which will be checked in technical inspection.



2. The electrical voltage at any point in time in the machine should not exceed 30V DC. Robots using higher voltage will not be allowed to play the match.
3. 230 volt AC source will be provided; Teams have to bring their own battery eliminators.
4. All wiring and terminals must be of a suitable size and secured to prevent chafing and shorting. All terminals should be covered to minimize the risk of electrical shorts. Failure to do so will cause direct disqualification. (Also checked in technical inspection)

Exceptional rules for wired Combots:

Wired robots will be allowed to connect only 2 batteries per match and will not be allowed to inter-change any batteries between the match, hence only 2 batteries will be allowed in the control station. Also, it is necessary to define switch for controlling each system (drive, weapon); and no participant should hinder with circuit other than the switches, controlling the system during the match. Only, in case of failure in the circuit, batteries may be immediately disconnected; However, reconnecting is prohibited.

3. TEAM SPECIFICATION:

Any team can participate in Robowars. A team may consist of a maximum of 5 participants. The participation is open to all.

Team Name: Every team must have a name which must be unique. Organizers must be notified during if a Team's name has been changed.

Team Representative: Each team must specify their Team Representative (Leader) at the time of registration on the website. All important communications between organizers and the registered teams will be done through their Team Representative. The Team Representatives must submit valid contact details (phone no., email ID etc.) at the time of registration.

CERTIFICATION POLICY:

Certificate of Excellence will be given to all the winners. Certificate of participation will be given to all the participants. The teams which get disqualified



due to disobeying any of the competition rules will not be considered for the certificate.

*It is Mandatory to wear Shoes by each and every team member for the purpose of safety. Care should be taken while handling the bots. Any kind of causality should be reported quickly to the organizer so that first-Aid can be given immediately. Members without shoes will not be allowed to enter the arena nor allowed to stand near the control station.

4. ROUNDS

4.1 TECHNICAL INSPECTION:

In this coordinator will check the robot for all technical rules as stated above and will PASS the robot if all the rules are abided, If the robot fails to do so, necessary changes have to be done in order to participate in the robot else may lead to disqualification. (All rules under section 2 should be abided).

4.2 MATCH & GAMEPLAY:

1. All matches will be deathmatch of 3 minutes. Only 3 participants will be allowed to stay near the control station.
2. No Hand touches will be allowed in between the match, and the match won't be stopped unless wires are entangled or any emergency case. If the match is stopped, the match will be continued for remaining time and position of the robots will be maintained.
3. A robot will be declared victorious on the basis of criteria stated in section 4.4 and will be decided by three professional Judges. The decision of the Judges will be considered final and no team can object or quarrel on the decision, failure to do so may cause disqualification.
4. All robots will be given at least 30minutes of the break after each match. Time is calculated from the time the robot leaves the arena. If the robot fails to return to the arena when called after the allotted time; the robot may be forced to forfeit.



4.3 Criteria for Victory

1. A robot is declared victorious by knockout if its opponent is immobilized or thrown outside the playing area.
2. A robot will be declared immobile if it cannot display linear motion of at least one inch in a time period of 15 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 case both the robots remain mobile after the end of the round then 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. Robots cannot win by pinning or lifting their opponents. Organizers will allow pinning or lifting for a maximum of 10 seconds per pin 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 does not, their robot may be disqualified. If robots become entangled due to wires or a crushing or gripping weapon is employed and becomes trapped within another robot, then the competitors should make the timekeeper aware, the fight should be stopped and the robots separated by the safest means. (NOTE- wires should not be taught at any point of time; teams doing same will be disqualified).
5. Points will be given on the basis of aggression, damage, control, and strategy.
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 Aggression.

Control – Control means a robot is able to attack an opponent at its weakest point, use its weapons in the most effective way, and minimize the damage caused by the opponent or its weapons.



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 rapidly spinning device on a robot fragments, any damage to the opponent will not be considered “deliberate”.

Strategy – The robot exhibits a combat plan that exploits the robot's strengths against the weaknesses of its opponent. The strategy is also defined as a robot exhibiting a deliberate defense plan that guards its weaknesses against the strengths of the opponent.

6. In case the match is stopped by a participant due to malfunctioning of combat, the stoppage will be considered as a forfeit from the match and opponent will be declared victorious.

4.5 Event specific Terminologies

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

Disqualification – A Robot is no longer permitted to compete in the current Robowars Tournament.

Immobilized – In Judge's opinion, a robot is not responsive for a specified period of time.

Knockout – Occurs when the attack or deliberate actions of one robot causes its opponent to become immobilized or thrown outside the playing arena.

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



No Contact – Occurs when neither robot makes contact with each other for a specified period of time.

Pinning – Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilize it.

Radio Interference – Refers to the situation where at least one robot becomes non-Responsive or non-controllable due to the effect of the other robot's remote-control signal.

Non-Responsive – In a Referee's opinion, the robot cannot display some kind of controlled translational movement along the Arena floor.

Restart – Occurs after a Fault or a Timeout has been declared and the competing robots are ready to continue.

Stuck – A robot is hung-up on a part of the Arena, an Arena Hazard or an opponent, such that it is effectively non-responsive.

Tap-Out – Occurs when a Robot's Operators decide that they no longer want to continue the Match, and concede the win to the opposing Team.

Technical Knockout – Occurs when a robot wins due to immobilization of its opponent even though, in the Judges' opinion, no action of the winning robot caused the opponent's immobilization.

Timeout – A temporary halting of a Match. Timeouts are usually called to separate robots but can be called for other reasons as well.



LINE FOLLOWING BOT

Problem Statement

An autonomous robot has to follow black lines on a white background and reach from starting line to finishing line as soon as possible. Robot must be able to detect particular line and keep following it.

Game Play

Robots will be placed at starting point and time will be recorded until it reaches finish line. Each team will be given two trials in each round.

A robot must restart if:

- The robot does not start after pressing the Start Button for 1 minute.
- A human touches the robot.
- The robot moves off the field.
- The referee orders to restart.

There is no limit for the number of restarts within the TRIAL period. Time limits, scoring and penalties rules will be announced on the day of event.

