The supplementary file of the paper "Multi-agent Coalition Formation by An Efficient Genetic Algorithm with Heuristic Initialization and Repair Strategy"

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Abstract

This PDF is the supplementary file of the paper "Multi-agent Coalition Formation by An Efficient Genetic Algorithm with Heuristic Initialization and Repair Strategy". The detailed algorithm flow, experimental data, parameter settings, etc. are available in this PDF. This PDF is publicly available at GitHub (https://github.com/luzaijiaoxia/SWEVO_supplementary_file).

1. GAHIR for STSCF/MTSCF

1.1. Random initialization

The random initialization method means that each agent joins the coalition with the probability of 0.5. The algorithm flow is described in Algorithm 1.

1.2. Decremental heuristic initialization

Decremental heuristic initialization firstly generates N_p random solutions by the random initialization in Section 1.1. Then, for N out of N_p solutions, the deletion operation will be performed until all superfluous agents have been deleted (N is equal to rounded $\frac{N_p}{2}$). The algorithm flow is shown in Algorithm

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Algorithm 1 Random initialization for STSCF/MTSCF

```
1: for s = 1 to N_p do

2: for i = 1 to n do

3: if rand < 0.5 (rand \in (0,1)) then

4: The agent a_i joins the coalition C.

5: end if

6: end for

7: Add the coalition into the initial population P_{ini}.

8: end for
```

Algorithm 2 Decremental heuristic initialization for STSCF/MTSCF

```
1: for s = 1 to N_p do
```

- 2: Add the coalition into the initial population P_{ini} generated by the random initialization in Algorithm 1.
- 3: end for
- 4: for s = 1 to N do
- 5: repeat
- 6: Obtain a list S_A in which deleting any agent does not break constraints in the current coalition C.
- 7: Randomly delete an agent a_i ($a_i \in S_A$).
- 8: **until** there are not superfluous agents in the coalition C.
- 9: end for

1.3. Hybrid repair strategy

Similar to the incremental heuristic initialization, the hybrid repair strategy (HY) will also be designed according to specific problems. The specific flow of the hybrid repair strategy is shown in Algorithm 3.

Algorithm 3 Hybrid repair strategy for STSCF/MTSCF

```
1: for s = 1 to N_p do
```

- 2: **if** the sth coalition C is an infeasible solution **then**
- 3: Compute the remaining requirement on the jth ability of the task $R_t^j = \min\{q_t^j q_c^j, 0\} \ (j \in \{1, 2, \dots, r\})$, the sum of the jth ability of every unassigned agent $R_B^j = \sum_{a_i \in R_A} b_i^j \ (j \in \{1, 2, \dots, r\})$, the set of the unassigned agents $R_A \ (R_A \cup C = A \ \text{and} \ R_A \cap C = \emptyset)$.

```
4: repeat
```

5: if
$$rand < \gamma \ (rand \in (0,1))$$
 then

6: Randomly select an agent a_i ($a_i \in R_A$) to join the sth coalition C.

7: else

8: Compute the value
$$f_i = (\sum_{j=1}^r \frac{R_t^j}{R_R^j} \times b_i^j)/d_i \ (a_i \in R_A).$$

9: Select the agent a_i ($a_i \in R_A$) which has the maximum value of f_i to join the coalition.

10: **end if**

11: Update
$$R_A, R_t^j$$
 and R_B^j $(j \in \{1, 2, ..., r\})$.

12: **until** the coalition C becomes a feasible solution.

13: end if

14: end for

2. GAHIR for MTMCF

2.1. Random initialization

Each solution in the initial population is randomly generated as shown in Algorithm 4. In each solution (coalition scheme), each agent is selected to join a coalition with the probability of 0.5. If an agent is selected to join a coalition, it can randomly join any task coalition.

2.2. Decremental heuristic initialization

The decremental heuristic initialization firstly generates random solutions. Then, superfluous agents will be deleted from each task coalition if the dele-

Algorithm 4 Random initialization for MTMCF

```
1: for s=1 to N_p do
2: for i=1 to n do
3: if rand < 0.5 (rand \in (0,1)) then
4: The agent a_i joins any coalition C_k (k \in \{1,2,\ldots,m\}).
5: end if
6: end for
7: Add all coalitions C_k (\forall k \in \{1,2,\ldots,m\}) into the initial population P_{ini}.
8: end for
```

Algorithm 5 Decremental heuristic initialization for MTMCF

```
1: for s = 1 to N_p do
```

2: Add the coalition into the initial population P_{ini} generated by the random initialization in Algorithm 4.

```
3: end for
```

```
4: for s = 1 to N do
```

5: **for** k = 1 to m **do**

6: repeat

7: Obtain a list S_A in which deleting any agent does not violate constraints in the current coalition C_k .

```
8: Randomly delete an agent a_i (a_i \in S_A).
```

9: **until** there are not superfluous agents in the coalition C_k .

10: end for

11: end for

tion does not violate the constraints. The detail of the decremental heuristic initialization is shown in Algorithm 5 where N is equal to rounded $\frac{N_p}{3}$.

2.3. Hybrid repair strategy

The hybrid repair strategy (HY) repairs solutions by adding unassigned agents to the coalitions which do not satisfy the ability requirements of the cor-

Algorithm 6 Hybrid repair strategy for MTMCF

- 1: for s = 1 to N_p do
- Initialize the set of the unassigned agents R_A , the remaining requirement on the jth ability of the kth task $R_{t_k}^j = \min\{p_{t_k}^j - p_{c_k}^j, 0\}$ $(k \in \mathbb{R}^n)$ $\{1,2,\ldots,m\},\ j\in\{1,2,\ldots,r\}),$ the sum of the jth ability of every unassigned agent $R_B^j = \sum_{a_i \in R_A} b_i^j$ $(j \in \{1, 2, ..., r\})$. **if** there exists a coalition C_k of the sth individual is infeasible **then**
- 3:
- repeat 4:
- if $rand < \gamma \ (rand \in (0,1))$ then 5:
- Randomly select an agent a_i ($a_i \in R_A$) to join any coalition 6: C_k $(k \in \{1, 2, ..., m\})$ which does not satisfy the task constraints.
- else 7:
- the value $s_k^j = \frac{R_{i_k}^j}{R_B^j}, \quad f_k^i$ Compute 8: $\sum_{j=1}^{r} \left(\frac{s_k^j}{\sum_{j=1}^{r} s_k^j} \times b_i^j \right) / d_i \ (a_i \in R_A).$
- Select the agent a_i to join the coalition C_k which has the maximum value of f_k^i .
- end if 10:
- Update $R_A, R_{t_k}^j$ and R_B^j $(k \in \{1, 2, ..., m\}, j \in \{1, 2, ..., r\})$. 11:
- **until** all coalitions C_k ($\forall k \in \{1, 2, ..., m\}$) satisfy the requirements 12: of the corresponding tasks or R_A is an empty set.
- 13: end if
- 14: end for

responding tasks. The repair method is based on the heuristic rules in the incremental heuristic initialization. The detail of the repair strategy is shown in Algorithm 6.

3. Experiments and Results

All experiments were carried out in MATLAB R2016a environment on a PC with Intel(R) Core(TM) i5-7500 @3.40GHz and 16GB RAM.

3.1. Parameter settings of compared methods

In the paper, the random sampling [1], the binary monarch butterfly optimization method [2] and the improved genetic algorithm-simulated annealing [3] are taken as competitors in the experiment. Some parameters of the compared methods were appropriately tuned and the remaining parameters were set to the setup of the presenters. How parameters of compared methods were tuned is shown as follows.

Table 1: Parameter settings of compared methods

	1		
Algorithm	Parameter	Description	Value
	N_p	population size	100
	P_c	crossover rate in the GA	0.8
	P_m	mutation rate in the GA	0.2
IGA-SA	K	the size of tournament selection in the GA	20
	L	maximum iterations in the SA	250
	T	maximum temperature in the SA	2500
	α	temperature change in the SA	0.9
	N_p	population size	3n
	p	migration ratio	5/12
	peri	migration period	1.2
BMBO	S_{max}	the max walk step of Levy flights	1.0
	Maxgen	maximum number of iterations	50
	BAR	butterfly adjusting rate	5/12
	RG	generation interval between recombination	50
/	NFE_{max}	maximum number of function evaluations	2000n

• Random Sampling (RS)[1]

All parameters are set as those of the presenters. The probability that each agent is assigned is 0.5.

