

# ABU Robocon 2019 Ulaanbaatar

## FAQ1

2018.10.26

### FAQ

Please send the question after reading the rule book carefully. Thank you for your cooperation.

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FAQ update

FAQ1 announced on October 26.

FAQ update

FAQ2 announced on December 10.

FAQ update

FAQ2 announced on January 25.

## **0. Terms and Definitions**

2018.10.26

- 0-1) Regarding 'Terms and Definitions' on page 8 of the Rulebook, is MR2 allowed to float?  
A. MR2 is not allowed to float or fly.
- 0-2) If one component has two or more ground contact areas mechanically, will it still be regarded as one leg? For example, a leg wearing a high heel or geta (Japanese traditional clog).  
A. It will be accepted as one leg. However, please make MR2 like a robot that moves with four legs from the viewpoint of the audience. We mean a robot that moves like a quadruped animal and a robot with four legs which move independently.
- 0-3) Can MR2's part other than its four legs touch the field or fence? For example, sensor to touch the ground to read the guidelines, distant measurement roller to touch inside of the fence, and MR2's part other than the legs to touch the ground when MR2 falls over.  
A. No. MR2 can only use four (4) legs. It is not allowed to use 5th and/or other options of legs. MR2's part other than its four legs must not touch the field. However, MR2 can touch the fence.
- 0-4) Is it a violation if MR2 doesn't walk like a horse?  
B. It is not necessary for MR2 to walk like a horse walking mechanism.
- 0-5) Rulebook says that mechanism whose legs rotate 360 degrees centered on joints are prohibited but when we use link such as crank mechanism to drive the legs, is it allowed if the rotation axis of the motor or the input link to rotate 360 degrees? Also, please let us know if this '360 degrees centered on joints' belongs to a robot or to the field.  
A. Using a rotating mechanism to drive legs is allowed. The criterion of 360 degrees centered on the joint belongs to the field.
- 0-6) Is it allowed to get driving force other than the four legs? Specifically, is it acceptable to get propulsion with fans and etc.?  
A. It is not allowed to get driving force other than the four legs.
- 0-7) When MR2 moves, does all the four legs need to make contact with the ground in one cycle of walking?  
A. In one cycle of walking, each of the four legs needs to make contact with the ground and separated again. One cycle means one cycle of motion that repeats when moving

with four legs. You cannot use just one leg, out of four legs, when passing through the sand dunes.

0-8) Please elaborate on 'shuffling is not allowed'. Is it allowed to drag legs or shuffle when MR2 moves?

A. It is not allowed to drag and move without lifting the leg completely from the field. It is allowed to drag the leg instantaneously when lifting the leg from the ground and making contact with the ground.

0-9) Is it allowed for MR2's all legs to leave the field at the same time?

A. Yes, it is allowed. If other part of MR2 than its legs touched the game field it will be a violation and team has to ask for a retry.

0-10) What will the fifth part of the MR2 contacting the dark yellow area consider as?

A. If other part of MR2, except the 4 legs, contacts the game field is considered as a violation.

#### 2018.12.10

0-11) Regarding FAQ 0 - 7, is it acceptable for MR2 to change its direction on the spot while the feet are in contact with the ground?

A. Yes, it is acceptable.

0-12) The FAQ1 says that each of the four legs must leave the ground once in one cycle of walking. Does it conflict with the rule if the robot itself makes a pivot turn by using a certain foot as an axis for a change of direction?

A. No, it doesn't conflict with the rule. The requirement of walking is a condition for walking, and it is not a rule that must be observed at all times during the game.

0-12) Is it allowed for MR2's parts other than 4 legs to make contact with the rope when MR2 travel over the rope?

A. MR's parts other than 4 legs can make contact with the rope but if the rope gets broken by the pressure of MR2, your team will lose that game.

## **1. Game Procedure and Competition Tasks**

### **1.1 Game Procedure and Competition Tasks**

#### 2018.12.10

1.1-1) Regarding Rule 1.3.3, can we place Shagais on the River?