Robot

- The following size limitations apply for each robot

Width – 200mm max

Length – 200mm max

Height – no limit

- The robot cannot have potential more than 12V between any two points.
- The robot must be controlled autonomously with no human aid.
- The robot must be started manually with a start button.
- The robot can be powered by a power source such as a battery fixed on the robot or by a stationary power source connected to the robot by a cord.
- Participants should keep spare batteries otherwise; it may lead to disqualification if bot is not ready or stops in trial.

Arena

- The arena is made up of white colored flex sheet with black colored lines on it.
- There will be one START point and one FINISH point in the entire arena.
- The thickness of the lines will be 30mm.
- The course line may have acute, obtuse and right angles, curves.



- The course line may also have discontinuities at various points.

Rules & Regulations

- A team can have maximum of 3 members.
 - Before each game begins, the participants should clearly describe how their robot detects the obstacles and indicates at the checkpoint.
 - Between trials, participants may not feed information about the arena to the machine. However, participants are allowed to: Adjust sensors (Gain, Position etc.), Change speed settings and Make repairs. However, a participant may not alter a machine in a manner that alters its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed). The judges shall arbitrate.
- One team member is elected as the robot handler. Only that team member is permitted to handle the robot during the game. All other team members must remain outside the game zone.
- Participants who misbehave may be asked to leave the competition area and risk being disqualified from the contest.
 - Robots or participants that cause deliberate interference with other robots or damage to the arena will be disqualified.
 - All decisions about scoring, game play and timing made by the Organizing Committee are final. Teams should completely respect their vote and decisions.



ROBO RACE

Problem Statement

A manually controlled robot wired or wireless has to traverse through the track full of turns and obstacles in minimum possible time.

Game Play

- The robot will be placed at start line.
- The robot can start the lap when timer starts.
- The robot should remain on track, otherwise it has to start from last checkpoint crossed though timer will not be stopped.
- There are penalties for each obstacle skipped. Penalties will be added to total time.
- Timer will stop as soon as robot crosses finish line.
- Scoring and penalties rules will be announced on the day of event.

Robot

- The machine can be wired/wireless.
- The machine must not be made from Lego parts, or any ready-made assembly kits, and it must be powered electrically, use of IC engine is not allowed.
- The robot can be powered by a power source such as a battery fixed on the robot or by a stationary power source connected to the robot by a cord.
- Potential between any two points on the robot should not exceed 12 V.
- Participants should keep spare batteries otherwise; it may lead to disqualification if bot is not ready or stops in between the race.
- The length of the wire (for wired bots) should be long enough to cover the whole arena and wire should remain slack during the complete race.

Details about the dimensions of the machine and the dimensions of the obstacles in the path will be available at bits-quark.org/Quark-2019/index.html from 23rd November 2018

3D Models are available in the same website

Race Track

- There will be only one Start and one Finish line.
- The track surface and course line may have unevenness.
- There will be certain obstacles in the racetrack, which will try to slow down the robot.



- The design and size of the track may vary from that shown in the pictures.
- Track may consist of bridges, speed breakers, marble pit, slippery path, rotating disc, curve ramp down, seesaw etc.

Rules & Regulations

- A team can have maximum of 3 members.
- One team member is elected as the robot handler. Only that team member is permitted to control the robot during the game. All other team members must remain outside the game zone.
- Participants who misbehave may be asked to leave the competition area and risk being disqualified from the contest.
- Robots or participants that cause deliberate interference with other robots or damage to the arena will be disqualified.
- All decisions about scoring, Game Play and timing, participation made by the Organizing Committee are final. Teams should completely respect their vote and decisions.



ROBOSOCCER

Problem Statement

A manually controlled robot wired or wireless has to push ball in opposite team's goal post and also it has to prevent opposite team from pushing ball in our goal post. Robots can have kicking mechanisms.

Game Play

- This is a 1 on 1 type game.
- The balls used will be 3-inch smiley balls.
- Robots will be placed in different halves of the arena with ball in center of arena.
- Each team will try to score goal by pushing the ball.
- Team with more number of goals will win the match.
- If ball goes out of arena it will be placed in center and match will be resumed.
- In case of a tie, 3 penalties would be taken by each team.
- Match duration will be announced on the day of event.

Robot

- The following size limitations apply for each robot including whatever kick mechanisms the bot have
 - o Width – 250mm max
 - o Length – 250mm max
 - o Height – 250mm max
- The robot cannot have potential more than 12V between any two points.
- The external device, which is used to control the machine, is not included in the size constraint.
- The machine can be wired/wireless.
- The machine must not be made from Lego parts, or any ready-made assembly kits, however participants are allowed to use their own creativity for the kick mechanism.
- The robot can be powered by a power source such as a battery fixed on the robot or by a stationary power source connected to the robot by a cord.
- Participants should keep spare batteries otherwise; it may lead to disqualification if bot is not ready or stops in between the match.
- The length of the wire (for wired bots) should be long enough to cover the whole arena and wire should remain slack during the complete game.



Arena

- The arena is made up of wooden ply of dimensions 8 feet in length and 4 feet in 4 widths.
- The arena has 15 cm wide goal post on either sides.
- The arena is bounded from all sides.

Rules & Regulations

- A team can have maximum of 3 members.
- One team member is elected as the robot handler. Only that team member is permitted to control the robot during the game. All other team members must remain outside the game zone.
- Participants who misbehave may be asked to leave the competition area and risk being disqualified from the contest.
- Robots or participants that cause deliberate interference with other robots or damage to the arena will be disqualified.
- All decisions about scoring, Game Play and timing, participation made by the Organizing Committee are final. Teams should completely respect their vote and decisions.



ROBOCLENCH

TASK

- Teams have to build a remote controlled robot which can perform simple task of clenching objects. The bot has to put these objects in strategic places to complete the obstacle course.
- The bots can be wired or wireless. The wired bots should have a cable of length 2m at least so that the cables are in slack position at all times.

ARENA

- The outer dimensions of the arena are 3650mm X 3650mm.
- Dimensions of square thermocol blocks are 100mm X 100mm. There are 5 block in total.
- The first two bridges have an inclination of 30 degrees , the last bridge has an inclination of 45 degrees..
- The standing space on the bridge is 250mm.
- The width of the track is 450mm.