• Binary Monarch Butterfly Optimization (BMBO) Method [2]

The parameter settings of BMBO are shown in Table 1. The population size N_p is set to 3n in this paper (the setup of N_p of the presenters is 50). The remaining parameters of BMBO are set as those of the presenters. The results of different N_p of BMBO are shown in Table 2. n represents the number of agents in each instance. Comprehensively, the larger population size is more beneficial to solve the problem. In Table 2, the *Score* represents the score of each algorithm for solving different instances, and their scores are evaluated based on the results of the statistical analysis and Wilcoxons rank-sum tests

with the significance level of 0.05. One algorithm gets a point as long as the Wilcoxons rank-sum test has demonstrated its performance is obviously better than another with regard to the mean of objective values in 20 runs for a certain instance.

Table 2: Experimental results of BMBO

No.	Objective value			
NO.	$N_p = 50$	$N_p = 3n$		
1	253.60 ± 2.68	253.00 ± 0.00		
2	1320.35 ± 13.34	1314.60 ± 8.31		
3	708.80 ± 26.63	686.05 ± 17.45		
4	3929.90 ± 27.61	$3912.15 \pm \! 0.37$		
5	9157.15 ± 72.92	$9085.80\ \pm 77.34$		
6	8572.70 ± 207.68	$\textbf{7754.80} \pm \textbf{212.61}$		
7	10320.10 ± 241.92	9264.65 ± 261.39		
8	17774.25 ± 194.92	$17003.25\ \pm 394.93$		
9	17952.65 ± 325.58	$15730.15\ \pm 359.33$		
10	10701.60 ± 496.26	$7709.60\ \pm 338.13$		
11	28904.30 ± 358.77	$27413.05 \pm \! 596.25$		
12	38716.35 ± 324.75	38192.50 ± 235.74		
Score	0	<u>10</u>		

• Improved Genetic Algorithm-simulated Annealing (IGA-SA) [3]

All parameters are set as those of the presenters. The parameter settings of IGA-SA are shown in Table 1.

- 3.2. Results and analysis about STSCF
- 3.2.1. Comparison about different combinations of initialization methods and constraint handling strategies

In this comparison experiment, the effect of different combinations of initialization methods and constraint handling strategies will be compared. The detailed results of the statistical analysis are shown in Table 3.

3.2.2. Comparison between GAHIR, IGA-SA, BMBO and RS

The convergence curves of GAHIR, IGA-SA, BMBO and RS in all instances are shown in Figure 1. The horizontal axis and the vertical axis represent the

 $\begin{tabular}{ll} Table 3: Results of the comparison between the variants of GAHIR with different combinations of initialization methods and constraint handling strategies for STSCF \\ \end{tabular}$

