"Information Era" contest rules --WER2018 Brick Educational Robot Contest Series

Brief

The first computer came into service in 1946.

Internet came into modern society in 1969.

Nowadays, number of netizens has exceeded over 3 billion out of more than 7 billion population in a global scope.

Information technology has been radically facilitating human's development ever before by infinitely boosting the value generated by information. Its content and speed of disseminating, disposing and using have risen exponentially, which makes computer language a global passport.

The grand landscape is as follows: Internet has become a center of obtaining and interchanging information globally, knowledge has grown into the major resource of producing wealth, emerging industries such as electronics, telecommunication and logistics are booming, technologies pertinent to semi-conductor, information transmitting, multimedia, database and data-compressing are consistently combining with one another.

Human's lifestyles have experienced unprecedented transforming. To state more clearly, we turn on mobile phone to obtain newest information and browse most "in" products in a world-wide scale whenever and wherever possible; Email, video and voice calls have been flagged as the most pervasive communication patterns; Facebook, Wechat and Live show have been the most effective approach to demonstrate distinctive characters.

Meanwhile, potential issues about privacy leakage, computer virus, data security and online scam are increasingly grabbing public attention and humans need wits to tackle those problems.

In WER brick educational robot contest series, contestants are supposed to write codes, create telecommunication technology, develop APP and defend network security work as software engineer, telecommunication specialist, data analyst or network and information security admin, in pursuit of making information better cater to human's development.

2 Contest venue and surrounding

2.1 Venue
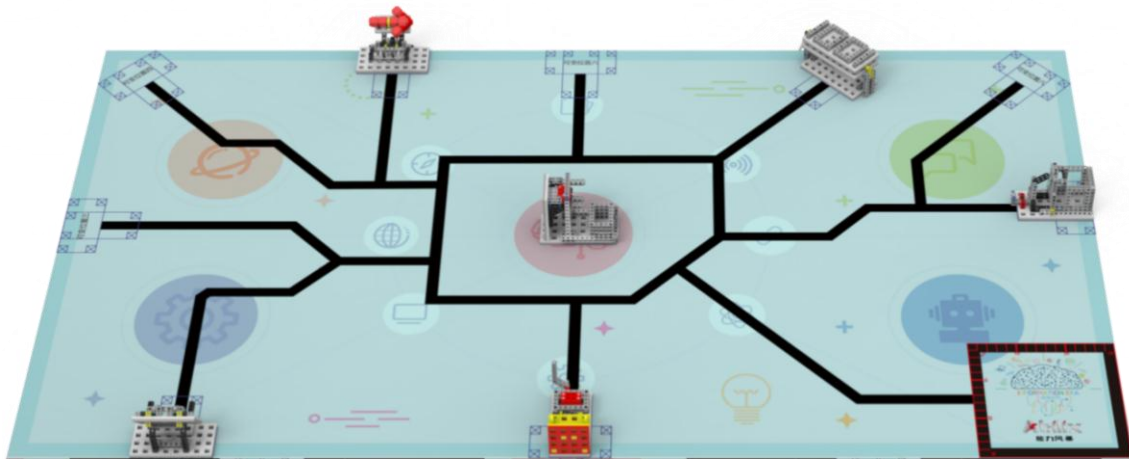
Picture1: Arena Map

The dimension of the arena map (made of PU or PVC) is 220 (Length) x 120 (Width). In the end of the black leading line (2cm-3cm in width) marks a position of placing models (Model Zone). The position and direction of models are variable. There is a base (30cm x 30cm) in the arena to which the robot can go back and forth time and again.

2.2 Surrounding

The surroundings are categorized into cold-light source, low-level lighting and magnetic interference-free. Due to the various uncertainties, for example: the surface of the arena is bumpy or zigzag, the lighting condition is variable, etc, the contestants need to come up with countermeasures when designing their robots.

3 Task and Score

There are 7 tasks for each round, including preset and additional tasks. 6 preset tasks are given in accordance with difficulties in the rule and 4 to 5 preset tasks will be drawn on the arena in terms of difficult, medium and basic levels; additional tasks will be made public only before the contest.

Contents of preset tasks are announced in the rule whereas the position and direction of models, which are variable, are published right before the contest. Additional tasks will be made public only before the contest and contestants should refer to venue situation to design robot's building and programs.