GAMEPLAY

- The bot has to begin from the START point.
- The bot has to pick up the block A1, climb up the incline and put the block in the hole to complete the bridge.
- Then, the bot has to knockout the support that is elevating the second bridge to cross the second bridge.
- The bot has to pick up and place blocks A3 and A4 strategically in order to cross the third bridge.
- The bot has to pick up block A5 and place it inside the catapult (B5).
- The bot has to pick up block A6 which has a knife attached to it and start cutting the thread to release the block which will eventually hit the target. This is the end of the competition.

JUDGING

- 10 points for clenching block A1.
- 15 points for putting the block in the hole to complete the first bridge.
- 5 points for clearing the first bridge.
- 10 points for knocking out the support to the 2 nd bridge.
- 5 points for crossing the 2 nd bridge.
- 10 points for clenching each of blocks A3 and A4.
- 15 points for putting the block A3 and A4 in its place, to complete the third bridge.
- 5 points for crossing the third bridge.
- 10 points for clenching block A5.



Catapult



Fulcrum



Bridge



Fulcrum



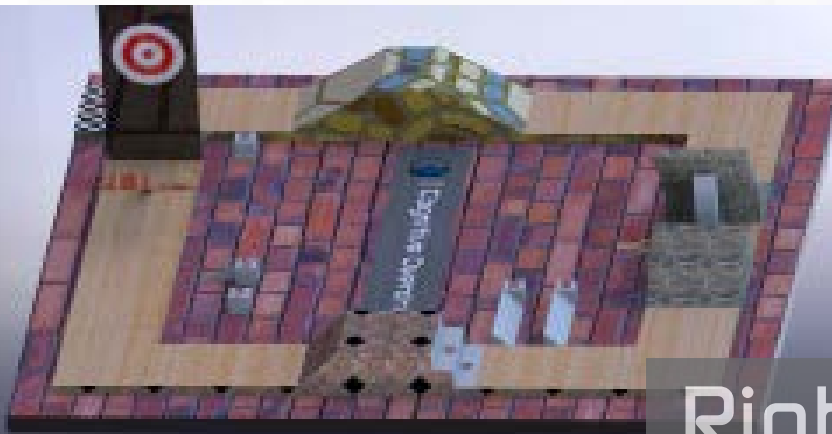
Stairs



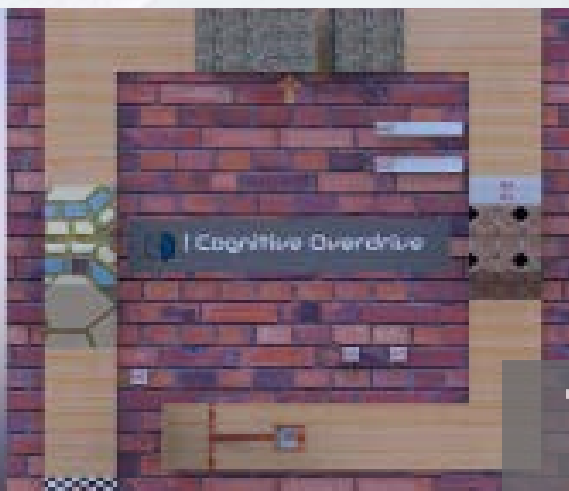
Target



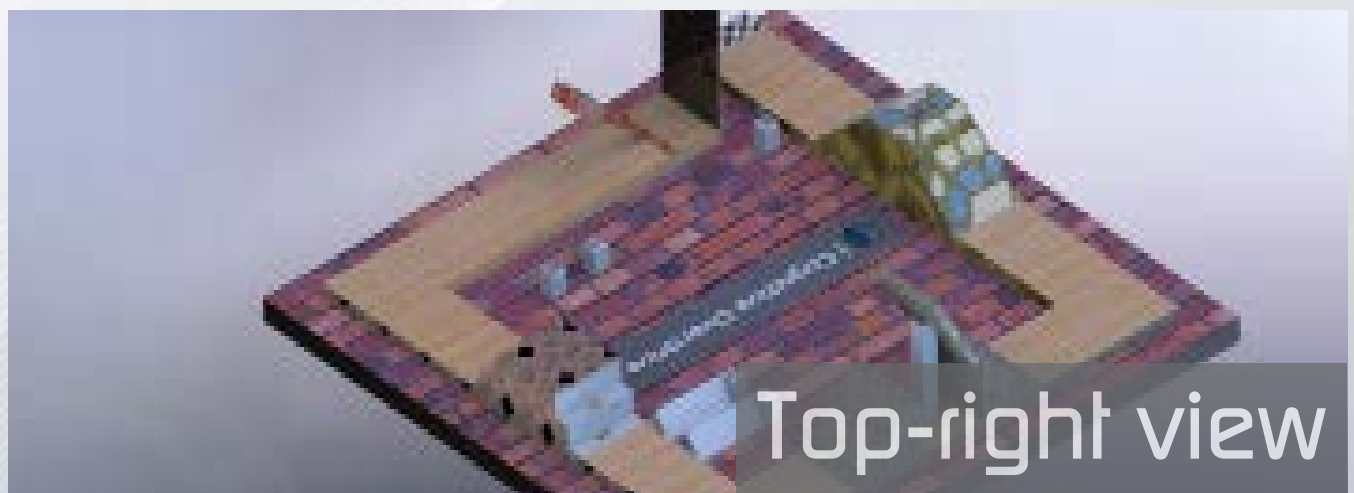
Left view



Right view



Top view





- 10 points for putting block A5 in the catapult B5.
- 10 points for clenching block A6.
- 15 points to cutting the thread to hit the target.
-

PENALTY

- Touching the bot/the wire attached to the bot at any time to help it clear an obstacle will lead to a penalty of 10 points.
- There will be a reset penalty of 10 points.
-

BOT SPECIFICATION

- The dimension of the bot should be less than or equal to 300mm X 200mm X 300mm (lxbxh).
- Failing which the team will be disqualified from the competition. The bot can however extend its dimension once the run starts. An error of (+5%/-5%) is Permitted.
- The bot must be controlled manually.
- Teams can use both wired as well as wireless control mechanisms. In case of wired bots, the length of wire should be minimum 2 meters so that the wire remains slack at any instant of time.
- Participants are not supposed to use any readymade Lego components or readymade-gripping mechanism. However, the participants are allowed to use readymade gearassemblies.
- Only one person will be allowed to control the bot.
- Failing to meet any of the above specifications will lead to immediate disqualification.