No. GAHR-RI-PF GAHR-RI-RR GAHR-RI-HY GAHR-RI-HR 1 253.00 ± 0.00 253.00 ± 0.00 253.00 ± 0.00 253.00 ± 0.00 253.00 ± 0.00 310.00 ± 0.00 1310.00 ± 0.00 1310.00 ± 0.00 1310.00 ± 0.00 668.00 ± 0.00 668.00 ± 0.00 8889.00 ± 0.00 8889.00 ± 0.00 8889.00 ± 0.00 8889.00 ± 0.00 8889.00 ± 0.00 7146.00		ation methods and co			~
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		3912.00 ± 0.00	3912.00 ± 0.00	3912.00 ± 0.00	3912.00 ± 0.00
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5	8889.00 ± 0.00	8889.00 ± 0.00	8889.00 ± 0.00	8889.00 ± 0.00
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	6	7148.80 ± 4.70	7146.00 ± 0.00	7146.00 ± 0.00	7146.00 ± 0.00
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	8306.70 ± 4.50	8302.35 ± 1.93	8302.20 ± 1.96	8304.30 ± 1.49
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8		15340.40 ± 6.17	15340.75 ± 4.89	15343.85 ± 3.76
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		13274.40 ± 7.74	13265.55 ± 3.00	13263.00 ± 0.00	13263.00 ± 0.00
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$ \begin{array}{ c c c c c c c c } \hline \textbf{No.} & \textbf{GAHIR-DI-PF} & \textbf{GAHIR-DI-RR} & \textbf{GAHIR-DI-HY} & \textbf{GAHIR-DI-HR} \\ \hline \textbf{1} & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 \\ 2 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 \\ 3 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 \\ 4 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 \\ 5 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 \\ 6 & 7148.10 \pm 3.75 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 \\ 7 & 8307.90 \pm 5.17 & 8301.70 \pm 2.05 & 8302.70 \pm 2.00 & 8304.90 \pm 1.02 \\ 8 & 15348.65 \pm 8.98 & 15339.40 \pm 6.26 & 15341.20 \pm 3.61 & 15344.35 \pm 4.04 \\ 9 & 13275.45 \pm 7.09 & 13265.75 \pm 3.32 & 13263.00 \pm 0.00 & 13263.40 \pm 1.23 \\ 10 & 5876.70 \pm 3.51 & 5874.10 \pm 2.34 & 5878.75 \pm 4.80 & 5881.85 \pm 4.68 \\ 11 & 23751.80 \pm 7.69 & 23750.65 \pm 9.08 & 23753.80 \pm 2.24 & 23757.25 \pm 1.33 \\ 12 & 33844.55 \pm 7.04 & 33838.10 \pm 5.30 & 33836.40 \pm 4.38 & 33845.80 \pm 0.89 \\ \hline \textbf{Score} & \textbf{20} & \textbf{47} & \textbf{51} & \textbf{22} \\ \hline \textbf{No.} & \textbf{GAHIR-HI-PF} & \textbf{GAHIR-HI-RR} & \textbf{GAHIR-HI-HY} & \textbf{GAHIR-HI-HR} \\ 1 & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 \\ 2 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 \\ 3 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 \\ 4 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 8889.00 \pm 0.00 \\ 5 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 668.00 \pm 0.00 \\ 6 & 7183.40 \pm 21.13 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 \\ 7 & 8320.00 \pm 0.00 & 8305.60 \pm 1.35 & 8305.10 \pm 1.02 & 8305.25 \pm 1.48 \\ 8 & 15402.10 \pm 9.16 & 15339.00 \pm 0.00 & 15336.20 \pm 3.69 & 15337.80 \pm 4.29 \\ 9 & 13382.25 \pm 35.68 & 13283.90 \pm 9.16 & 13266.55 \pm 3.22 & 13266.95 \pm 2.98 \\ 10 & 5878.00 \pm 0.00 & 5878.00 \pm 0.00 & 5877.35 \pm 2.06 & 5877.60 \pm 1.79 \\ 11 & 23822.30 \pm 15.28 & 23768.30 \pm 3.37 & 23756.80 \pm 4.14 & 23755.90 \pm 2.20 \\ 12 & 33920.70 \pm 13.88 & 33857.80 \pm 0.89 & 33853.75 \pm 3.73 & 33845.35 \pm 8.15 \\ \hline \end{tabular}$					
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1	253.00 ± 0.00	253.00 ± 0.00	253.00 ± 0.00	253.00 ± 0.00
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \end{array}$	253.00 ± 0.00 1310.00 ± 0.00 668.00 ± 0.00 3912.00 ± 0.00 8889.00 ± 0.00 7146.00 ± 0.00 8301.70 ± 2.05	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{888.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \end{array}$	$egin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8304.90 \pm 1.02 \\ \hline \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \end{array}$
$\begin{array}{ c c c c c c c c }\hline 12 & 33844.55 \pm 7.04 & 33838.10 \pm 5.30 & 33836.40 \pm 4.38 & 33845.80 \pm 0.89 \\ \hline Score & 20 & 47 & 51 & 22 \\ \hline \hline No. & GAHIR-HI-PF & GAHIR-HI-RR & GAHIR-HI-HY & GAHIR-HI-HR \\ 1 & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 & 253.00 \pm 0.00 \\ 2 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 & 1310.00 \pm 0.00 \\ 3 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 & 668.00 \pm 0.00 \\ 4 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 & 3912.00 \pm 0.00 \\ 5 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 & 8889.00 \pm 0.00 \\ 6 & 7183.40 \pm 21.13 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 & 7146.00 \pm 0.00 \\ 7 & 8320.00 \pm 0.00 & 8305.60 \pm 1.35 & 8305.10 \pm 1.02 & 8305.25 \pm 1.48 \\ 8 & 15402.10 \pm 9.16 & 15339.00 \pm 0.00 & 15336.20 \pm 3.69 & 15337.80 \pm 4.29 \\ 9 & 13382.25 \pm 35.68 & 13283.90 \pm 9.16 & 13266.55 \pm 3.22 & 13266.95 \pm 2.98 \\ 10 & 5878.00 \pm 0.00 & 5878.00 \pm 0.00 & 5877.35 \pm 2.06 & 5877.60 \pm 1.79 \\ 11 & 23822.30 \pm 15.28 & 23768.30 \pm 3.37 & 23756.80 \pm 4.14 & 23755.90 \pm 2.20 \\ 12 & 33920.70 \pm 13.88 & 33857.80 \pm 0.89 & 33853.75 \pm 3.73 & 33845.35 \pm 8.15 \\ \hline \end{array}$	1 2 3 4 5 6 7 8 9	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \end{array}$
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1 2 3 4 5 6 7 8 9	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \end{array}$
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1 2 3 4 5 6 7 8 9 10	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \textbf{GAHIR-HI-PF} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \\ \textbf{GAHIR-HI-RR} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \textbf{GAHIR-HI-HY} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \textbf{GAHIR-HI-HR} \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score No.	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \\ \textbf{GAHIR-HI-RR} \\ \textbf{253.00} \pm \textbf{0.00} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score No.	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \hline \textbf{51} \\ \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4 5	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \hline \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \end{array}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 839.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 2 3 4 5 6 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 6 7	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 839.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 3889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8305.60 \pm 1.35 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{810.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{8305.10} \pm \textbf{1.02} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \end{array}$
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1 2 3 4 5 6 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 6 7 8 8	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{CAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \textbf{15402.10} \pm \textbf{9.16} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{GAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8305.60 \pm 1.35 \\ 15339.00 \pm 0.00 \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.10} \pm \textbf{1.02} \\ \textbf{15336.20} \pm \textbf{3.69} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \textbf{15337.80} \pm \textbf{4.29} \\ \end{array}$
12 33920.70 ± 13.88 33857.80 ± 0.89 33853.75 ± 3.73 33845.35 ± 8.15	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 7 8 9	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \textbf{15402.10} \pm \textbf{9.16} \\ \textbf{13382.25} \pm \textbf{35.68} \\ \end{array}$	$\begin{array}{c} 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 8889.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8301.70 \pm 2.05 \\ 15339.40 \pm 6.26 \\ 13265.75 \pm 3.32 \\ 5874.10 \pm 2.34 \\ 23750.65 \pm 9.08 \\ 33838.10 \pm 5.30 \\ 47 \\ \hline \mathbf{CAHIR-HI-RR} \\ 253.00 \pm 0.00 \\ 1310.00 \pm 0.00 \\ 668.00 \pm 0.00 \\ 3912.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8899.00 \pm 0.00 \\ 7146.00 \pm 0.00 \\ 8305.60 \pm 1.35 \\ 15339.00 \pm 0.00 \\ 13283.90 \pm 9.16 \\ \hline \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \hline \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.10} \pm \textbf{1.02} \\ \textbf{15336.20} \pm \textbf{3.69} \\ \textbf{13266.55} \pm \textbf{3.22} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \textbf{15337.80} \pm \textbf{4.29} \\ \textbf{13266.95} \pm \textbf{2.98} \\ \end{array}$
	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 7 8 9 10	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \textbf{15402.10} \pm \textbf{9.16} \\ \textbf{13382.25} \pm \textbf{35.68} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \hline \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.60} \pm \textbf{1.35} \\ \textbf{15339.00} \pm \textbf{0.00} \\ \textbf{13283.90} \pm \textbf{9.16} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.10} \pm \textbf{1.02} \\ \textbf{1536.20} \pm \textbf{3.69} \\ \textbf{13266.55} \pm \textbf{3.22} \\ \textbf{5877.35} \pm \textbf{2.06} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \textbf{15337.80} \pm \textbf{4.29} \\ \textbf{13266.95} \pm \textbf{2.98} \\ \textbf{5877.60} \pm \textbf{1.79} \\ \end{array}$
Score 6 23 32 31	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 7 8 9 10 11	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \textbf{15402.10} \pm \textbf{9.16} \\ \textbf{13382.25} \pm \textbf{35.68} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \textbf{23822.30} \pm \textbf{15.28} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.60} \pm \textbf{1.35} \\ \textbf{15339.00} \pm \textbf{0.00} \\ \textbf{13283.90} \pm \textbf{9.16} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \textbf{23768.30} \pm \textbf{3.37} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \hline \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3305.10} \pm \textbf{1.02} \\ \textbf{1536.20} \pm \textbf{3.69} \\ \textbf{13266.55} \pm \textbf{3.22} \\ \textbf{5877.35} \pm \textbf{2.06} \\ \textbf{23756.80} \pm \textbf{4.14} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \textbf{15337.80} \pm \textbf{4.29} \\ \textbf{13266.95} \pm \textbf{2.98} \\ \textbf{5877.60} \pm \textbf{1.79} \\ \textbf{23755.90} \pm \textbf{2.20} \\ \end{array}$
	1 2 3 4 5 6 7 8 9 10 11 12 Score No. 1 2 3 4 5 6 7 8 9 10 11 12	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7148.10} \pm \textbf{3.75} \\ \textbf{8307.90} \pm \textbf{5.17} \\ \textbf{15348.65} \pm \textbf{8.98} \\ \textbf{13275.45} \pm \textbf{7.09} \\ \textbf{5876.70} \pm \textbf{3.51} \\ \textbf{23751.80} \pm \textbf{7.69} \\ \textbf{33844.55} \pm \textbf{7.04} \\ \textbf{20} \\ \hline \\ \textbf{GAHIR-HI-PF} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{7183.40} \pm \textbf{21.13} \\ \textbf{8320.00} \pm \textbf{0.00} \\ \textbf{15402.10} \pm \textbf{9.16} \\ \textbf{13382.25} \pm \textbf{35.68} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \textbf{23822.30} \pm \textbf{15.28} \\ \textbf{33920.70} \pm \textbf{13.88} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{8301.70} \pm \textbf{2.05} \\ \textbf{15339.40} \pm \textbf{6.26} \\ \textbf{13265.75} \pm \textbf{3.32} \\ \textbf{5874.10} \pm \textbf{2.34} \\ \textbf{23750.65} \pm \textbf{9.08} \\ \textbf{33838.10} \pm \textbf{5.30} \\ \textbf{47} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.60} \pm \textbf{1.35} \\ \textbf{15339.00} \pm \textbf{0.00} \\ \textbf{13283.90} \pm \textbf{9.16} \\ \textbf{5878.00} \pm \textbf{0.00} \\ \textbf{23768.30} \pm \textbf{3.37} \\ \textbf{33857.80} \pm \textbf{0.89} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{8302.70} \pm \textbf{2.00} \\ \textbf{15341.20} \pm \textbf{3.61} \\ \textbf{13263.00} \pm \textbf{0.00} \\ \textbf{5878.75} \pm \textbf{4.80} \\ \textbf{23753.80} \pm \textbf{2.24} \\ \textbf{33836.40} \pm \textbf{4.38} \\ \textbf{51} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.10} \pm \textbf{1.02} \\ \textbf{15336.20} \pm \textbf{3.69} \\ \textbf{13266.55} \pm \textbf{3.22} \\ \textbf{5877.35} \pm \textbf{2.06} \\ \textbf{23756.80} \pm \textbf{4.14} \\ \textbf{33853.75} \pm \textbf{3.73} \\ \end{array}$	$\begin{array}{c} \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{889.00} \pm \textbf{0.00} \\ \textbf{8304.90} \pm \textbf{1.02} \\ \textbf{15344.35} \pm \textbf{4.04} \\ \textbf{13263.40} \pm \textbf{1.23} \\ \textbf{5881.85} \pm \textbf{4.68} \\ \textbf{23757.25} \pm \textbf{1.33} \\ \textbf{33845.80} \pm \textbf{0.89} \\ \textbf{22} \\ \hline \textbf{CAHIR-HI-HR} \\ \textbf{253.00} \pm \textbf{0.00} \\ \textbf{1310.00} \pm \textbf{0.00} \\ \textbf{668.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{3912.00} \pm \textbf{0.00} \\ \textbf{8889.00} \pm \textbf{0.00} \\ \textbf{7146.00} \pm \textbf{0.00} \\ \textbf{8305.25} \pm \textbf{1.48} \\ \textbf{15337.80} \pm \textbf{4.29} \\ \textbf{13266.95} \pm \textbf{2.98} \\ \textbf{5877.60} \pm \textbf{1.79} \\ \textbf{23755.90} \pm \textbf{2.20} \\ \textbf{33845.35} \pm \textbf{8.15} \\ \hline \end{array}$

number of objective function evaluations and the mean value of the results of each algorithm in 20 runs, respectively.