Following preset tasks simulate some real life scenarios:

3.1 Upload data

3.1.1 Cloud server model is fixated in the arena and the end of its joystick stays vertical. See picture 2 for reference.

3.1.2 Robot pulls the joystick to upload data to cloud sever, team will be scored 60 points.

3.1.3 Data model must contact the upper surface of board and maintain the status till the end of competition.
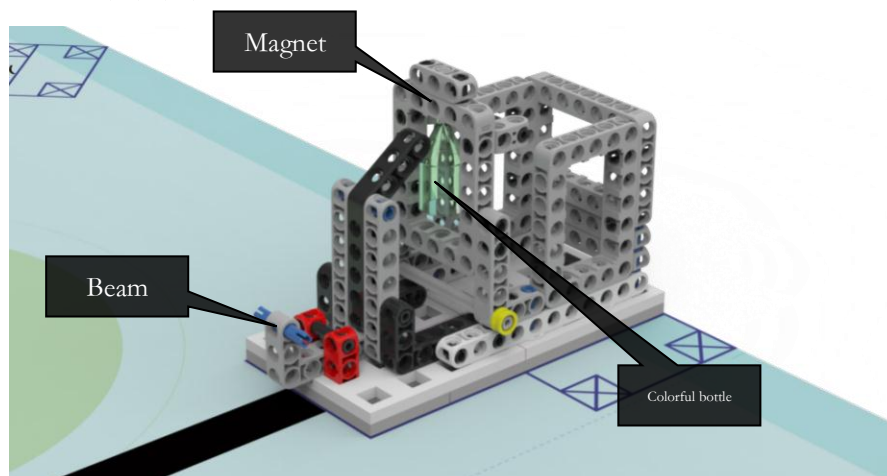
Task level：★ ★
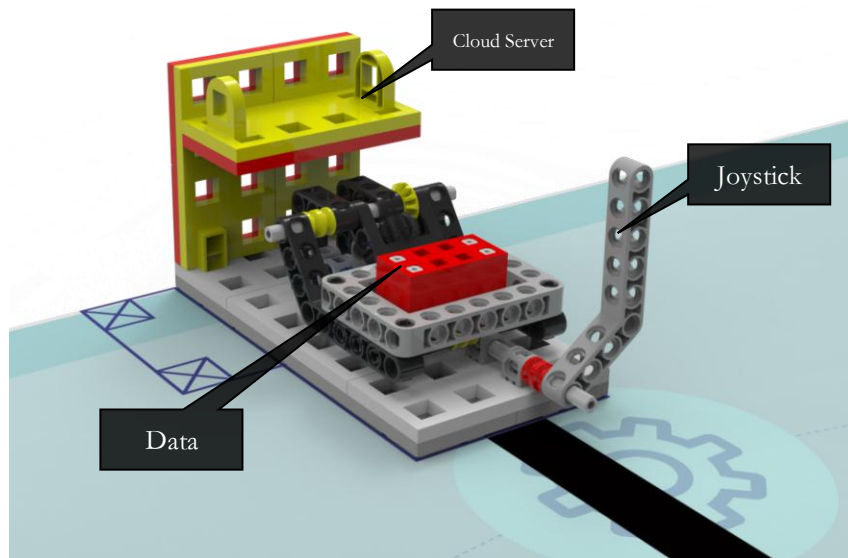
Picture 2: Cloud Server

3.2 Renew E-waste

3.2.1 E-waste disposal factory is placed in the arena and discarded E-waste (colorful bottles) are attached to the magnet. See picture 3 for reference.

3.2.2 Robot puts E-waste(colorful bottles) into E-waste disposal factory by drawing the beam, team will be scored 50 points then. See picture 4 for reference.