GAME RULES

- Only one team member is allowed to handle the bot. No other team member is allowed to enter the arena.
- The bot will be liable for disqualification if it causes any kind of damage to the arena.
- The bot is not allowed to Slide the blocks against the ground except for fine adjustments in the Deposit Zone.
- Any damage done to the blocks will lead to immediate disqualification.
- In case of any disputes/discrepancies, the organizer's decision will be final and binding.
- The organizers reserve the rights to change any or all of the above rules as they deem fit.
- Change in rules, if any will be highlighted on the website and notified to the registered-teams.



2019
quark
COGNITIVE OVERDRIVE

Electrify

μ C Mania
Digilogica



μC MANIA

The most favorite event μC MANIA is now Microcontrollers open, and as the name implies, we're open to any microcontroller you are comfortable with. So come and take part in this unique event and get to know more about your little friend.

Round 1

In this round participants will be tested on how well they apply their basic electronics knowledge and logical reasoning in Arduino related problems. There will be a time constraint for this round.

Round 2

Selected teams from the first round will be further tested on their skills. This round will contain complicated questions which may need making small algorithms and complicated connections.

Again, teams are required to complete the tasks within a given time limit.

Rules of participation:

- Each team can have a maximum of 2 members.
- Each team should have the microcontroller board they are comfortable with, be it Arduino, TI's MSP430 MCU series, 8051 development board etc. and a laptop with required software for programming the board.
- Questions will be same for all the teams even if they are using different boards.
- Any other hardware components and datasheets required will be provided.
- Participants may use the internet in round one.
- Participants may use any type of offline documentation for their reference.
- Any violation of rules or mishandling of equipment will lead to disqualification.
- Marks will be given on the basis of final outputs of each subpart (if any) of the question and no help while debugging will be given.
- The decision of the jury is FINAL and no further excuses will be entertained.



Digilogica

Do you think that Digital Design is just a boring course just about gates and logic? Well, you're in for a huge surprise! Welcome to the vast world of digital logic! Get ready to go beyond with counters, multiplexers, flip-flops, encoders, decoders and much more and be prepared to be challenged at a whole new level!

General Rules

- Each team shall consist of a maximum of 3 participants.
- Any sort of malpractice or mishandling of equipment will lead to immediate disqualification.
- The decision of the jury is final and is to be abided by in any case.
- The above rules and judging criteria are subject to change based on the jurisdiction of the Event Managers.

Round 0

- A Pre-Quark Wild Card event, which gives the winners direct entry to the second round. You think it'll be easy? Brace yourself, Winter is Coming! Get ready for December, which will challenge you to a quick mock-compre, which will be a surprise event. So be prepared for any format, be it a Quiz where the top two teams qualify for Round 2, or, a round of Digital Circuit Designing to your Wild Card ticket to Round 2. The conventional way (Round 1) or this way, the Choice is Yours!
- Beat others to be among the Top 2 teams, to qualify for Round 2.
- Series of challenging surprises await you!
- The judgment will be based on Perfection and Accuracy and will be easy to conquer. So expect high cut-offs!

Round 1

- A rapid series of mind puzzling MCQs with sand trickling down the hourglass. How many of these basic digital electronics questions can you answer in the given time?
- Teams would be short-listed for the next round based on the quiz score.
- In case of a tie, the completion time will be taken into account.
- This round is to be attempted online from any location convenient for the team.
- The questions are of variable weightage, and negative marking would be there.

Round 2



- Teams will have to design a combinational/sequential circuit as the solution to the given problem. A hardware implementation of the design has to be done on the breadboard using the components provided. Datasheets and pin diagrams will be provided if necessary.
- Correctness and efficiency of the design will be considered.
- Final and intermediate outputs of the hardware implementation will be observed and will be given high weightage.
- In case of a tie, the time taken for the design and the implementation as well as the neatness of the circuit would be taken into consideration.
- This round will be carried out in the digital electronics lab at BITS Pilani K. K. Birla Goa Campus. All equipment-power supply, function generator, wire stripper, breadboard, etc. will be provided.

Round 3

- Just like the previous round, the teams have to design a digital circuit for the given problem.
- However, this one will be on a completely different level! A simulation of the design on Lab center Proteus (version 7.10) will decide who will carry home the trophy.
- Correctness and efficiency of the design will be considered
- Marks will be given only for final and intermediate outputs of the simulation.
- In case of a tie, the time taken for the design and the implementation will be taken into consideration.
- Teams are advised to install and be well versed with the software beforehand.

Registration: Vaibhav 8449973958
 Aditya 8872005011
 Satyadeep 7309705302



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COGNITIVE OVERDRIVE

Programmers Inc

CodeJam
BITS CTF
Reverse Coding
Hackathon



CODEJAM

Do you believe not just in writing code but making it more efficient? If yes, this event is for you. Quark presents to you a competitive programming event. Rack your brains to solve puzzles and real world problems. Compete with people all across the nation and show off your programming skills

CodeJam will have 2 rounds exclusive of each other, and are individual events. These rounds will be held on codechef.com

Round 1:

This is a teaser round for Quark CodeJam '17 and participants are welcome to attempt this optional round. This round will be hosted online on CodeChef for a duration of 3 hours with 5 short problems. For any wrong submission (no test cases passed), a penalty of 10 mins will be imposed.

Round 2:

Anybody is allowed to sit for this, irrespective of their participation in the first round (optional). The contest will be hosted online on CodeChef for a duration of 5 hours with 8 problems. No team participation is allowed and plagiarism of any sort will result in cancellation of participation. For any wrong submission (none of the test cases passed), a penalty of 15 mins will be imposed.

Judging Criteria:

Participants will be judged based on the number of test cases their program gives the correct answer for. Judging will be done via the online judge.