3.3. Results and analysis about MTMCF

3.3.1. Comparison about different combinations of initialization methods and constraint handling strategies

In this comparison experiment, the effect of different combinations of initialization methods and constraint handling strategies will be tested. The results of statistical analysis in all instances are shown in Table 4.

3.3.2. Comparison between GAHIR and RS

For verifying the performance of GAHIR, GAHIR will be compared with RS.

In this experiment, GAHIR will adopt the decremental heuristic initialization (DI) and the heuristic repair strategy (HR). The box plots of GAHIR and RS are shown in Figure 2. The convergence curves of GAHIR and RS in all instances are shown in Figure 3. The horizontal axis and the vertical axis represent the number of objective function evaluations and the mean value of results of each algorithm in 20 runs, respectively.

3.3.3. Extension experiment of GAHIR

We additionally conducted the experiment of CPLEX and GAHIR for larger-scale instances, with the purpose of further studying the performance of GAHIR in larger-scale instances. The experimental results are shown in Table 5 where n.a. means that CPLEX cannot obtain global optima within two hours or the computer is out of memory. From the results of the further experiment, we conclude that CPLEX cannot obtain global optima within acceptable time (2 hours) in many larger-scale instances, and GAHIR can provide feasible solutions of good quality for the same instance. Furthermore, for the instances whose optima can be obtained by CPLEX, it can be seen that the optimality gap between GAHIR and the optima is small, which indicates that GAHIR has good performance in solving the problem.

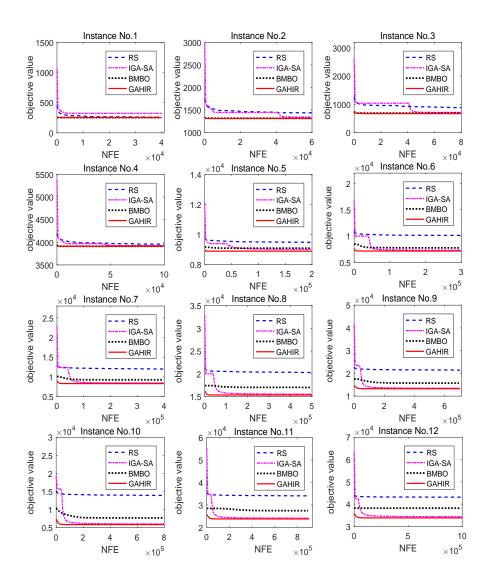


Figure 1: Convergence curves of GAHIR, IGA-SA, BMBO and RS for STSCF

Table 4: Results of the comparison between the variants of GAHIR with different combinations of initialization methods and constraint handling strategies for MTMCF

No.			GAHIR-RI-HY	GAHIR-RI-HR
	402 00 0 00	402 00 0 00	$\begin{array}{c} \textbf{GAHIR-RI-HY} \\ \textbf{493.00} & \pm 0.00 \\ \textbf{832.10} & \pm 4.92 \\ \textbf{794.00} & \pm 0.00 \\ \textbf{1443.00} & \pm 11.21 \\ \textbf{1309.25} & \pm 20.92 \\ \textbf{2076.00} & \pm 10.08 \\ \textbf{2030.80} & \pm 24.61 \\ \textbf{3144.35} & \pm 35.85 \\ \textbf{2892.55} & \pm 59.38 \\ \textbf{2952.55} & \pm 46.02 \\ \textbf{3184.90} & \pm 66.31 \\ \textbf{5580.55} & \pm 137.15 \\ \textbf{4127.90} & \pm 40.35 \\ \textbf{4030.90} & \pm 68.32 \\ \textbf{7525.05} & \pm 113.95 \\ \end{array}$	402 00 0 00
$\begin{vmatrix} 1 \\ 2 \end{vmatrix}$	493.00 ± 0.00	493.00 ± 0.00	493.00 ± 0.00	493.00 ± 0.00
2	841.90 ± 15.98	834.30 ± 8.00	832.10 ± 4.92	831.00 ± 0.00
$\begin{bmatrix} 2\\3\\4 \end{bmatrix}$	807.24 ± 17.86	794.00 ± 0.00	794.00 ± 0.00	794.00 ± 0.00
4	1451.35 ± 18.64	1440.30 ± 9.91	1443.00 ± 11.21	1460.20 ± 7.80
5	1522.30 ± 93.82	1345.90 ± 34.19	1309.25 ± 20.92	1286.00 ± 14.65
5 6 7 8 9	2660.23 ± 222.36	2083.40 ± 19.50	2076.00 ± 10.08	2078.60 ± 11.63
7	2143.45 ± 50.01	2061.05 ± 30.34	2030.80 ± 24.61	2016.50 ± 13.27
8	3432.45 ± 91.81	3210.95 ± 55.77	$3144\ 35\ \pm\ 35\ 85$	3095.85 ± 39.34
0	4634.07 ± 273.58	2082.85 ± 87.33	2802 55 ± 50 38	2883.45 ± 37.50
10	2205 55 ± 275.56	202.00 ± 01.00	2052.55 ± 46.02	2005.45 ± 51.55
	3203.33 ± 90.04	3030.45 ± 30.51	2992.99 ± 40.02	2900.70 ± 29.36
11	3733.93 ± 113.31	3320.60 ± 69.73	5164.90 ± 00.51	3120.10 ± 49.30
12	$8/95.46 \pm 769.01$	5703.55 ± 113.72	5580.55 ± 137.15	5532.00 ± 99.82
13	4427.40 ± 81.93	4239.90 ± 66.88	4127.90 ± 40.35	4106.20 ± 42.95
14	4947.80 ± 222.39	4270.00 ± 112.55	4030.90 ± 68.32	3981.00 ± 90.88
15	12701.29 ± 1051.79	7773.20 ± 223.35	7525.05 ± 113.95	7435.20 ± 122.17
Score	9	62	103	109
	CALLED II DE		CATIO II IIV	
No.	GAHIR-II-PF	GAHIR-II-RR	GAHIR-II-HY	GAHIR-II-HR
1	493.00 ± 0.00	493.00 ± 0.00	493.00 ± 0.00	493.00 ± 0.00
2	844.65 ± 16.90	834.00 ± 9.59	831.00 ± 0.00	831.00 ± 0.00
3	$\textbf{795.00}\pm\textbf{4.45}$	794.00 ± 0.00	794.00 ± 0.00	794.00 ± 0.00
4	1464.40 ± 20.43	1460.70 ± 12.91	1449.00 ± 13.44	1456.55 ± 10.34
2 3 4 5 6 7	1503.05 ± 79.79	1353.75 ± 50.62	1291.35 ± 20.92	1291.25 ± 17.91
6	2504 16 ± 218 45	2086.75 ± 18.40	2076 00 + 10 02	2079 50 + 13 32
5	2004.10 ± 210.40 2128 60 ± 26 76	2000.70 ± 10.40 2052.00 ± 20.62	2010.00 ± 10.02	2018 00 ± 13.36
[2240 45 1 26 07	2100 00 ± 50 60	2013.93 ± 23.02	2010.90 ± 12.03
8	3340.45 ± 86.97	5190.00 ± 50.62	3148.30 ± 37.54	3120.35 ± 41.16
9	4037.10 ± 359.21	3048.05 ± 83.87	$\begin{array}{c} \text{GAHIR-II-HY} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1449.00 \pm 13.44 \\ 1291.35 \pm 20.92 \\ 2076.00 \pm 10.02 \\ 2013.95 \pm 23.62 \\ 3148.30 \pm 37.54 \\ 2928.45 \pm 77.60 \\ 2944.05 \pm 38.67 \\ 3159.80 \pm 70.58 \\ 5625.35 \pm 151.98 \\ 4131.30 \pm 52.07 \\ 4021.40 \pm 89.93 \\ 7493.15 \pm 128.67 \\ 98 \end{array}$	2892.25 ± 66.23
10	3181.90 ± 84.51	3014.40 ± 52.81	2944.05 ± 38.67	2906.85 ± 14.67
11	3634.00 ± 139.81	3305.85 ± 101.97	3159.80 ± 70.58	3125.30 ± 66.67
12	8492.24 ± 760.16	5675.40 ± 162.85	5625.35 ± 151.98	5549.05 ± 126.50
13	4380.00 ± 52.71	4242.00 ± 51.33	4131.30 ± 52.07	4124.80 ± 24.52
14	4687.25 ± 154.49	4183.55 ± 77.97	4021.40 ± 89.93	3992.55 ± 59.85
15	11511.73 ± 653.48	$7684\ 50\ \pm\ 176\ 87$	$7/03 15 \pm 128 67$	7497.60 ± 121.56
	11011.70 ± 000.40	52	1433.13 ± 120.01	1497.00 ± 121.00
Score	18	32	98	103
No.	GAHIR-DI-PF	GAHIR-DI-RR	GAHIR-DI-HY	GAHIR-DI-HR
No. 1	$egin{array}{c} ext{GAHIR-DI-PF} \ ext{493.00} \pm 0.00 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-RR} \\ 493.00 \pm 0.00 \end{array}$	$egin{array}{c} ext{GAHIR-DI-HY} \ ext{493.00} & \pm 0.00 \end{array}$	$egin{array}{c} ext{GAHIR-DI-HR} \ ext{493.00} \pm 0.00 \end{array}$
1	GAHIR-DI-PF 493.00 ± 0.00 840.00 ± 14.80	$\begin{array}{c} \text{GAHIR-DI-RR} \\ 493.00 \pm 0.00 \\ 833.20 \pm 6.77 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \end{array}$
1	GAHIR-DI-PF 493.00 ± 0.00 840.00 ± 14.80 800.25 ± 15.18	$egin{array}{c} { m GAHIR-DI-RR} \\ { m 493.00} \pm 0.00 \\ { m 833.20} \pm 6.77 \\ { m 794.00} \pm 0.00 \\ \end{array}$	$ ext{GAHIR-DI-HY} \ ext{493.00} \pm 0.00 \ ext{832.90} \pm 8.50 \ ext{794.00} + 0.00 \ ext{}$	$egin{array}{c} { m GAHIR-DI-HR} \\ { m 493.00\pm0.00} \\ { m 831.00\pm0.00} \\ { m 794.00\pm0.00} \end{array}$
1	GAHIR-DI-PF 493.00 ± 0.00 840.00 ± 14.80 800.25 ± 15.18 1453.15 ± 14.63	$ ext{GAHIR-DI-RR} \\ ext{493.00} \pm 0.00 \\ ext{833.20} \pm 6.77 \\ ext{794.00} \pm 0.00 \\ ext{1440.00} + 11.89 \\ ext{} \end{aligned}$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \end{array}$
1	GAHIR-DI-PF 493.00 ± 0.00 840.00 ± 14.80 800.25 ± 15.18 1453.15 ± 14.63 1538.05 ± 69.04	$\begin{array}{c} \text{GAHIR-DI-RR} \\ 493.00 \pm 0.00 \\ 833.20 \pm 6.77 \\ 794.00 \pm 0.00 \\ 1440.00 \pm 11.89 \\ 1375.90 \pm 56.21 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HR} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ 1460.75 \pm 8.85 \\ \textbf{1201.35} \pm \textbf{20.92} \end{array}$
1	GAHIR-DI-PF 493.00 \pm 0.00 840.00 ± 14.80 800.25 ± 15.18 1453.15 ± 14.63 1538.05 ± 69.04 1538.05 ± 49.44	$\begin{array}{c} \text{GAHIR-DI-RR} \\ 493.00 \pm 0.00 \\ 833.20 \pm 6.77 \\ 794.00 \pm 0.00 \\ 1440.00 \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2000.00 \pm 20.25 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2027.20 \pm 10.67 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ 1460.75 \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075} = \textbf{05} \pm \textbf{0.75} \\ \textbf{2075} = \textbf{0.75} \\ \textbf{1291.35} = \textbf{20.75} \\ \textbf{2075} = \textbf{20.75} \\ \textbf{2075} = \textbf{20.75} \\ \textbf{2075} = \textbf{20.75} \\ \textbf{20.75} = \textbf{20.75} \\ 20.75$
1	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ \textbf{1375.90} \pm 56.21 \\ \textbf{2090.00} \pm 20.35 \\ \textbf{2090.00} \pm \textbf{20.35} \\ \textbf{2000.00} \pm \textbf{20.35} \\ 2$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2077.30 \pm 10.67 \\ \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ \end{array}$
1	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ 2156.65 \pm 45.34 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ \textbf{1375.90} \pm 56.21 \\ \textbf{2090.00} \pm 20.35 \\ \textbf{2065.80} \pm 30.98 \\ \textbf{2065.80} \pm$	$\begin{array}{c} \text{GAHIR-DI-HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2077.30 \pm 10.67 \\ 2015.35 \pm 31.88 \\ \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ \end{array}$
1	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ 2156.65 \pm 45.34 \\ 3473.30 \pm 104.95 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ \textbf{1375.90} \pm 56.21 \\ \textbf{2090.00} \pm 20.35 \\ \textbf{2065.80} \pm 30.98 \\ \textbf{3189.70} \pm 47.69 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ \end{array}$
1 2 3 4 5 6 7 8	$\begin{array}{c} \textbf{GAHIR-DI-PF}\\ \textbf{493.00} \pm \textbf{0.00}\\ 840.00 \pm 14.80\\ 800.25 \pm 15.18\\ 1453.15 \pm 14.63\\ 1538.05 \pm 69.04\\ 2684.75 \pm 244.10\\ 2156.65 \pm 45.34\\ 3473.30 \pm 104.95\\ 4509.95 \pm 421.56\\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ \end{array}$
1 2 3 4 5 6 7 8 9	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ 2156.65 \pm 45.34 \\ 3473.30 \pm 104.95 \\ 4509.95 \pm 421.56 \\ 3197.10 \pm 72.41 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm 12.44 \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm 33.69 \\ \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ \end{array}$
1 2 3 4 5 6 7 8	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm \textbf{14.80} \\ 800.25 \pm \textbf{15.18} \\ 1453.15 \pm \textbf{14.63} \\ 1538.05 \pm \textbf{69.04} \\ 2684.75 \pm \textbf{244.10} \\ 2156.65 \pm \textbf{45.34} \\ 3473.30 \pm \textbf{104.95} \\ 4509.95 \pm \textbf{421.56} \\ 3197.10 \pm \textbf{72.41} \\ 3758.95 \pm \textbf{162.99} \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ 2156.65 \pm 45.34 \\ 3473.30 \pm 104.95 \\ 4509.95 \pm 421.56 \\ 3197.10 \pm 72.41 \\ 3758.95 \pm 162.99 \\ 9285.69 \pm 757.95 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm 12.44 \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm 14.80 \\ 800.25 \pm 15.18 \\ 1453.15 \pm 14.63 \\ 1538.05 \pm 69.04 \\ 2684.75 \pm 244.10 \\ 2156.65 \pm 45.34 \\ 3473.30 \pm 104.95 \\ 4509.95 \pm 421.56 \\ 3197.10 \pm 72.41 \\ 3758.95 \pm 162.99 \\ 9285.69 \pm 757.95 \\ 4478.05 + 91.40 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 + 46.16 \\ \end{array}$	$\begin{array}{c} {\rm GAHIR\text{-}DI\text{-}HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2077.30 \pm 10.67 \\ 2015.35 \pm 31.88 \\ 3153.30 \pm 49.62 \\ 2926.35 \pm 48.81 \\ 2928.20 \pm 33.69 \\ 3157.85 \pm 61.02 \\ 5517.75 \pm 94.60 \\ 4134.25 \pm 34.69 \\ \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 + 44.28 \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm \textbf{14.80} \\ 800.25 \pm \textbf{15.18} \\ 1453.15 \pm \textbf{14.63} \\ 1538.05 \pm \textbf{69.04} \\ 2684.75 \pm \textbf{244.10} \\ 2156.65 \pm \textbf{45.34} \\ 3473.30 \pm \textbf{104.95} \\ 4509.95 \pm \textbf{421.56} \\ 3197.10 \pm \textbf{72.41} \\ 3758.95 \pm \textbf{162.99} \\ 9285.69 \pm \textbf{757.95} \\ 4478.05 \pm \textbf{91.40} \\ 4963.60 + \textbf{163.54} \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-HY} \\ \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 + 73.81 \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14	$\begin{array}{c} \textbf{GAHIR-DI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm \textbf{14.80} \\ 800.25 \pm \textbf{15.18} \\ 1453.15 \pm \textbf{14.63} \\ 1538.05 \pm \textbf{69.04} \\ 2684.75 \pm \textbf{244.10} \\ 2156.65 \pm \textbf{45.34} \\ 3473.30 \pm \textbf{104.95} \\ 4509.95 \pm \textbf{421.56} \\ 3197.10 \pm \textbf{72.41} \\ 3758.95 \pm \textbf{162.99} \\ 9285.69 \pm \textbf{757.95} \\ 4478.05 \pm \textbf{91.40} \\ 4963.60 \pm \textbf{163.54} \\ 12852.69 \pm \textbf{1209.37} \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ \textbf{7857.50} \pm 187.55 \\ \end{array}$	$\begin{array}{c} {\rm GAHIR\text{-}DI\text{-}HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2077.30 \pm 10.67 \\ 2015.35 \pm 31.88 \\ 3153.30 \pm 49.62 \\ 2926.35 \pm 48.81 \\ 2928.20 \pm 33.69 \\ 3157.85 \pm 61.02 \\ 5517.75 \pm 94.60 \\ 4134.25 \pm 34.69 \\ 4051.85 \pm 89.28 \\ 7494.10 \pm 143.04 \end{array}$	$\begin{array}{c} \text{GAHIR-DI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.100} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \end{array}$	$\begin{array}{c} \textbf{GAHIR-DI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm 11.89 \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \end{array}$	$\begin{array}{c} {\rm GAHIR\text{-}DI\text{-}HY} \\ 493.00 \pm 0.00 \\ 832.90 \pm 8.50 \\ 794.00 \pm 0.00 \\ 1441.60 \pm 12.44 \\ 1302.70 \pm 24.57 \\ 2077.30 \pm 10.67 \\ 2015.35 \pm 31.88 \\ 3153.30 \pm 49.62 \\ 2926.35 \pm 48.81 \\ 2928.20 \pm 33.69 \\ 3157.85 \pm 61.02 \\ 5517.75 \pm 94.60 \\ 4134.25 \pm 34.69 \\ 4051.85 \pm 89.28 \\ 7494.10 \pm 143.04 \\ 100 \pm 143.$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 29902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{833.20} \pm \textbf{6.77} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1440.00} \pm \textbf{11.89} \\ \textbf{1375.90} \pm \textbf{56.21} \\ \textbf{2090.00} \pm \textbf{20.35} \\ \textbf{2065.80} \pm \textbf{30.98} \\ \textbf{3189.70} \pm \textbf{47.69} \\ \textbf{3003.55} \pm \textbf{110.05} \\ \textbf{3022.45} \pm \textbf{41.12} \\ \textbf{3304.50} \pm \textbf{77.67} \\ \textbf{5713.60} \pm \textbf{221.14} \\ \textbf{4225.30} \pm \textbf{46.16} \\ \textbf{4280.65} \pm \textbf{99.86} \\ \textbf{7857.50} \pm \textbf{187.55} \\ \textbf{62} \end{array}$	493.00 ± 0.00 832.90 ± 8.50 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline \\ 110 \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 Score	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score No. 1 2 3 4	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \hline \textbf{GAHIB-HI-PF} \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62	493.00 ± 0.00 832.90 ± 0.00 794.00 ± 0.00 1441.60 ± 12.44 1302.70 ± 24.57 2077.30 ± 10.67 2015.35 ± 31.88 3153.30 ± 49.62 2926.35 ± 48.81 2928.20 ± 33.69 3157.85 ± 61.02 5517.75 ± 94.60 4134.25 ± 34.69 4051.85 ± 89.28 7494.10 ± 143.04 100	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm \textbf{20.92} \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm \textbf{38.62} \\ \textbf{2902.60} \pm \textbf{53.86} \\ \textbf{2896.30} \pm \textbf{13.41} \\ \textbf{3117.00} \pm \textbf{64.41} \\ \textbf{5562.25} \pm \textbf{108.96} \\ \textbf{4118.25} \pm \textbf{44.28} \\ \textbf{4004.95} \pm \textbf{73.81} \\ \textbf{7459.10} \pm \textbf{118.47} \\ \hline \\ \textbf{110} \\ \hline \\ \textbf{GAHB-HI-HB} \\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Score No.	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{348.55} \pm \textbf{68.27} \\ \textbf{360.05} \\ \textbf{360.05} \pm \textbf{360.05} \\ \textbf$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ \hline \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm 20.92 \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm 38.62 \\ \textbf{2992.60} \pm 53.86 \\ \textbf{2896.30} \pm 13.41 \\ \textbf{3117.00} \pm 64.41 \\ \textbf{5562.25} \pm 108.96 \\ \textbf{4118.25} \pm 44.28 \\ \textbf{4004.95} \pm 73.81 \\ \textbf{7459.10} \pm 118.47 \\ \hline \textbf{110} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1461.15} \pm 6.96 \\ \textbf{1298.55} \pm 32.35 \\ \hline \end{array}$
1 2 3 4 4 5 6 6 7 7 8 8 9 10 11 12 13 14 15 Score No. 1 2 3 4 4 5 6 6	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $
1 2 3 4 4 5 6 6 7 8 8 9 10 111 12 13 14 15 Score No. 1 2 3 4 5 6 6 7	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62 $GAHIR-HI-RR$ 493.00 ± 0.00 831.00 ± 0.00 794.00 ± 0.00 1459.60 ± 9.34 1372.50 ± 66.47 2086.50 ± 12.92 2044.85 ± 27.45	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2992.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline \hline \textbf{CAHIR-HI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 1461.15 \pm 6.96 \\ 1298.55 \pm 32.35 \\ 2077.45 \pm 13.13 \\ 2011.70 \pm 14.07 \\ \hline \end{array}$
1 2 3 4 4 5 6 6 7 7 8 8 9 10 11 12 13 14 15 Score No. 1 2 3 4 4 5 6 6	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm 20.92 \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm 38.62 \\ \textbf{2992.60} \pm 53.86 \\ \textbf{2896.30} \pm 13.41 \\ \textbf{3117.00} \pm 64.41 \\ \textbf{5562.25} \pm 108.96 \\ \textbf{4118.25} \pm 44.28 \\ \textbf{4004.95} \pm 73.81 \\ \textbf{7459.10} \pm 118.47 \\ \hline \textbf{110} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1461.15} \pm 6.96 \\ \textbf{1298.55} \pm 32.35 \\ \textbf{2077.45} \pm 13.13 \\ \textbf{2011.70} \pm 14.07 \\ \textbf{3106.60} \pm 31.82 \\ \end{array}$
1 2 3 4 4 5 6 6 7 8 8 9 10 111 12 13 14 15 Score No. 1 2 3 4 5 6 6 7	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62 $GAHIR-HI-RR$ 493.00 ± 0.00 831.00 ± 0.00 794.00 ± 0.00 1459.60 ± 9.34 1372.50 ± 66.47 2086.50 ± 12.92 2044.85 ± 27.45	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2992.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline \hline \textbf{CAHIR-HI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 1461.15 \pm 6.96 \\ 1298.55 \pm 32.35 \\ 2077.45 \pm 13.13 \\ 2011.70 \pm 14.07 \\ \hline \end{array}$
1 2 3 4 4 5 6 6 7 7 8 9 10 111 12 13 14 15 Score No. 1 2 3 4 4 5 6 6 7 8 9 9	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{3888.95} \pm \textbf{139.38} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{833.20} \pm \textbf{6.77} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ 3055.10 \pm 99.01 \\ \hline \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{20077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \textbf{100} \\ \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2992.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $
1 2 3 4 4 5 6 7 8 8 9 10 11 12 13 14 15 Score No. 1 2 3 4 4 5 6 7 8 8 9 10	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{CAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{388.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62 $GAHIR-HI-RR$ 493.00 ± 0.00 794.00 ± 0.00 1459.60 ± 9.34 1372.50 ± 66.47 2086.50 ± 12.92 2044.85 ± 27.45 3173.55 ± 59.29 3055.10 ± 99.01 3020.90 ± 48.30	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $
1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 13 14 15 Score No. 1 2 3 4 5 5 6 6 7 8 9 10 11	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{3888.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \textbf{3693.40} \pm \textbf{100.89} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ 3055.10 \pm 99.01 \\ 3020.90 \pm 48.30 \\ 3283.10 \pm 59.56 \\ \hline \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2992.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline \hline \textbf{CAHIR-HI-HR} \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 1461.15 \pm 6.96 \\ 1298.55 \pm 32.35 \\ 2077.45 \pm 13.13 \\ 2011.70 \pm 14.07 \\ 3106.60 \pm 31.82 \\ 2896.90 \pm 50.46 \\ 2913.50 \pm 28.27 \\ 3119.90 \pm 52.36 \\ \hline \end{array}$
1 2 3 4 4 5 6 6 7 7 8 9 10 111 12 13 14 15 Score No. 1 2 3 4 4 5 6 6 7 7 8 9 10 111 12	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ 840.00 \pm \textbf{14.80} \\ 840.025 \pm \textbf{15.18} \\ 1453.15 \pm \textbf{14.63} \\ 1538.05 \pm \textbf{69.04} \\ 2684.75 \pm \textbf{244.10} \\ 2156.65 \pm \textbf{45.34} \\ 3473.30 \pm \textbf{104.95} \\ 4509.95 \pm \textbf{421.56} \\ 3197.10 \pm \textbf{72.41} \\ 3758.95 \pm \textbf{162.99} \\ 9285.69 \pm \textbf{757.95} \\ 4478.05 \pm \textbf{91.40} \\ 4963.60 \pm \textbf{163.54} \\ 12852.69 \pm \textbf{1209.37} \\ \hline \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ 844.70 \pm \textbf{13.55} \\ 796.07 \pm \textbf{4.70} \\ 1462.30 \pm \textbf{5.98} \\ 1488.55 \pm \textbf{68.27} \\ 2696.96 \pm \textbf{157.90} \\ 2092.75 \pm \textbf{32.15} \\ 3314.10 \pm \textbf{65.87} \\ 3888.95 \pm \textbf{139.38} \\ 3202.40 \pm \textbf{90.31} \\ 3693.40 \pm \textbf{10.89} \\ 7952.89 \pm \textbf{270.85} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{833.20} \pm 6.77 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ 3055.10 \pm 99.01 \\ 3020.90 \pm 48.30 \\ 3283.10 \pm 59.56 \\ 5657.10 \pm 107.39 \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \textbf{5550.85} \pm \textbf{103.74} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1460.75} \pm 8.85 \\ \textbf{1291.35} \pm 20.92 \\ \textbf{2075.05} \pm 9.75 \\ \textbf{2014.50} \pm 20.42 \\ \textbf{3108.90} \pm 38.62 \\ \textbf{2992.60} \pm 53.86 \\ \textbf{2896.30} \pm 13.41 \\ \textbf{3117.00} \pm 64.41 \\ \textbf{5562.25} \pm 108.96 \\ \textbf{4118.25} \pm 44.28 \\ \textbf{4004.95} \pm 73.81 \\ \textbf{7459.10} \pm 118.47 \\ \hline \textbf{110} \\ \hline \textbf{GAHIR-HI-HR} \\ \textbf{493.00} \pm 0.00 \\ \textbf{831.00} \pm 0.00 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1461.15} \pm 6.96 \\ \textbf{1298.55} \pm 32.35 \\ \textbf{2077.45} \pm 13.13 \\ \textbf{2011.70} \pm 14.07 \\ \textbf{3106.60} \pm 31.82 \\ \textbf{2896.90} \pm 50.46 \\ \textbf{2913.50} \pm 28.27 \\ \textbf{3119.90} \pm 52.36 \\ \textbf{5522.60} \pm 82.94 \\ \end{array}$
1 2 3 4 4 5 6 6 7 7 8 9 10 11 12 13 14 15 Score No. 1 2 3 4 4 5 6 6 7 7 8 8 9 10 11 12 13	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.025} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{7} \\ \textbf{GAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{3888.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \textbf{3693.40} \pm \textbf{100.89} \\ \textbf{7952.89} \pm \textbf{270.85} \\ \textbf{4389.40} \pm \textbf{59.14} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{833.20} \pm \textbf{6.77} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1459.60} \pm \textbf{9.34} \\ \textbf{1372.50} \pm \textbf{66.47} \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ \textbf{3173.55} \pm \textbf{59.29} \\ \textbf{3055.10} \pm \textbf{99.01} \\ \textbf{3020.90} \pm \textbf{48.30} \\ \textbf{3283.10} \pm \textbf{59.56} \\ \textbf{5657.10} \pm \textbf{197.39} \\ \textbf{4216.70} \pm \textbf{36.91} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{832.90} \pm \textbf{8.50} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm \textbf{24.57} \\ \textbf{20077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm \textbf{49.62} \\ \textbf{2926.35} \pm \textbf{48.81} \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \textbf{5550.85} \pm \textbf{103.74} \\ \textbf{4133.40} \pm \textbf{41.97} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $
1 2 3 4 4 5 6 6 7 8 9 10 11 12 2 3 4 4 5 6 6 7 8 8 9 10 11 12 13 14 15 6 6 7 8 8 9 10 11 12 13 14	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{CAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{388.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \textbf{3693.40} \pm \textbf{100.89} \\ \textbf{7952.89} \pm \textbf{270.85} \\ \textbf{4389.40} \pm \textbf{59.14} \\ \textbf{4551.35} \pm \textbf{77.21} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{833.20} \pm \textbf{6.77} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ 3055.10 \pm 99.01 \\ 3020.90 \pm 48.30 \\ 3283.10 \pm 59.56 \\ 5657.10 \pm 107.39 \\ 4216.70 \pm 36.91 \\ 4184.90 \pm 86.06 \\ \hline \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \textbf{5550.85} \pm \textbf{103.74} \\ \textbf{4133.40} \pm \textbf{41.97} \\ \textbf{4068.10} \pm \textbf{96.70} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $
1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 13 14 15 5 6 6 7 8 9 10 11 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{CAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{3888.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \textbf{3693.40} \pm \textbf{100.89} \\ \textbf{7952.89} \pm \textbf{270.85} \\ \textbf{4389.40} \pm \textbf{59.14} \\ \textbf{4551.35} \pm \textbf{77.21} \\ \textbf{11374.71} \pm \textbf{375.11} \\ \end{array}$	493.00 ± 0.00 833.20 ± 6.77 794.00 ± 0.00 1440.00 ± 11.89 1375.90 ± 56.21 2090.00 ± 20.35 2065.80 ± 30.98 3189.70 ± 47.69 3003.55 ± 110.05 3022.45 ± 41.12 3304.50 ± 77.67 5713.60 ± 221.14 4225.30 ± 46.16 4280.65 ± 99.86 7857.50 ± 187.55 62 $GAHIR-HI-RR$ 493.00 ± 0.00 831.00 ± 0.00 1459.60 ± 9.34 1372.50 ± 66.47 2086.50 ± 12.92 2044.85 ± 27.45 3173.55 ± 59.29 3055.10 ± 99.01 3020.90 ± 48.30 3283.10 ± 59.56 5657.10 ± 107.39 4216.70 ± 36.91 4184.90 ± 86.06 7745.60 ± 152.58	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{831.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \textbf{5550.85} \pm \textbf{103.74} \\ \textbf{4133.40} \pm \textbf{41.97} \\ \textbf{4068.10} \pm \textbf{96.70} \\ \textbf{7538.85} \pm \textbf{130.87} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 29902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline \hline $CAHIR-HI-HR$ \\ 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 1461.15 \pm 6.96 \\ 1298.55 \pm 32.35 \\ 2077.45 \pm 13.13 \\ 2011.70 \pm 14.07 \\ 3106.60 \pm 31.82 \\ 2896.90 \pm 50.46 \\ 2913.50 \pm 28.27 \\ 3119.90 \pm 52.36 \\ 5522.60 \pm 82.94 \\ 4125.95 \pm 41.19 \\ 3980.10 \pm 70.77 \\ 7449.95 \pm 136.04 \\ \hline \end{array}$
1 2 3 4 4 5 6 6 7 8 9 10 11 12 13 4 4 5 6 6 7 8 8 9 10 11 12 13 14 15 6 6 7 8 8 9 10 11 12 13 14	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{840.00} \pm \textbf{14.80} \\ \textbf{800.25} \pm \textbf{15.18} \\ \textbf{1453.15} \pm \textbf{14.63} \\ \textbf{1538.05} \pm \textbf{69.04} \\ \textbf{2684.75} \pm \textbf{244.10} \\ \textbf{2156.65} \pm \textbf{45.34} \\ \textbf{3473.30} \pm \textbf{104.95} \\ \textbf{4509.95} \pm \textbf{421.56} \\ \textbf{3197.10} \pm \textbf{72.41} \\ \textbf{3758.95} \pm \textbf{162.99} \\ \textbf{9285.69} \pm \textbf{757.95} \\ \textbf{4478.05} \pm \textbf{91.40} \\ \textbf{4963.60} \pm \textbf{163.54} \\ \textbf{12852.69} \pm \textbf{1209.37} \\ \textbf{7} \\ \textbf{CAHIR-HI-PF} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{844.70} \pm \textbf{13.55} \\ \textbf{796.07} \pm \textbf{4.70} \\ \textbf{1462.30} \pm \textbf{5.98} \\ \textbf{1488.55} \pm \textbf{68.27} \\ \textbf{2696.96} \pm \textbf{157.90} \\ \textbf{2092.75} \pm \textbf{32.15} \\ \textbf{3314.10} \pm \textbf{65.87} \\ \textbf{388.95} \pm \textbf{139.38} \\ \textbf{3202.40} \pm \textbf{90.31} \\ \textbf{3693.40} \pm \textbf{100.89} \\ \textbf{7952.89} \pm \textbf{270.85} \\ \textbf{4389.40} \pm \textbf{59.14} \\ \textbf{4551.35} \pm \textbf{77.21} \\ \end{array}$	$\begin{array}{c} \textbf{493.00} \pm \textbf{0.00} \\ \textbf{833.20} \pm \textbf{6.77} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1440.00} \pm \textbf{11.89} \\ 1375.90 \pm 56.21 \\ 2090.00 \pm 20.35 \\ 2065.80 \pm 30.98 \\ 3189.70 \pm 47.69 \\ 3003.55 \pm 110.05 \\ 3022.45 \pm 41.12 \\ 3304.50 \pm 77.67 \\ 5713.60 \pm 221.14 \\ 4225.30 \pm 46.16 \\ 4280.65 \pm 99.86 \\ 7857.50 \pm 187.55 \\ \hline \textbf{62} \\ \hline \textbf{GAHIR-HI-RR} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1459.60} \pm 9.34 \\ 1372.50 \pm 66.47 \\ 2086.50 \pm 12.92 \\ 2044.85 \pm 27.45 \\ 3173.55 \pm 59.29 \\ 3055.10 \pm 99.01 \\ 3020.90 \pm 48.30 \\ 3283.10 \pm 59.56 \\ 5657.10 \pm 107.39 \\ 4216.70 \pm 36.91 \\ 4184.90 \pm 86.06 \\ \hline \end{array}$	$\begin{array}{c} \textbf{493.00} \pm 0.00 \\ \textbf{832.90} \pm 8.50 \\ \textbf{794.00} \pm 0.00 \\ \textbf{1441.60} \pm \textbf{12.44} \\ \textbf{1302.70} \pm 24.57 \\ \textbf{2077.30} \pm \textbf{10.67} \\ \textbf{2015.35} \pm \textbf{31.88} \\ \textbf{3153.30} \pm 49.62 \\ \textbf{2926.35} \pm 48.81 \\ \textbf{2928.20} \pm \textbf{33.69} \\ \textbf{3157.85} \pm \textbf{61.02} \\ \textbf{5517.75} \pm \textbf{94.60} \\ \textbf{4134.25} \pm \textbf{34.69} \\ \textbf{4051.85} \pm \textbf{89.28} \\ \textbf{7494.10} \pm \textbf{143.04} \\ \hline \textbf{100} \\ \hline \textbf{GAHIR-HI-HY} \\ \textbf{493.00} \pm \textbf{0.00} \\ \textbf{794.00} \pm \textbf{0.00} \\ \textbf{1450.30} \pm \textbf{14.61} \\ \textbf{1301.75} \pm \textbf{27.28} \\ \textbf{2077.25} \pm \textbf{10.59} \\ \textbf{2016.90} \pm \textbf{14.97} \\ \textbf{3147.05} \pm \textbf{49.24} \\ \textbf{2899.10} \pm \textbf{52.26} \\ \textbf{2924.65} \pm \textbf{28.94} \\ \textbf{3168.25} \pm \textbf{68.31} \\ \textbf{5550.85} \pm \textbf{103.74} \\ \textbf{4133.40} \pm \textbf{41.97} \\ \textbf{4068.10} \pm \textbf{96.70} \\ \end{array}$	$\begin{array}{c} 493.00 \pm 0.00 \\ 831.00 \pm 0.00 \\ 794.00 \pm 0.00 \\ 1460.75 \pm 8.85 \\ 1291.35 \pm 20.92 \\ 2075.05 \pm 9.75 \\ 2014.50 \pm 20.42 \\ 3108.90 \pm 38.62 \\ 2902.60 \pm 53.86 \\ 2896.30 \pm 13.41 \\ 3117.00 \pm 64.41 \\ 5562.25 \pm 108.96 \\ 4118.25 \pm 44.28 \\ 4004.95 \pm 73.81 \\ 7459.10 \pm 118.47 \\ \hline $