Task level：★ ★ ★

Picture 3: E-waste Factory
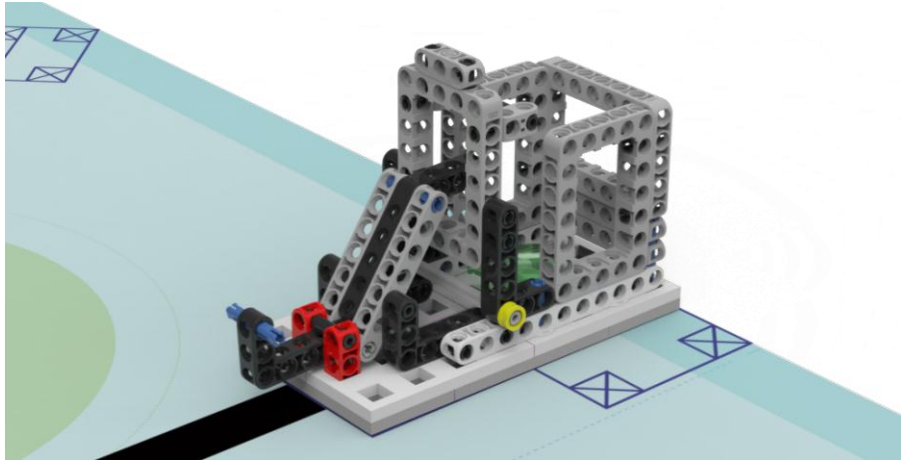
Picture4: Completed status of E-waste factory model

3.3 Online Shopping

3.3.1 A computer model is positioned in the arena and 2 colorful bottles are attached to the magnet on the upper side of the computer model. See picture 5 for reference.

3.3.2 Robot shall take colorful bottles off from the magnet. If bottle falls down (without touching the model), team will be scored 20 points for each one while 30 points for each one if the bottle is carried back to the base.

3.3.3 As long as the vertical shadow of robot who carries colorful bottle enters the base, team will be scored.

Task level:★ ★ ★ ★ ★
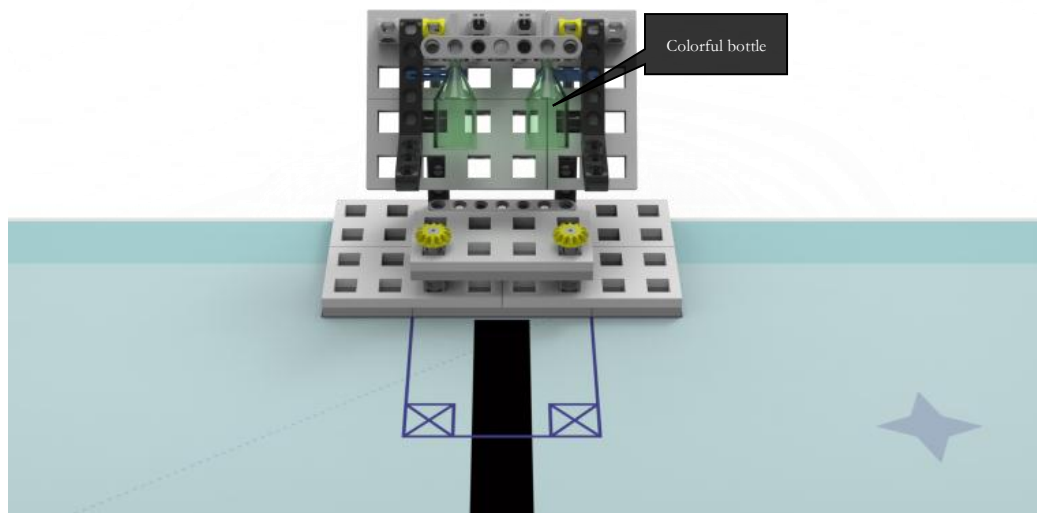
Picture 5: Computer task model