Team size: 1

Rules :

- You are required to print the final output. Sample output format will be provided in each problem statement.
- All the major programming languages are permitted. The participants will be judged on both correctness and time of submission of the solution.
- Use of the internet, other than accessing Code chef, is prohibited.
- Any participants, if found using any unfair means, will be disqualified from the event.
- The decision of the organizers in declaring the results will be final. No queries in this regard will be entertained.



BITS CTF

Bits CTF is a computer security contest targeted at anyone with an interest in computer science. The game consists of a series of challenges where participants must reverse engineer, break, hack, decrypt, or do whatever it takes to solve them. The challenges are all set up with the intent of being hacked; making it a great way to get some hands-on experience. The objective of the game is for to gain as many points as possible by solving these challenges. This is a jeopardy-style CTF with multiple categories of challenges.

Duration: 48 hours.

Team Size: up to 5

Judging Criteria:

- Participants will be judged on the cumulative points over the entire set of problems.
- In case of a tie, it will be sorted by adding the cumulative time of all the solved questions

Rules:

1. The competition is an online jeopardy style CTF with multiple categories of challenges, accessible from the Internet which has a duration of 48 hours.
2. The competition can be played by individuals or groups (max team size of 5), only one account per team.
3. The participant must provide a real point of contact for future notifications or claim the prize.
4. Participants that behave inappropriately will be immediately disqualified, including:
 - Share solutions or hints.
 - Attack computers or applications not designated by the competition.
 - Attack other participants.
 - General brute force attacks over online platform unless specified.
 - Duplicated accounts.
 - Other things we consider to be unfair.
 - Attacking contest server.
5. Scoring system is dynamic.



REVERSE CODING

This event will push your logical, deductive and mathematical skills to the limits. Be the Bond of programming and figure out what is the hidden source code by looking at its behavior on your inputs. The participants will be provided a portal with a 'black box' function and an input template. The participant can generate as many outputs on any desired input to guess what exactly the hidden source code is doing (e.g. calculating the nth Fibonacci number for every input n.) and code it. The portal will test your function on several test cases, and award a score accordingly. The score will vary depending on the difficulty level of the problem. The participants are responsible for bringing their own laptops and ensuring that they are sufficiently charged for a 3-hour event.

Judging Criteria:

Participants will be judged on the cumulative points over the entire set of problems. In case of a tie, it will be sorted by adding the cumulative time of all the solved questions.

Rules:

- Almost all languages supported on Hackerrank are allowed.
- Any participants, if found using any unfair means, will be disqualified from the event.
- Each program will be tested based on our critical test data. However, output and input should be exactly as specified in the samples provided.
- Internet connectivity, other than for accessing Hackerrank, is not allowed.
- The decision of the organizers in declaring the results will be final. No queries in this regard will be entertained



HACKATHON

The Hackathon event will be organized in 5 sub-categories:

- 1 Web & App
- 2 Block Chain
- 3 Machine Learning
- 4 Fin – Tech
- 5 IOT

It will be a 48 hours continuous hackathon.

Complete rules will be available at : <http://bits-quark.org/>



2019
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COGNITIVE OVERDRIVE

Specials

Paper Presentation
Stratazenith
School Bag



PAPER PRESENTATION

About:

Quark 2019 is hosting a paper presentation event with an objective to encourage talented and skilled young engineering students to showcase their creative original work in the domain of research. Given the difficulties involving undergraduate publication, we offer undergraduate students from any engineering or science stream an opportunity to present their research work.

We intend this to be an open platform for presenting innovative ideas through research papers and competing with peers in the field of engineering. We invite you to showcase your innovative ideas on this platform which will be judged by an experienced panel of Professors.

Categories:

- Mechanical and Chemical Engineering
- Electronics, Instrumentation and Computer Science
- Sciences
- Humanities, Economics and Management

Competition Format:

- While the final event that takes place on campus is a presentation by the group that worked on the project, we will require you to submit the abstract of your paper to us ahead of the competition, which would form the preliminary round in the competition. We will select the best papers based on the abstracts. The decision of the judges and the organizers shall be final and abiding vis-a-vis the selection of the papers for the final presentation.
- The last date for the submission of the abstract and the paper is 9th January 2019.
- The groups whose papers are selected will have to come over to our campus to give a presentation. A presentation has to be created by the team based on their paper which should be presented in the presence of the judges. Each group will be given 10 minutes to present on their paper, followed by a questioning period by the judges of up to 5 minutes. Use of visual aids, like a PowerPoint presentation, are encouraged. Each group can have a maximum of 4 participants.
- We will be judging the participants not only based on the presentation but also on the paper submitted, with equal weightage for both components.



Round 1:

- Participants should mail their abstracts and papers to Pavan Patel by the 9th of January and mention their registration number, category, and topic in the body of the mail.
- The abstract should not be more than 500 words long and should attempt to capture the essence of the paper. Abstracts should state clearly and concisely the problem, the methodology used and central conclusions, and may include figures and graphs.
- Please ensure that your abstract matches the following:
 - The first sheet is blank, but for your project title, names of the team members and their respective institutes.
 - The last sheet, following the abstract, may have a list of references – websites, books, journals and so on, which amply support the ideas or solutions implemented or proposed.
 - The information in the abstract should not be very descriptive or vague. It is recommended that vital aspects of the project that require special focus be mentioned as bold points.
- Teams selected from the first round will have to give their presentation in Quark 2019. We will mail the groups whose papers have been selected.
- Those who are selected for the final round are required to e-mail Pavan Patel. The mail should consist of the following:
 - Acknowledgement that you are aware of you being selected.
 - Details of all the team members: Names, Departments, Phone numbers and College.
 - You must send in your paper by this time, in case you hadn't already.
- For the final round, the participants will have to give their presentation in Microsoft PowerPoint.
 - Only picture clippings and graphs may be used.
 - Recorded dialogues or movie clippings are not allowed.
 - We will provide a computer for presentation. The teams will get 1 minute to set up their presentation and 10 minutes to present their idea.
- Exceeding the time limit carries penalties: 2 points for up to 2 minutes extra, 15 points for between 2 and 5 minutes extra, and 20 points for more than 5 minutes. Please keep your presentation concise.

Guidelines and Regulations:

- Each group can have a maximum of 4 participants.
- The paper you wish to submit should, preferably, be a research paper. However, you can submit papers on experiments, project work or reviews.