A. No, you can't.

## **1.2 Position of robot and team members**

2018.10.26

- 1.2-1) Is operate allowed to enter the field if MR 1 has both aspects of automatic and manual robot such as moving automatically but passing on Gerege and throwing Shagai manually?
- A. Not allowed. In the case of a robot that automatically controls its travel, for safety reasons, the operator cannot enter the field.
- 1.2-2) Please specify the area that team members are allowed to
- a) step inside the field during a game
- A. team member who operates MR1 is allowed to be in the own Khangai area and/or Throwing zone.
- b) enter the space area during retry
- A. A team member who retries for MR2 and/or Shagai is allowed to enter own team's Khangai area, Gobi area, Mountain area and Throwing zone. A team member must not enter the opponent's areas and Landing zone including space area. If it happened, the team will be disqualified.

## **1.3 The Gerege and Shagai**

2018.10.26

- 1.3-1) If a part of Shagai is in contact with the Khangai Area, will it be considered as 'placed in Khangai Area'?
- A. No. When placing Shagai, all of Shagai must be inside of the Khangai Area including the space above.
- 1.3-2) Is it allowed to pile up Shagais in Khangai Area?
- A. Yes, it is allowed.
- 1.3-3) Is it allowed to put Shagais on top of a self made rack to make it easy for MR1 to pick them up?
- A. No, it is not allowed to put Shagai on a rack.
- 1.3-4) Rulebook states that 70% of Gerege must be visible when MR1 carrying Gerege. Is it allowed to cover Gerege with a transparent material such as acrylic?
- A. It is not regarded as a 'visible state'. The uncovered part of Gerege must be visible for 70% or more. The same condition applies when the team raises Gerege for Uukhai.
- 1.3-5) Is it allowed to keep the visible state of 70% of Gerege if seen from the bridge side when the

robot moves through the forest with omnidirectional movement?

- A. If MR1 is capable of omni-directional movement, when passing through the forest, the state where the side on which the letter of Gerege is written always faces the bridge is regarded as the Gerege is oriented in the direction of travel.

1.3-6) Is there a back-and-front on the Gerege?

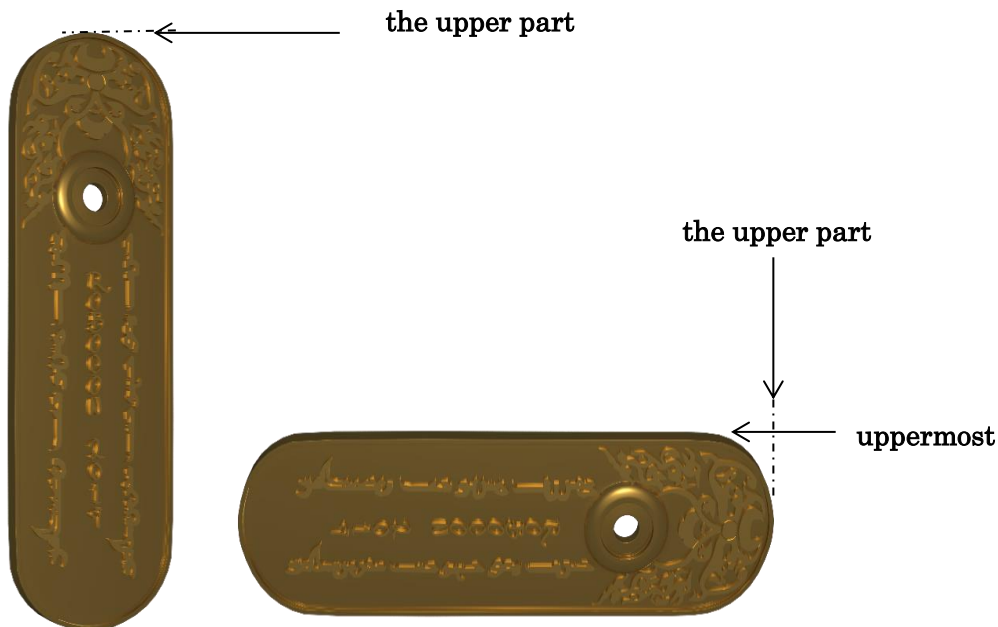
- A. Both sides of the Gerege have written letters, and the back-and-front are not distinguished.

1.3-7) What exactly does the Gerege with visible state of over 70% represent?

- A. Over 70% of the face of Gerege on which the letters are written must be visible when seen from the traveling direction.

1.3-8) With reference to Rule 1.3.5.4 MR1's holding of the Gerege, what part of the Gerege needs to be above the "upper body" of the robot? Also, about MR2's holding of the Gerege, what part of the Gerege needs to be below the "upper body" of the robot?

- A. MR1 must carry the Gerege in the way that the upper part of Gerege is higher than the top of MR1 from the start till it passes Line 1.  
MR 2 must carry the Gerege in the way that the uppermost part of Gerege is lower than the top of MR2 from the moment of receiving Gerege till the arrival at the Uukhai Zone. While carrying, MR doesn't have to hold the Gerege vertically and it doesn't have to be visible.



1.3-9) Please elaborate on 'raising Gerege vertically', Rule 1.8.4.

- A. To raise Gerege, the upper part of Gerege must be raised higher than 1000mm from the top surface of the Uukhai Zone. When doing so, MR2 is allowed to extend itself beyond maximum extension size.

1.3-10) As for Rule 1.5.4, if the Gerege has been passed from MR1 to MR2, and then after MR1 is just separated from the Gerege, MR2 drops it on the ground, is this situation considered as "successful passing"?

- A. The successful passing of Gerege is achieved in the moment when MR 2 receives the Gerege and MR1 is separated from the Gerege. If MR2 dropped the Gerege after that, it will be a violation. (Rule 5.1)

1.-3.11) While transferring the Gerege from MR1 to MR2, is it allowed for MR2 to raise its arm above its upper body and then take the Gerege and carry it below its upper body?

- A. It is not necessary to follow the rule "carrying Gerege" after MR1 crosses Line 1 .

1-3.12) Can we use the hole in Gerege to hold it?

- A. Yes, robots can use hole on a Gerege to hold it.

1.3-13) Is the Gerege considered while measuring the dimensions of MR1 while it's holding it?

- A. No, a Gerege is not included in the dimensions of the robot.

1.3-14) What if Autonomous robot dropped Gerege?

- A. It's a violation.

1.3-15) Can any part of MR2(AUTOMATIC HORSE ROBOT) touch the tussock rope?

- A. Yes, MR2 can touch the rope.

1.3-16) If a Shagai landed in the Landing Zone is overturned by another incoming Shagai, are points counted by the original or final face of the Shagai? For Example; If we land a sheep with our first throw and the second Shagai hits the first one and turns it to a the camel, are we allotted 40 or 60 points?

- A. If a Shagai lands in the Landing zone and a score is approved by referee, initial score will not change even its posture is changed.

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1.3-17) What does inclination of the Gerege mean to which direction? Also, how do you measure it?

- A. It is an inclination with respect to a plane perpendicular to the field plane. During the game, if the referee judged that the Gerege obviously leaned more than 45 degrees, it will be a

violation at that moment. Please try to hold Gerege vertically to the field surface when MR1 holds Gerege and MRs raises Gerege.

#### 1.4 Task in the Khangai Area

2018.10.26

- 1.4-1) MR1 has to ravel through the forest according to the route indicated by white guidelines but is it OK as long as a part of the robot passes over the white guidelines?
- A. MR1 does not have to travel on the white guidelines as long as it passes the route indicated by the white guidelines.

#### 1.5 Passing the Gerege

2018.12.10

- 1.5-1) With reference to Rule 1.5, can MR 2 operate for delivery when the delivery of the Gerege is not completed?
- A. MR2 can move during the delivery of Gerege. However, MR2 cannot move beyond Gobi Urtuu including its space above until the delivery is completed.