3.4 System conversion
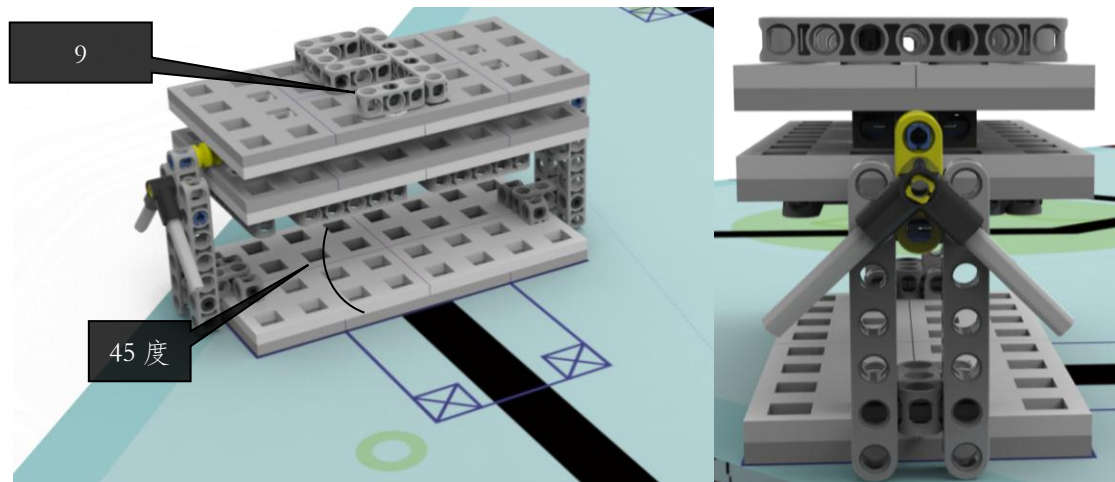
3.4.1 A system conversion is positioned in the arena with digits "1001" facing upward and its board being parallel to the ground. See picture 6 for reference.

3.4.2 Robot shall convert digits "1001" into figure "9"based on decimal system. (Figure "9"faces upward and its board forms a degree less than 45 °with the ground) The team will be scored 50 points. See picture 7 for reference.

Task level: ★ ★ ★ ★ ★

1001
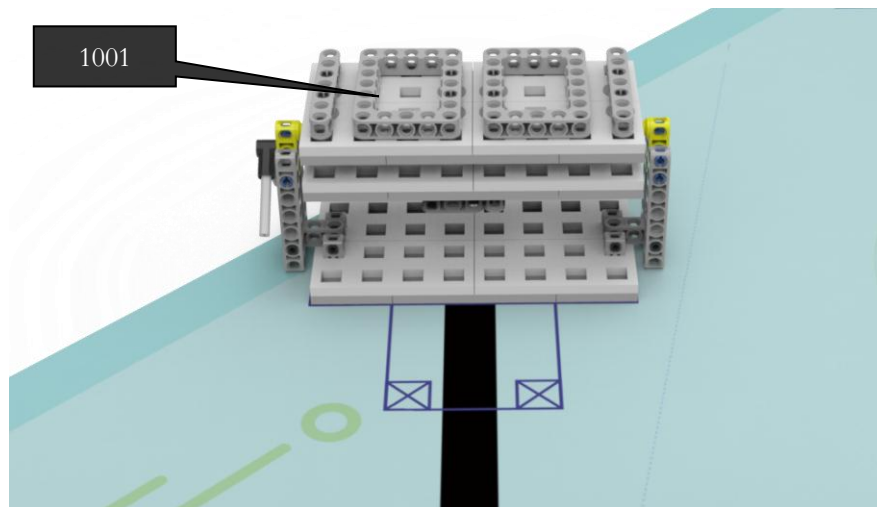
Picture 6: System Conversion

9

45 度

Picture 7: Completed status of system conversion

3.5 Starting navigation

3.5.1 A GPS model is positioned in the arena. See picture 8 for reference.

3.5.2 Robot shall carry its built components and place them on the pressure lever to make the arrow go vertical.(Contact surface formed by the arrow and board should be 90 degrees) Team will be scored 60 points. See picture 9 for reference.