- Any sort of plagiarism is frowned on and discouraged. Any sort of plagiarism will lead to disqualification.
- The papers should have proper references/ citations.

Judging criteria:

- The submitted papers will be marked on a scale of 1-10 on the basis of the following criteria:
 - A concise, informative abstract.
 - Adequacy of introduction and background to the topic on which the paper is based on.
 - Logical development and analytical treatment in the body.
 - Adequacy of conclusion to the paper.
 - Factual and technical accuracy in the paper.
 - Originality of ideas, experimental procedure, design, and results or conclusion.
- The presentation on campus will be judged on the following criteria, with a similar marking scheme:
 - Organization of presentation – that is, it has a recognizable introduction, body, and conclusion.
 - Logical development through the presentation.
 - Poise, eye contact and platform manners.
 - Clarity and directness in exposition.
 - Apparent technical and factual accuracy, and students' grasp of the subject matter.
 - Discussions and the ability to answer the judges' questions. Abstracts to be emailed at specials.quark2019@gmail.com



STRATAZENITH

Stratazenith will be organized by "The Indian Game Theory Society" during Quark'19.

About the Event

It is an on spot strategy based event where common sense is your best friend. Participants don't need to have any prior knowledge to participate in the event. It is a team event. The team can comprise of 2 to 3 members.

Game No. 1 to Game No. 6 will have problem statements. Each having multiple rounds. After each round, the participants will be informed about their scores. Using which they can observe the behaviour of their opponents and strategize accordingly to maximise their score.

Format of the Event

It is a team based event.

- Maximum team size can vary from 2 to 3.
- The event consists of multiple games.
- Some teams may or may not be eliminated after some games depending on the number of participating teams.
- Pools will be made. A pool consists of the maximum of 6 teams (in the final round) and 8 to 12 teams (in the preliminary round)
- A game is held individually for each pool. If teams are shortened, pools will be merged.
- A game consists of multiple rounds.
- In each round, we will ask the bidding amount.
- On the bases of the bidding amount, the profit or loss can be determined for each player/team.
- A player/team comes to know the decision of the other player/team once the scores are computed and then they can analyze and bid accordingly for the next round.
- Payoff (Profit or Loss) of each player depends upon the decision of the other player.
- The decision of the organizers will be final and binding.



SCHOOL BAG

Schoolbag is a mixed bag of events, interactive sessions and workshops, or Guest talks, designed for the participation of students of Secondary and Higher Secondary Schools. It has events ranging from education, to arts and fun. The aim of this event is none other than to provide an opportunity for the Secondary and Higher Secondary students to visit BITS Pilani Goa Campus during the technical festival Quark, to explore innovative technical projects and exhibits, and to participate in exciting events. The competition promote education and learning of our young minds and nurture the potential within them. We plan to have a quiz, debate and a science fair as part of this conglomeration, in separate categories for secondary and higher secondary schools.

Their four main competitions:

- A Quiz
- A Debate
- A cryptography Competition
- A Science Exhibition

1) Quiz

The Schoolbag 2019 Quiz will be one on general knowledge with a generous sampling of questions on Science and Technology in which students from the schools of Goa get to test their quizzing aptitude and the depth of their general knowledge.

2) Debate

In the Schoolbag 2019 Debate, participants must lock horns in verbal combat and stun their opponent in a volley of cogent rebuttals.

3) Cryptic Writings

Cryptography is an exciting field. It involves hiding messages in what appears to be random text. We will be teaching everyone basic cryptography like shift ciphers, box ciphers and such – after which will show you a few questions based on the same. The three teams that solve the questions fastest will be allotted points, and the teams with the most points at the end will be the winner. This event involves learning something new and then applying the knowledge just learned to a set of questions that we have set specially for school students. This event will be a wealth of experience for students.



4) Imagine India

As a developing country, India faces a lot of common problems, both big and small. As young citizens of India, we are the future of this country and we need to be the source of the solutions to all the little problems that plague our country. We will be posing basic problems that our country faces and look for solutions from the school students of modern India.

5) Science fair

Science Fair is an opportunity for school students to present working models/demonstrations based on science and technology during Quark 2019. This is your chance to give your project the exposure it deserve.



2019
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COGNITIVE OVERDRIVE

Corporate

Market Kshetra
Alpha Tickers
Bullion Beatdown
AD Mad Show
Novatia



Market Kshetra

Market Kshetra is a 6 hours long growth hackathon. And it requires no coding. Participants will be given an existing business model. They have to study marketing strategy deployed by the business. In the six-hour long competition, they have to identify the problems of the existing marketing structure and propose new and innovative marketing strategies that will significantly improve the outreach of their products.

The participants will be judged based on the following:

- % increment in profit after implementation of the solutions suggested by a team
- % increase in tangible mindshare in the industry after the suggested solutions are implemented.

Judging Criterion:

- Identification of a critical problem
- Approach to the problem
- The originality of the solution
- Feasibility of the solution
- Size of impact
- Plan of action
- Timeline
- The practicality of the solution Bonus points for idea validation.



Alpha Tickers

Alpha males are the leaders of the pack. The ones who take initiatives and inspire everyone in their surrounding with their drive and ethics. And CEO's are the essential cogs in the machine that makes businesses tick. So, this Quark we give you the chance to showcase you have it in you lead the charge of a multinational company- to show that you can be an ALPHA TICKER!

- It's a 2-day event that will be contested in teams of 3. Over the two days, a series of case studies will be given that will be encountered by any CEO- from scaling a startup to revitalizing growth in a saturated market.
- Each team will be given 1 hour to prepare for the case study and then 30 mins to present them. There will be 3-4 case studies spread across 2 days.
- The case studies will be given 10 minutes before the event and use of the internet will be strictly prohibited.
- Each member of the team has to take part in the presentation process.

Judging Criterion:

- Identification of a critical problem
- Approach to the problem
- The originality of the solution
- Feasibility of the solution
- Size of impact
- Plan of action
- Timeline
- The practicality of the solution Bonus points for idea validation.