#### 1.6 Task in the Gobi Area

2019.01.27

- 1.6-1) If MR2 jumps from Gobi Urtuu to Mountain Urtuu, will it be regarded as passing Line 2 and Line 3?
- A. No. MR2 must touch the field at least once between Line 2 to Line 3 and between Line 3 to Mountain Urtuu.

Is it acceptable to pass under the rope while satisfying the regulation?

- A. It is OK as long as it meets regulation.

Is MR2 allowed to touch/carry Shagai at any point in the game?

- A. MR2 is not allowed to touch a shagai at any moment in the game.

#### 1.7 Throwing a Shagai

2018.10.26

- 1.7-1) With reference to 'MR1 can hold and throw only one Shagai at a time', can MR1 to put multiple Shagais in TZ?
- A. No. MR1 can put only 1 Shagai in TZ including its space above.



- 1.7-2) With reference to 'MR1 can hold and throw only one Shagai at a time', can MR1 hold another Shagai other than the Shagai which MR1 to throw?  
A. No. MR can hold only 1 Shagai at a time.
- 1.7-3) Is it a violation if MR1 touched another Shagai while picking up a Shagai?  
A. No, it's not a violation.
- 1.7-4) Can MR1 throw Shagai as long as a part of it is in TZ?  
A. When throwing Shagai, MR's all of the contact areas with the ground must be inside of TZ.
- 1.7-5) What happens if the thrown Shagai hits team's own field then landed on the landing area?  
A. If the thrown Shagai hits team's own field then landed on the landing area, it will be a violation. However the points are valid if the thrown Shagai hits the fence or the side of the slope then landed on the landing area.
- 1.7-6) When we do Shagai retry, if own team's Shagai in LZ becomes an obstacle, can we move the Shagai back to Khangai Area?  
A. No, you cannot retrieve the Shagai which is already in LZ when you do Shagai retry. The same condition applies to Retry.
- 1.7-7) When we do Shagai retry, if we want to put Shagai where the MR1 is placed, can we move MR1?  
A. No you cannot. MR1 must be stopped there and cannot be moved until restart.
- 1.7-8) What happens if a thrown Shagai lands on top of our team's Shagai or opponent's Shagai and come to rest but it didn't make contact with the LA?  
A. You will get 20 points.
- 1.7-9) During retry, can we move those Shagais before throwing or Shagais which didn't earn points back to the original position?  
A. Yes, you can.
- 1.7-10) Can MR1 continue to throw Shagai even after earning 50 points?  
A. Yes, as long as MR2 is inside of Mountain Urtuu. Points will be added by throwing Shagai even after earning 50 points.

2018.10.30

1.7-11) Can MR1 pick up a Shagai from Throwing zone?

A. All of MR1's contact surfaces must be within the Khangai Area when MR1 picks up Shagai.

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1.7-12) Regarding 'picking up Shagai', is it a violation if MR1 is in contact with Shagai before it passes on Gerege to MR2? For example, is it possible to pass on Gerege when MR1 hasn't pick up the Shagai yet but MR1 is in contact with the Shagai in preparation for grabbing it?

A. MR1 cannot touch Shagai until MR1 finished passing on Gerege to MR2.

## **1.8 Climbing mountain**

2018.10.26

1.8-1) The Rulebook says MR2 raises Gerege vertically above its upper body but can we raise Gerege while moving it in the horizontal direction?

A. Yes, you can.

1.8-2) Instead of team member, can MR1 send a non-contact signal for MR 2 to leave the Mountain Urtuu?

A. No, it is not allowed.

1.8-3) Can we use jig to adjust/arrange MR2 in the Mountain Urtuu?

A. Yes, you can.

1.8-4) Is it OK if MR's legs are not in contact with the field when achieving Uukhai as long as the upper side of Gerege is at least 1000mm above the field of Uukhaii Zone?

A. No. MR2 must raise Gerege while at least one of its legs are in contact with the ground surface. MR2 must raise and keep raising the Gerege so that a referee can confirm it with his or her eyes.

1.8-5) Is it possible to use radio waves as a non-contact signal? In other words, can we inform our robot to start climbing the mountain by pressing the wireless switch with only one button that does not have the ability to control the robot?

A. The team member who gives signal to the robot is not allowed to use wireless radio waves.

2018.12.10

1.8-6) Regarding Rule 1.8, can we adjust the position of Gerege during retry after MR2 received Gerege?

- A. You can adjust the position of Gerege during retry if you satisfy following FAQ 1.8-7.

1.8.-7) Regarding Rule 1.8, can we create a separate 'Gerege Receiving Mechanism' and 'Gerege Raising Mechanism' and after receiving the Gerege, transfer it to 'Gerege Raising Mechanism' during retry?

- A. It is OK to separately create "Receiving Mechanism" and "Raising Mechanism". However, MR2 itself has to transfer the Gerege from "Receiving Mechanism" to "Raising Mechanism". When a team member adjusts the position of the Gerege during retry, or in Mountain Urtuu, he/she can only rest the Gerege on the "Receiving Mechanism'.

## **2. Retries**

## **3. Deciding Winner**

2018.10.26

3-1) What is the final task in 3.3.3.2?

- A. Of the tasks that both teams achieved and scored points, the task which is the closest to the goal.

## **4. Robots' design and development**

2018.10.26

4-1) Can the robot recognize another robot with a photoelectric sensor or something?

- A. No, it is not allowed.

4-2) The Rulebook prohibits suction of the field but is it allowed to obstruct opponent by sucking objects and/or making wind?

- A. Suction of the items on the field such as fence, rope, Sand Dune and so on and the contest field itself is prohibited. Obstruction by the wind is also prohibited. However, it is OK to suction in order to hold Shagai and Gerege.

4-3) Can MR1 blow Shagai with wind?

- A. No it's not allowed.

4-4) Can we put our smartphone on MR1?

- A. Yes, you can use a smartphone as a sensor and/or control unit. However, its weight will be considered as a robot's weight. Refer FAQ.

#### 2018.12.10

- 4-4) Regarding Rule 4.8, is it OK to install the equipment/objects outside of the field for sensing by the automatic robot?  
A. No, it is not allowed.
- 4-5) Regarding Rule 4.8, as a way of assisting MR2's walking, can we use wind?  
A. No. Using wind for assisting MR2's walking is not allowed. However, using fans to cool down motors and circuits are allowed.
- 4-6) Regarding Rule 4.8, can the vertical and lateral directions of MR2 be taken with any orthogonal axes, or is it determined with respect to the robot's traveling direction? Also, in the latter case, how do you determine the axis in a robot that can move in all directions?  
A. You can take it with any axis

### **5.6. Violations and Disqualification**

#### 2018.10.26

- 6-1) What happens if the thrown Shagai falls on the boundary fence between the LZ and the opponent team's field?  
A. If the thrown Shagai does not touch LA and enters opponent's field and the space above, the team will be disqualified. If the Shagai lies on the fence in contact with LA, the team will not be disqualified and the team will get 20 points
- 6-2) Will our team be disqualified if Shagai which already scored points fell to the opponent's field by the Shagai thrown by the opponent?  
A. Your team will not be disqualified. Disqualification happens when you drop Shagai in the opponent's field.
- 6-3) Will our team be disqualified if Shagai which already scored points fell to the opponent's field by the Shagai thrown by our team?  
A. Yes, your team will be disqualified.
- 6-4) If a thrown Shagai fell to the opponent's field after hitting our own or opponent's Shagai, will

we be disqualified?

- A. Yes, your team will be disqualified.

### **7.8 Safety and team**

As per Rule 7.3, if MR1 is a manual robot, must the emergency stop button be built on its control box? Can this button stop the robot effectively?

- A. Each robot must have an emergency stop button. If MR1 is an automatic robot, apart from the emergency stop button directly attached to the robot, you must also prepare an emergency stop button which stop the robot remotely.

### **9. Others**

2018.10.26

9-1) Is the floor of the field made of plywood? Or is it Lonlium? Also, in the case of loniumum, are Sand Dunes and Slopes also made of Loniumum?

- A. The surface of the field will be created by plywood, in the same way as the ABU Robocon 2018.