Task level: ★ ★ ★ ★ ★ ★ ★
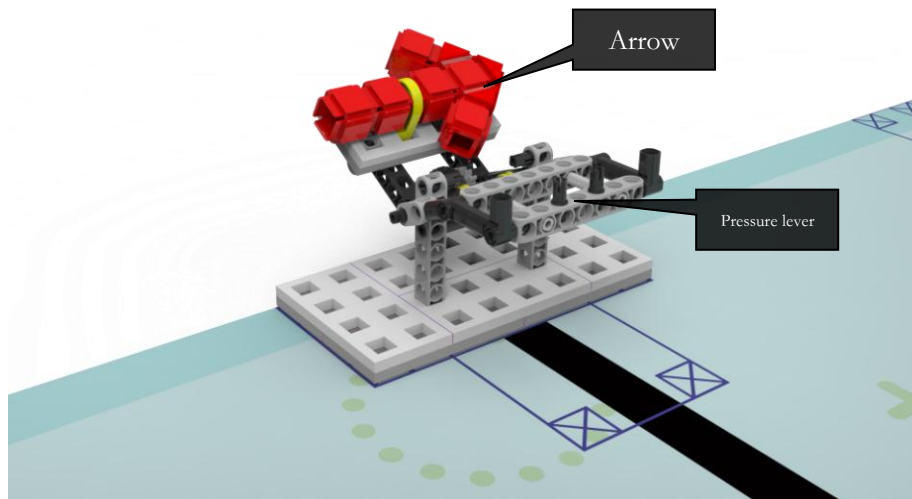
Picture 8: Initial status of Navigation
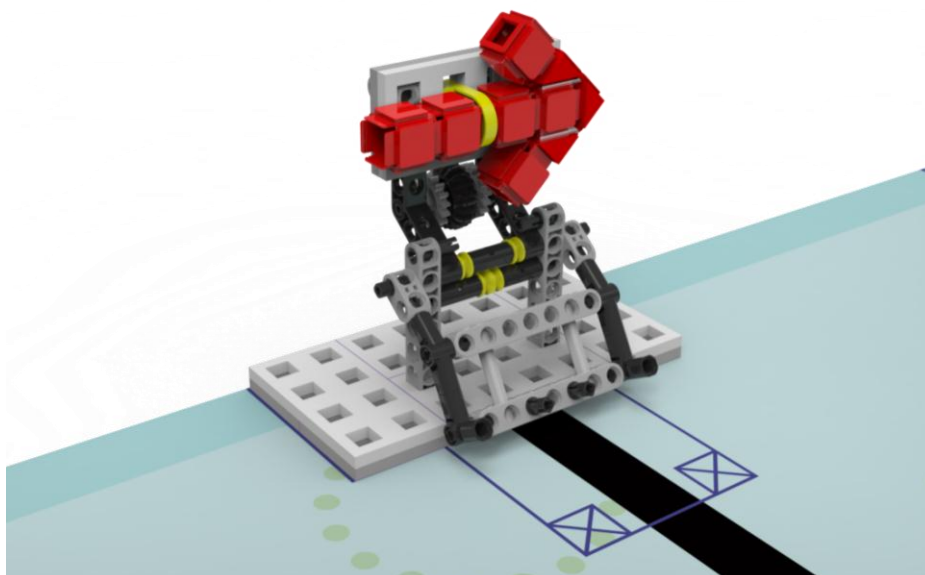
Picture 9: Completed status of Navigation

3.6 Download data

3.6.1 Database model is positioned in the middle of the arena and download axle stays level or vertical. Details will be announced prior to the contest. See picture 10 for reference.

3.6.2 Robot pushes data collector to "data"and turns around the axle. Each "data" falling into data collector will be scored 40 points. See picture 11 for reference.

3.6.3 Both situations can be scored ("Data"falls into data collector or falls on the upper surface of data collector). Otherwise, team cannot be scored.

Difficulty:

Task level：★★★★★★★★

Data

Collector

Axle
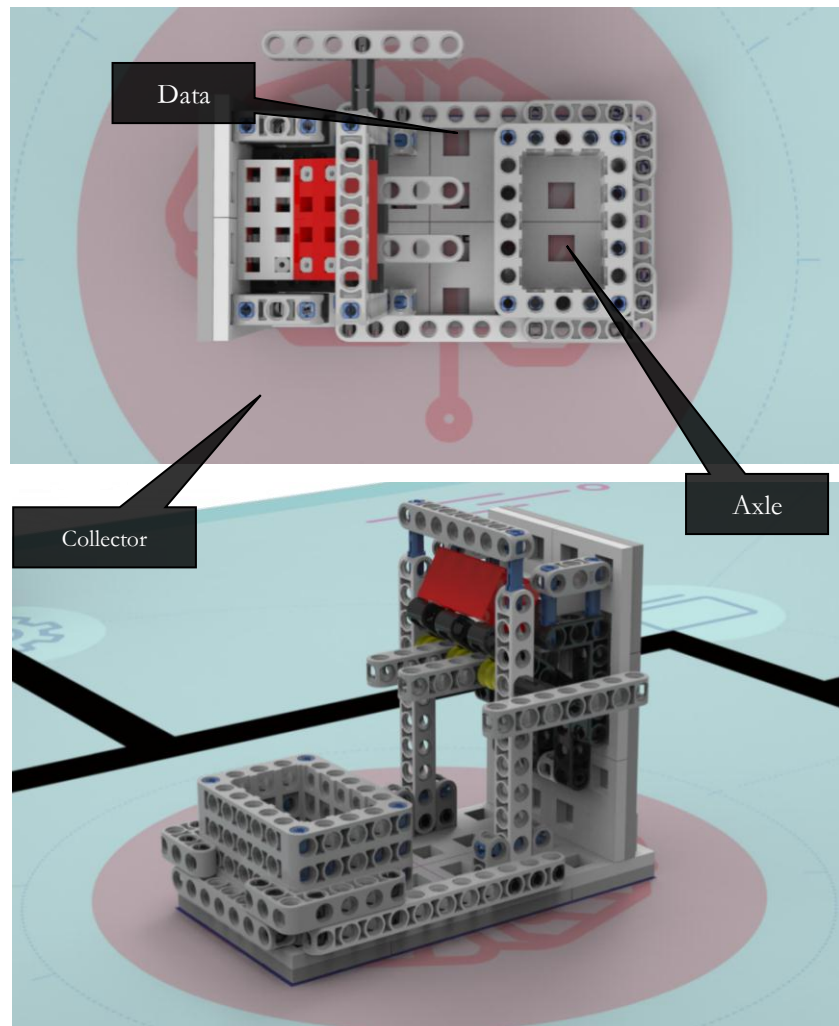
Picture10: Database Model

Picture11: Completed status of Database Collecting

4 Robot

Robot's design and building rules and regulations: All robots must be checked before the contest. In order to guarantee the fairness, judge will randomly check contestants' robots during the contest and require those non-compliant robots to be adjusted in line with the regulations. If the robot still cannot meet the requirement, contestants will be disqualified.
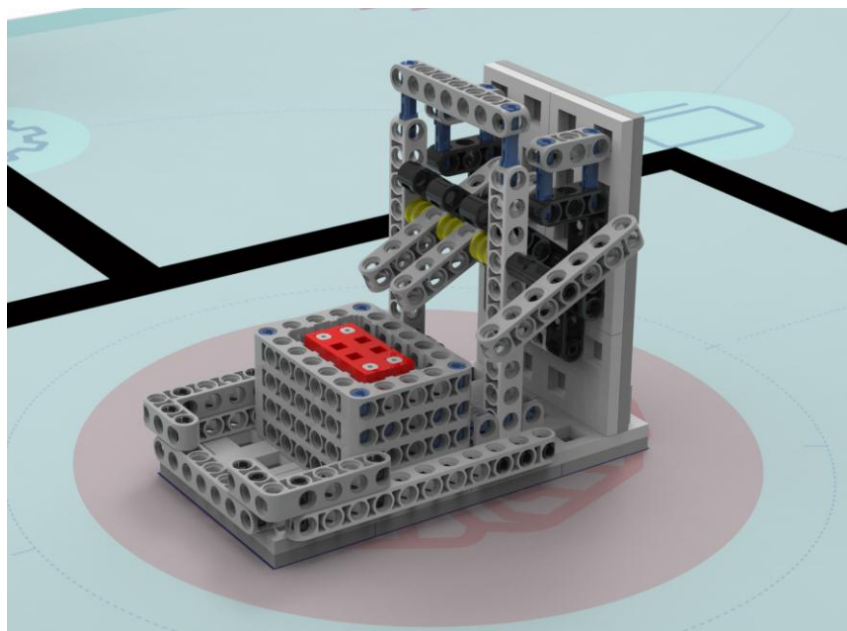
4.1 Dimension: The dimension of robot shall not be larger than 30cm x 30cm x 30cm (Length x Width x Height) before taking off; the structure of robot can automatically extend after leaving the base.

4.2 Controller: The controller shall not be replaced during the single round. Each robot can only use one controller.

4.3 Actuator: Each robot can only use 4 motors in total. (Digital steering engine is forbidden)

4.4 Sensor: The sort and number of sensors used by each robot are unlimited, while an integrated sensor made of various similar or different probes shall not be used.

4.5 Structure: Robots must apply plastic splicing structure; accessories such as ribbons, screws, rivets, glue or tapes shall not be applied.