Bullion Beatdown

Event Rules:

- In the first stage of the event, there will be 10 rounds, each of 2 minutes.
- 5 teams(or 4, if there are 8 teams in all) will be given +2000 units of gold. The other 5(or 4)teams will be given -2000 units of gold. The base price of each unit is 200.
- The teams are free to trade amongst themselves. Each trade should involve buying/selling in multiples of 100 units. A team can buy or sell any number of units in each round.
- The negotiators are expected to negotiate the selling/buying price and bring it down to their requirements in the 2-minute interval.
- The person at the table will officially "handle" the transactions.
- After the end of all 10 rounds, every team has to bring the number of units they have to zero and maximize their profit.
- A limited number of teams with the maximum amount of profit will proceed to the next stage of the event.
- The organizers will inform the participants about the next stage.
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The AD MAD Show

Bring out the creativity inside you and make a fantastic advertisement of your own. Be it hilarious or sensitive, be it just your creativity and ad sense.

- It is a team event. Each team should have 2-5 members only.
- Topics would be provided on the spot.
- 5 minutes of preparation time for each team.
- Time limit for the performing the advertisement is 1-2 minutes.
- Participants shall be judged on the basis of spontaneity, content, adherence to the topic, on-stage presentation, coordination and overall appeal of the advertisement.
- The caution should be taken to refrain from displaying obscenity, violence, prejudice, defamation etc. in Advertisement.
- The decision of the judges will be final and binding



NOVATIA

" A Premier B- Plan Competition "

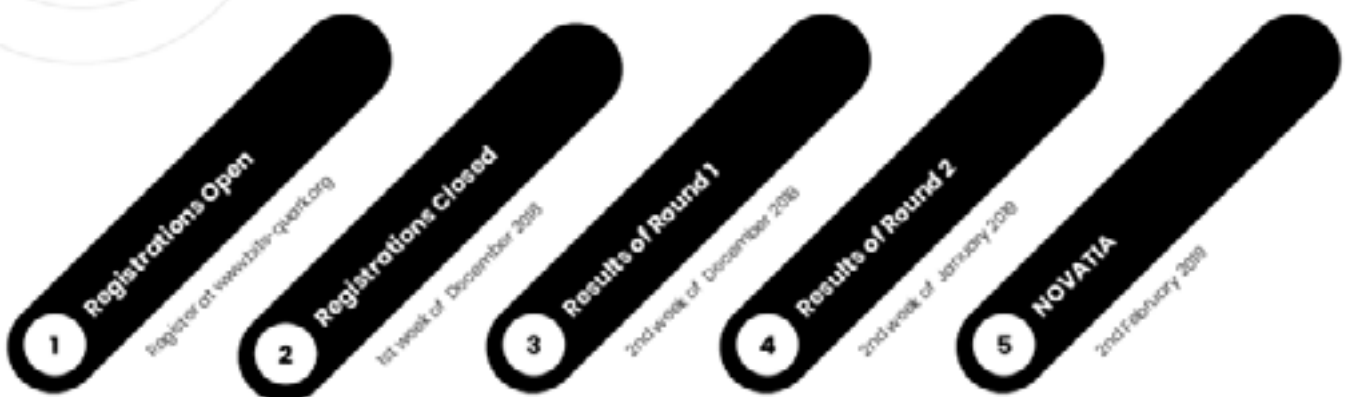
Business Plan competitions prove to be great catalysts in carrying the crude ideas to a level where they can be transformed into great start-ups.

Round 1 - Participants will be asked to enter the basic details of their idea/prototype/startup. Entries will be shortlisted with the help of our partners on the basis of merit.

Round 2 - Mentors will be allotted to all shortlisted participants of Round 1. Mentoring period will be of about 2 weeks. By the end of mentoring session, participants will have to submit their B-Plan. Finalists will be announced based on their B-Plan.

Finale - All the finalists will be invited to the finale of NOVATIA where they will be given opportunity to pitch their B-Plan in front of a judge panel. Winners will be declared based on this presentation.

Timeline





2019
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COGNITIVE OVERDRIVE

Elixir

**Quark National Quiz
Ganimatoonics**



Quark National Quiz

Description:

This quiz will be based on Science, Technology, and Business.

Team composition:

1-2 members; Junior College and College students eligible for participation, with cross-college teams allowed.

Teams per college:

Unlimited

Format & Rules :

- There will be a preliminary written round which will see the top 8 teams go through to the final round.
- The quiz will consist of an interactive final consisting of numerous rounds declared by the quizmaster on the spot.
- The quizmaster himself will explain scoring patterns.
- Quizmaster's decision is final and binding.



Ganimatoonics

Description:

This quiz will be based on Ganimatoonics i.e. Games (not limited to just video games), Anime, Cartoons, and Comics over the years. Anything related to these domains can be asked in the quiz.

Team composition:

1-2 members; Cross college teams are allowed. Registration can be done on the spot.

Format & Rules :

- There will be a preliminary round conducted by the quizmaster.
- The top eight teams from the preliminary round will participate in the finals.
- The quizmaster will explain the design and scoring systems of both the preliminary and final rounds on the spot.
- Quizmaster's decision is final and binding.



CUBIX

Events

- 2x2
- 3x3
- 4x4
- 5x5
- 3x3 one handed
- 3x3 blind folded
- Pyraminx

Rules

The rules are as per the World Cubing Association (WCA) regulations –
<https://www.worldcubeassociation.org/regulations/guidelines.html>



MATKA

Foreword

This document outlines the rules that should at all times be followed when participating in Matka competition. Failure to adhere to these rules may be penalized as outlined. It should be remembered that it is always the administration of the tournament that has the last word and that decisions that are not explicitly supported, or detailed in this rulebook, or even go against this rulebook may be taken in extreme cases, to preserve fair play and sportsmanship. We at Quark hope that you as a participant, spectator, or press will have an enjoyable competition to partake in and we will do our utmost to make it a fair, fun, and exciting competition for everyone involved.

1. Event Rules

- **Punctuality**

All matches in Matka should start as stated on the provided schedule, any changes in the time must be accepted by the opposing party and administrators (if rescheduling is generally possible). All participants in a match should be on the server and ready to go at the latest 10 minutes before the match is to start.

- **Participants Not Showing**

If a participant is not ready to play until 10 minutes after the scheduled start of the match, he is considered a no-show. In that case, the participant will be penalized, and the match will have to be rescheduled if the schedule allows it. Otherwise, the opponent will receive a default win from the administration.

- **Removable Media**

It is strictly forbidden to connect or use any removable media on the tournament computers without prior examination and approval from the tournament administrators.

- **Warm-up Period**

A warm-up period of 20 minutes is usually provided before a match, although this period may not be guaranteed. This will include the time that might be required by a player to set up his/her config and game settings. In case a player arrives late, no extra time shall be provided for configuration or setting changes.

- **Cheating**

The use of the following programs will result in a cheat ban: Multihacks, Wallhack, Aimbot, Colored Models, NoRecoil, No-Flash, and Sound changes. These are only examples, other



programs or methods may be considered cheats as well. The player who is found cheating shall be banned from further participation in subsequent iterations of Matka and his/her team shall be immediately disqualified from the tournament.

2. Game Specific Rules: Counter-Strike: Global Offensive

2.1 Map pool for Event

The map pool for the event will be

- Mirage
- Cache
- Overpass
- Inferno
- Nuke
- Train
- Dust 2

2.2 Veto Process

The veto process should be completed 10 mins before the scheduled start time of the match. Only 1 player each from either team can participate in the process and choices cannot be reverted after being made. The captain who'll take the first pick shall be decided with a coin toss.

2.3 Map choice

- 2.3.1. For BO1

For offline event: Ban A - 2 Bans B - 3 Bans A: remaining map is being played.

- 2.3.2 For BO3

For offline event: Ban A - Ban B - Pick A - Pick B - Ban A - Ban B - remaining map is being played as decider map if required.

2.4 Dropping of Players

- If a player drops before the first kill in the first round of a half, then the half will be re-



started.

- If a player drops after the first kill have been made and has not returned when the round has been decided, then the match will be paused at the start of the next round.
- If a player drops and the opponent has been notified before any kills have occurred during that round, then the round will be restarted.
- If a player has not returned, or cannot be replaced within 10 minutes after the pause has started, then the team with the dropped player may forfeit the match at admins discretion.

2.5 Draws

In case of a draw after all 30 rounds have been played, an overtime will be played with mp_maxrounds 6 and mp_startmoney 10000.

For the start of the overtime, teams will stay on the side which they played the previous half on, during half-time sites will be swapped. Teams will continue to play overtimes until a winner has been found.

2.6 Pause Function

• 2.6.1 Technical Pause

If a player has a problem that prevents him from playing on, he is allowed to use the pause function ("!pause"). The pause function can be used at any time but it will only come into effect during freeze time (immediately, if used during freeze time, else at the beginning of the next freeze time). The player has to announce the reason before or immediately after he paused the match. If no reason is given, the opponent may unpause the game and continue playing. Unpausing or pausing the game without any reason will lead to penalty points.

• 2.6.2 Tactical Pause / Timeout

Each team is allowed to invoke a tactical pause of 30 seconds up to four times per map. If the Matka Game Integration is being used, the special command "!timeout" has to be used. Otherwise, the "!pause" command has to be used and the team has to announce the tactical pause via chat. The pause function can be used at any time but it will only come into effect during freeze time (immediately, if used during freeze time, else at the beginning of the next freeze time). If all tactical pauses had already been used on the same map, the admin will unpause the game and continue the game.

• 2.6.3 Admin Pause

The admin can also pause the game from his station or from a player station when it seems



required. also, if for some reason the player pausing does not work, they have to request the admin to do it.

2.7 Player Settings

• **2.7.1 Configuration**

All players must upload their config to their own Gmail/ google drive and download it before their matches. Extra time apart from the given warmup time will not be provided for setting up player configuration or settings.

• **2.7.2 Forbidden Scripts**

In general, all scripts are illegal except for buy, toggle, demo scripts or jump throw scripts. Stop shoot scripts [Use or AWP scripts]

- Center view scripts
- Turn scripts [180° or similar]
- No recoil scripts
- Burst fire scripts
- Rate changers (Lag scripts)
- FPS scripts
- Anti-flash scripts or binding (snd_* bindings)
- Bunnyhop scripts
- Stop sound scripts
- Use of scripts that are not permitted will result in immediate disqualification.



3. Game Specific Rules: DOTA 2

3.1 Game Version

The latest version of Dota 2 will be used.

3.2 Lobby Settings

- Lobby Password: Mandatory
- Game Name: Optional
- Enable Cheats: OFF
- Bot Difficulty: Random
- Version: Tournament
- Series Type: No Series
- Game Mode: Captains Mode
- Starting Team: Check Game Mode
- Penalty-Radiant: None
- Penalty-Dire: None
- Spectators: Enable

3.3 Starting the game

As soon as both teams are on the same round the game must start. This means that if both teams get a default win on the first round (for not having an opponent or any other circumstances), even if the match page states a different match time hour, the match must start.

3.4 Game mode

- 3.4.1 For B01

The team at the left side of the match sheet chooses the side, the team on the right side chooses the drafting order. The lobby setting "Starting Team" must be set according to the drafting order. The side chosen in this setting will have the first ban/pick.

- 3.4.2 For B03

The team at the left side of the match sheet is radiant on the first game, the drafting order is random. On the second game, it's the reverse. On the third game, the team on the left side chooses the side, the other team chooses the drafting order. The lobby setting "Starting Team" must be set to random on games 1 and 2, and according to the drafting order on game 3. The side chosen in this setting will have the first ban/pick.



3.5 Game Host

Any team/player can host the lobby. Please follow the "Lobby Settings" and the rules stated in the "Game mode" tab above.

3.6 Pause Rule

It is forbidden to pause a game for no reason. After you pause a game you must say in all chat the reason for the pause. In the same game, the total pause time can't be longer than 10 minutes (if a team pause the game for 3 minutes and later pause it again for 7, they can't pause anymore, unless the opponents agree with it).

- A pause shouldn't be longer than 5 minutes. In the case a longer pause being needed, the opponent or an Matka admin has to agree on it, otherwise, the match continues.
- To unpause a game is only allowed if both teams agree to it in all chat or a pause lasted longer as 10 minutes and no further agreements were made.
- Abuse of the pause will lead to a disqualification. Screenshots of proof and the demo of the game must be uploaded into the match.