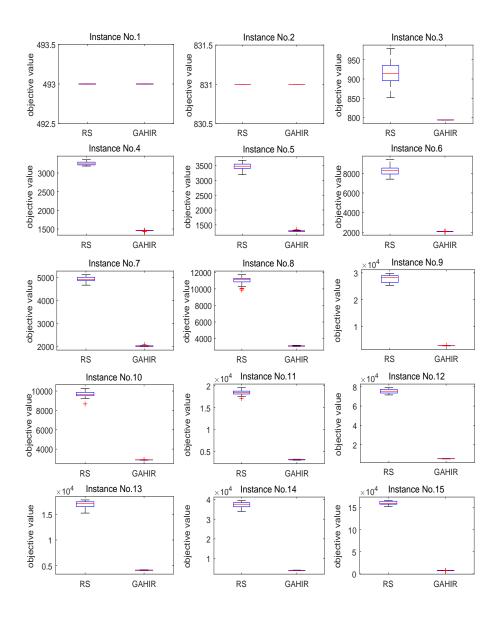


Figure 2: Box plots of GAHIR and RS for MTMCF

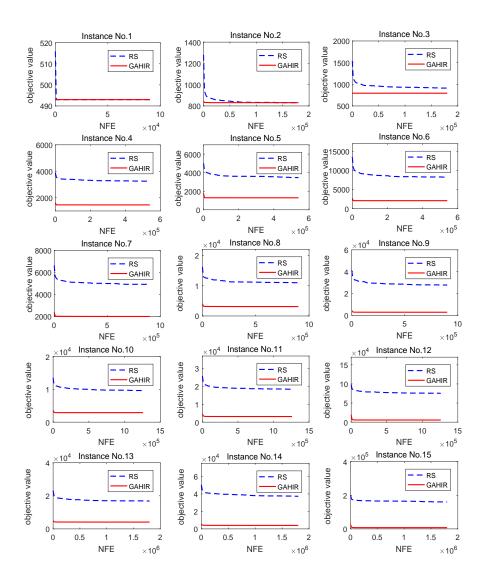


Figure 3: Convergence curves of GAHIR and RS for MTMCF

Table 5: The objective values of the GAHIR in solving larger-scale instances for MTMCF

No.	n	m	Objective value		
NO.	11		GAHIR	$f^*(CPLEX)$	
1		8	3934.00 ± 27.85	3792.00	
2		10	$4390.70{\pm}49.55$	n.a	
3	80	16	$4040.65{\pm}67.03$	n.a	
4		20	$5116.40{\pm}71.77$	n.a	
5		40	5670.60 ± 144.45	5379.00	
6		9	3173.55 ± 44.33	3011.00	
7		10	$3962.30{\pm}26.81$	n.a	
8	90	15	$3952.25{\pm}72.52$	n.a	
9		18	$4336.70{\pm}43.92$	n.a	
10		30	$4586.15{\pm}68.85$	n.a	
11		5	3947.05 ± 17.11	3891.00	
12		10	$4118.25{\pm}44.28$	n.a	
13	100	20	$4004.95{\pm}73.81$	n.a	
14		25	$5955.70{\pm}61.02$	n.a	
15		50	7459.10 ± 118.47	7253.00	

References

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- [1] B. Xin, Y. P. Wang, J. Chen, An efficient marginal-return-based constructive heuristic to solve the sensor-weapon-target assignment problem, IEEE Transactions on Systems, Man, and Cybernetics: Systems (2018) 1–12doi:10.1109/TSMC.2017.2784187.
 - [2] Y. H. Feng, G. G. Wang, S. Deb, M. Lu, X. J. Zhao, Solving 0-1 k-napsack problem by a novel binary monarch butterfly optimization, Neural Computing and Applications 28 (7) (2017) 1619–1634. doi:10.1007/s00521-015-2135-1.
 - [3] A. E. Ezugwu, V. Pillay, D. Hirasen, K. Sivanarain, M. Govender, A comparative study of meta-heuristic optimization algorithms for 0-1 knap-sack problem: Some initial results, IEEE Access 7 (2019) 43979–44001. doi:10.1109/ACCESS.2019.2908489.