4.6 Power: Each robot must have individual battery with a voltage less than 9V, external power supply, boost, step-down or regulated power supply shall not be applied.

5 Contest

5.1 Team

5.1.1 Each team consists of 2-3 students (in-school students by June 2018) and a trainer.

5.1.2 Contestants shall cope with all issues in the contest positively and voluntarily, with self-esteem and self-discipline, respect and kindly interact with teammates, opponents, volunteers, judges and all other people who have contributed greatly to the contest, and put into efforts to develop solid and sound qualities.

5.2   Rules

5.2.1 WER brick educational robot contests series are categorized into elementary, middle and high school group.

5.2.2 2-3 rounds are involved in the contest (no preliminary or semi-final). The time of each round is 150 seconds.

5.2.3 Time will not be extended even if the team chooses additional tasks.

5.2.4 After all rounds finish, rank teams based on their score in total, which is a sum of their score per each round.

5.2.5 It is of possibility that organizing committee alter the rules in terms of registration and practical situations.

5.3 Procedure

5.3.1 Build robot and program

5.3.1.1 Building and programming can only be conducted in preparation area while debugging can be performed in the arena map.

5.3.1.2 Contestants can enter the preparation area after registration. Judges needs to check the equipment carried by contestants. Built robots can be carried into the preparation area and all equipment must tally with the contest rules and regulations. Contestants are forbidden to carry telecommunication devices not improved by the organizing committee. After all contestants are seated in the preparation area, judges will notify teams of diagrams of model distribution and additional task rules.

5.3.1.3 Contestants should carry portable calculators, repair tools, replacement and spare parts. Contestants are prohibited to surf the internet or download any programs in the preparation area; contestants are also prohibited to shoot the venue by camera or other devices,

or contact trainer or parents by any means.

5.3.1.4 There are 2 hours including debugging and sealing. Contestants can make use of the time to revise robot's building and program referring to the surroundings.

5.3.1.5 Daily lighting is applied on the arena and contestants can calibrate sensors accordingly, whereas the organizing committee will not guarantee the on-arena lighting is constantly invariable. The lighting may alter in the progress of contest due to flashlight of camera or camcorder, LED light or other unknown lights, contestants should find solutions on their own.

Contestants must debug and prepare in order and trainers shall intervene by no means. Teams who disobey the order may be warned or even disqualified. Teams shall put robots in the designated place of the sealing area before the end of the debugging time, afterwards, the arena is in closure.

5.3.2 Preparation before contest time

5.3.2.1 Contestants pick up their own robots and are guided by judges into the contest field. Teams who do not show up in the regulated time will be deemed as waiver.

5.3.2.2 2 Contestants shall stand near the base after entering the field.

5.3.2.3 Contestants put their robots in the base, of whose parts and shadows must maintain inside the base.

5.3.2.4 The present contestants shall complete the preparation within 2 minutes and give a signal to the judge after completion.

5.3.3 Start-up

5.3.3.1 After judge confirms the team is ready, he/she will count down from 3 while contestant can use a hand to slowly approach the robot. When hearing the command "Start", contestant can touch the button or give the sensor a signal to start up the robot.

5.3.3.2 If the team starts up the robot before the command "Start" is given, the operation will be regarded as a mistake and the team will be warned or penalized accordingly (being counted as a restart).

5.3.3.3 Once robot starts up, it will only be controlled by the controller's in-built programs. Generally speaking, contestants shall not touch robots. (Restart is exceptional)

5.3.3.4 Contestants shall not deliberately detach components or drop components on the ground, such behaviors with a deliberate intent will be judged a foul. Any unintentionally dropped components shall be cleaned out of the arena instantly by the judge. Robot being scored due to detached components shall be invalid. Detached components indicate at a certain moment there is no connection between robot's built-in components and robot's body.

5.3.3.5 If the carried objects are cast out of the arena accidentally because of robot's rapid speed or program error, the objects shall not be back to the arena.

5.3.4 Restart

5.3.4.1 If dysfunction occurs or certain task is not completed in the progress, contestants can take the robot back to the base to restart and a "Restart" will be recorded; the tasks which are completed before "Restart" will be scored accordingly while the carried object during the dysfunction or task failure becomes invalid and will be kept by judge till the end of the contest. Timing will not be paused during the process.

5.3.4.2 Score: In each round, Restart 0 times, the team gains 40 points; Restart once, the team gains 30 points; Restart twice, the team

gains 20 points; Restart 3 times, the team gains 10 points; Restart 4 times or above, the team gains zero.

5.3.4.3 Time to Restart is of no limit in each round, but point-gaining will comply with 5.3.4.2.

5.3.4.4 Timing will not be paused or restarted during Restart period.

5.3.5 Robot can go back to the base autonomously.

5.3.5.1 Robot can go back and forth time and again, which will not be counted as a Restart.

5.3.5.2 The criterion of robot autonomously going back to the base is its vertical shadow lying in the base and contestants can touch robots which are already back to the base.

5.3.5.3 After robot autonomously goes back to the base, contestants can alter or repair robot's structure.

5.3.6 End of contest

5.3.6.1 Each round has 150 seconds.

5.3.6.2 After the team accomplishes some tasks, they shall give a signal to judge if they decide to give up in the contest, the judge will stop timing and keep the currently used time for a single round; otherwise, the team has to wait till the end of the contest. (Judge blows a whistle)

5.3.6.3 After judge blows a whistle for the ending of the contest, contestants must power off the robot instantly and leave the robot and all objects on arena untouched.

5.3.6.4 Judge fill in the scoring sheet and tell contestants their scores.

5.3.6.5. Contestants clear up the arena and move their robots back to the preparation area.

6 Score

6.1 Score the team based on their task accomplishment at the end of each round. Details in the 3th section.

6.2 The sequence of accomplishing tasks will not influence the score of a single task.

6.3 Some tasks can only be scored after the model is carried back to the base, meanwhile, the following requirements must be matched: 1. The criterion defining robot autonomously going back to the base; 2. The shadow of robot and that of the model are partially or utterly overlapped, or robot contacts the model.

7 Foul and Disqualification

7.1 The score of the team who does not show up on time will be deducted 10 points for every minute; if the team still does not show up in 2 minutes, they will be disqualified then.

7.2 Judge will give a warning to the team for their 1st mis-start, robot should be back to the base area for a Restart and timing will be restarted. The 2nd time mis-start will lead to the team's disqualification.

7.3 Detaching components intentionally is regarded as a foul. The team may be disqualified depending on the seriousness of the situation.

7.4 If the model is damaged by robot or contestants in the progress, intentionally or not, contestants will be given a warning. The task, no matter completed or not, will not be scored.

7.5 Neither the model nor robot shall be touched out of the base during the process, otherwise, a "Restart" will be recorded.

7.6 Contestants who disobey judge's directions will be disqualified.

7.7 Contestants will be disqualified if they privately contact trainer or parents without a permission of judge.

8 Rank

Each team will be ranked based on their score in total of all rounds, the higher the score is, the top the ranking will be. If there are teams scored the same, see followings to determine the ranking:

1) The team who used less time for all rounds will be ranked higher;

2) The team who restarts less will be ranked higher;

3) The team who completes more single tasks in all rounds will be ranked higher;

4) The team whose robot is less-weighted will be ranked higher, or the result will be decided by judge.

Appendix　Scoring Sheet

WER 2018 brick educational robot contest scoring sheet		Round ___
No.		Team	

	Tasks	Score	Status	Total Score
Online Shopping	Colorful bottles on the arena map	20/bottle		
	Colorful bottles in the base	30/bottle		
Start navigation	Arrow goes vertical (Contact Surface formed by the arrow and board should be 90 degrees.	60		
System conversion	Digits"1001"into figure"9"(Figure "9" faces upward and its board forms a degree less than 45 °with the ground)	50		
Download data	1 data model falling into data collector	40		
	2 data models falling into data collector	80		
Upload Data	Data model must contact the upper surface of board and maintain the status till the end of competition	60		
Renew E-waste	E-waste into E-waste disposal factory	50		
Additional task	Details to be confirmed	100		
Additional task	Details to be confirmed	100		
Additional task	Details to be confirmed	100		
Autonomous Operation Reward	40-(number of restart)*10. The score should be no less than zero.			
Total Score				
Time for the single round				

Remarks on disqualification:

Judge: _____　　Scorekeeper: _____

Players: _____

Chief Judge: _____　　Data Entry By: