

# Robots

by Al Levy

*Robots Compete for Title of "World Computer-Bridge Champion" in "cool" Menton*

The American Contract Bridge League's 7th annual World Computer-Bridge Championship was held in Menton, France, from June 22-25, at the site of the European Bridge League's first Open European Championships. Nine of the best bridge-playing software programs, or robots, competed for the title of 2003 World Computer-Bridge Champion. The software developers, along with their robots, enjoyed the "cool" playing facility of the Bridge Club du Menton, the only air-conditioned bridge playing facility in sweltering Menton.

## History

At the suggestion of New York Times bridge editor Alan Truscott, I petitioned the ACBL in 1996 to hold a computer-bridge event — and thus was born the World Computer-Bridge Championship. I have coordinated this championship event since its inception, holding it every year since 1997 at an important international bridge event (for humans). The preceding six championships were held three times at ACBL North American Bridge Championships and three times at World Bridge Federation World Championships. For a complete history and details of previous championships go to the Internet site: [ny-bridge.com/allevy/Menton](http://ny-bridge.com/allevy/Menton)

## Play Format

The five-day event started with a 20-board round robin with the top four robots

advancing to a 64-board KO semifinals, with carryover. To be awarded a carryover in the KO segment, a robot must both win its head-to-head round robin match against its KO opponent and finish higher in the overall standings. The carryover is the lesser of these two victory-point (VP) differences.

## Technical Remarks

A bridge "table" consists of a central server, or Table Manager (TM), that distributes the deals to four connected computers, each of which contains a robot. Before a match begins the opponent operators exchange convention cards and methods and enter the pertinent information into their robots' databases. Play then proceeds automatically with the TM receiving and passing information to the robots and recording the play of each deal. This year we used P4 1.8 MHz/256 MB PCs running under Windows XP. The speed of play was set at two minutes per pair per deal, approximately half that of human play.

Without getting into details, most of the computer programs use combinations of knowledge-based AI, based on sets of rules, and search-based AI based on simulations, in the bidding and play.

## The Competition

After nine round-robin segments, with each program sitting out one round, Wbridge5 topped all competitors with 165

VPs. Close behind was two-time defending champion, Jack, with 162 VPs, followed by Micro Bridge with 161 VPs. Bridge Baron was fourth, beating out Q-Plus Bridge and Oxford Bridge for the last semifinal birth. Would we see a rematch of last year's final in which Jack defeated Wbridge5 by 1 imp?

**20-Board Round Robin, 25 VP scale**

Wbridge5, France	165
Jack, The Netherlands	162
Micro Bridge, Japan	161
Bridge Baron, USA	141
Q-Plus Bridge, Germany	128
Oxford Bridge, UK	121
Blue Chip Bridge, UK	88
Meadowlark Bridge, USA	29
Sabrina, France	9

In the semifinal KOs Wbridge5 played fourth place Bridge Baron and second place Jack was matched against third place Micro Bridge. There were no carryovers, because

the lower overall round-robin finisher in each semifinal KO match defeated its semifinal opponent in the head-to-head round-robin match.

In the semifinals, Jack handily defeated Micro Bridge 167-81. In the other semifinal match, Bridge Baron made a remarkable comeback, from a 47-imp deficit with 16 boards to play, to defeat Wbridge5 143-139.

Semifinal	Wbridge5, France	Bridge Baron, USA
1-16	20	36
17-32	60	19
33-48	40	18
49-64	19	70
Total	139	143

Semifinal	Jack, Netherlands	Micro Bridge, Japan
1-16	36	9
17-32	33	26
33-48	59	12
49-64	39	34
Total	167	81

Board 48	North		
West dealer	♠ 10 7		
E-W vul	♥ A 10 8 4 3		
	♦ 9 7 4 2		
	♣ 6 3		
West		East	
♠ 6		♠ 9 5 3 2	
♥ 9 6		♥ Q J 7 2	
♦ A K Q 8 3		♦ J 6 5	
♣ Q J 7 5 2		♣ K 8	
	South		
	♠ A K Q J 8 4		
	♥ K 5		
	♦ 10		
	♣ A 10 9 4		

West	North	East	South
BB	Wb5	BB	Wb5
1 ♦	pass	1 ♥	double
2 ♣	pass	2 ♦	3 ♠
pass	4 ♠	double	(all pass)

One board that gave Wbridge5 some of its big lead was the last board of the third quarter, board 48.

West led the ♦ A and shifted to a trump. Wbridge5 played best for 10 tricks, playing ♥ K, a heart to the ace and a club, not allowing East on lead to return a second trump. The play of the ♥ K followed by a heart to the ace gave West a chance to err. If West has a second trump (and only one heart), declarer is going down in 4♠ unless West, with ♣ K-Q-J-x, mistakenly ruffs the second heart. South can then still keep East off lead, ruff a club, and pitch a club on the ♥ A.

At the other table Bridge Baron stopped in 3♠ and, with similar play, also made 10 tricks — 9 imps to Wbridge5.

In the final Jack defeated Bridge Baron 188-117 to retain the title of World Computer-Bridge Champion. This is Jack's third year in a row as title holder. Jack won the 2001 championship at the ACBL's summer NABC in Toronto, defeating Micro Bridge in the final, and won the 2002 championship at the WBF's world championship in Montreal, defeating Wbridge5 in the final.

Final	Bridge Baron, USA	Jack, Netherlands
1-16	26	79 (+2 carryover)
17-32	29	34
33-48	6	56
49-64	56	17
<b>Total</b>	<b>117</b>	<b>188</b>

To show the level of play of these two robots, boards 1-16 are presented without selecting the better hands.

Board 1	North	West	North	East	South
North dealer	♠ 7 5 3	Jack	BB	Jack	BB
None vul	♥ K 9 3	—	pass	pass	pass
	♦ Q 8 4 2	1 ♥	pass	1 ♠	pass
	♣ K 10 3	3NT*	pass	4 ♥	(all pass)
West		East			
♠ A Q		♠ 10 8 6 4			
♥ A J 8 6 5 2		♥ Q 4			
♦ 7 3		♦ A J 5			
♣ A Q J		♣ 9 8 7 2			
	South				
	♠ K J 9 2				
	♥ 10 7				
	♦ K 10 9 6				
	♣ 6 5 4				

\*17-18 HCP, six+ hearts, 0-2 spades

West	North	East	South
BB	Jack	BB	Jack
—	pass	pass	pass
1 ♥	pass	1 ♠	pass
4 ♥	(all pass)		

Bridge Baron's bidding (auction on the left) was not best, and it was lucky to reach the best contract. Jack's bidding (above) was sensible and scientific, with 3NT showing 17-18 HCP with 6+ hearts and less than three spades. North led the ♦4 at both tables (third best). Bridge Baron went up with the ♦A and took the spade finesse immediately to make the game. Jack played low from dummy at trick one and South went up with the king. When South returned a spade, Jack trusted the ♦K play and went up with the ♠A to finesse in diamonds, discarding his ♠Q on the ♦A — 4♥ made at both tables, no swing.

Board 2	North		
East dealer	♠ 9 8 7 5		
N-S vul	♥ 9 8 6 4 3		
	♦ J		
	♣ Q J 4		
West		East	
♠ Q 4		♠ A 6 3 2	
♥ K J 5		♥ A 2	
♦ A K Q 6		♦ 9 8 3	
♣ K 8 7 5		♣ A 10 9 2	
	South		
	♠ K J 10		
	♥ Q 10 7		
	♦ 10 7 5 4 2		
	♣ 6 3		

West	North	East	South
Jack	BB	Jack	BB
—	—	1 ♣	pass
2 ♣*	pass	2 NT	pass
3 NT	(all pass)		

\*inverted minor raise

Two notrump was not forcing opposite an inverted minor raise. West made a reasonable and winning decision not to pursue slam with a maximum 31 HCP and two balanced hands, and East made 12 tricks on a spade lead.

At the other table Bridge Baron reasonably bid to the relatively hopeless 6♣ contract and went down after a ♦2 lead (low from odd number). BB won the lead in dummy and cashed the ♣K and ♣A, then led a top diamond. North ruffed and BB had to lose a spade. Down one — 11 imps to Jack

The best play in 6♣ after a diamond lead is probably to cash the ♣K to see if an honor drops, then play three rounds of hearts, finessing, then a club to the ace and a diamond finesse of South's 10. This finesse is not clear, however. Now a trump endplays North if he has the ♠K.

Board 3	North	East
South dealer	♠ 9 6 4	♠ A J
E-W vul	♥ A 9 7	♥ K Q J 10 8 5 3 2
	♦ 8 3 2	♦ Q J
	♣ Q 10 9 2	♣ A
West	South	
♠ Q 10 7 3	♠ K 8 5 2	
♥ 4	♥ 6	
♦ A 10 6	♦ K 9 7 5 4	
♣ K J 8 6 5	♣ 7 4 3	

West	North	East	South
BB	Jack	BB	Jack
—	—	—	pass
pass	pass	2 ♣	pass
2 ♦ (waiting)	pass	2 ♥	pass
3 ♣*	pass	3 ♥	pass
3 NT	pass	4 ♥	pass
6 NT	(all pass)		

\*natural, BB doesn't use a double negative

At the table Bridge Baron went down in 6NT when Jack found the killing spade lead. At the other table, Jack rested in 4♥ and made six on a spade lead — 13 imps to Jack.

Editor's Question to Al Levy: How do you know that a computer doesn't "cheat"? That North doesn't know that South has the spade king? Or that one player doesn't know what the entire hand is?

Levy: Good question. There are situations ("peeking" at cards and passing hidden information to partner) that we have addressed extensively, but without a perfect solution — yet — as is the case in human

West	North	East	South
Jack	BB	Jack	BB
—	—	—	pass
pass	pass	2 ♣	pass
3 ♣ (positive)	pass	3 ♥	pass
4 ♥**	(all pass)		

\*\*Jack programmer Hans Kuijf says: "3♣ showed 8+ and a decent 5+ card club suit (this is about the minimum). The 4♥ bid by West showed a minimum, and East simply had no faith in 6♥. Slightly underbid but explainable. I guess the 4♥ bid should be replaced by, for example, 3♠, asking partner to describe the hand further. Showing a minimum might not be so important here."

Bridge Baron continued to bid aggressively, and seemed to just guess at 6NT when 6♥ could easily have been a much better slam.\* It turns out that 6NT by West is better than 50%, making whenever the spade finesse is onside no matter what the lead, and making other times as well ... for example, a diamond lead away from the king or not covered by South.

\*The only defense to defeat 6♥ is the ♦K lead or a trump lead and a diamond shift.

play. As in human play safeguards are in place but all precautions are not yet taken. For example, we could use firewalls to better protect against peeking and passing illegal information. This may be done in the future. Again, as in human play, if there is a suspicion of peeking or passing information, extensive testing might be done. The rules allow for the organizers to check the programs during and after play. All participants agree to these tests as part of their entry.

The safeguards are evolving. When we started play seven years ago we used both North and South on the same computer and East and West on the same computer.

Operators orally passed the bids and plays to opponents as their program made them and the opponent operator manually input information into his program, and on and on. The safeguards were spot checks on bidding and play by taking a good result and changing card(s) to see if a program bid or played the same. Some spot checks were done, but the rule was to trust entrants unless complaints or suspicions were made. Finding a queen always or more than statistically correct is proof of "peeking."

Now we set up with one program (hand) per computer. No firewalls yet, so there is room for some fancy programming, but that is minimized by the threat of random testing.

We require obtaining the version of each program used ahead of time for checking at any time...during and after the championship, as well as spot checking during play. Of course, the program that they started with might have been modified during the event.... Between matches operators may improve and/or debug their programs, provided that the program remains substantially the same. In summary, we are evolving to taking all safeguards and if there is suspicion, extensive "monitoring" is available.

The current players all appear to be above reproach and trusting of each other. The sportsmanship is refreshing. A great group of software developers!

Board 4	North		
West dealer	♠ J 9 8 5 2		
All vul	♥ 8 7		
	♦ 10 6 5		
	♣ 8 7 6		
West		East	
♠ K 7 6		♠ A Q 10 4 3	
♥ J 9 6 2		♥ A Q	
♦ 9 8		♦ J 4 3 2	
♣ A Q 9 5		♣ 4 3	
	South		
	♠ —		
	♥ K 10 5 4 3		
	♦ A K Q 7		
	♣ K J 10 2		

West	North	East	South
BB	Jack	BB	Jack
pass	pass	1 ♠	double
redouble	pass	pass	2 ♥
3 ♠	pass	4 ♠	(all pass)

West	North	East	South
Jack	BB	Jack	BB
pass	pass	1 ♠	double
2 ♥*	pass	2 ♠	3 ♥
pass	pass	3 ♠	pass
pass	double	(all pass)	

\*8+ HCP, three-card support for spades

At both tables South doubled and bid hearts, Jack at the two level and Bridge Baron at the three level. At Table One, Bridge Baron went down one in 4♠ while at Table Two, where Jack's 2♥ bid showed 8+ HCP and exactly three spades, Bridge Baron erred and doubled 3♠. Jack made 10 tricks when South eventually led away from the ♥K — 14 imps to Jack.

This is an interesting hand for East to play. After two rounds of diamonds and a club shift, declarer wins the ♣Q, cashes the

Board 4	North	
West dealer	♠ J 9 8 5 2	
All vul	♥ 8 7	
	♦ 10 6 5	
	♣ 8 7 6	
West		East
♠ K 7 6		♠ A Q 10 4 3
♥ J 9 6 2		♥ A Q
♦ 9 8		♦ J 4 3 2
♣ A Q 9 5		♣ 4 3
	South	
	♠ —	
	♥ K 10 5 4 3	
	♦ A K Q 7	
	♣ K J 10 2	

ace, ruffs a club, cashes the ♥A, ruffs a diamond, and leads a club from dummy. If North discards a heart, declarer ruffs low and has 10 tricks. If North ruffs with the ♠5, East discards the ♥Q and has 10 tricks. Interestingly, declarer must try to ruff the fourth club before the fourth diamond is ruffed with the ♠K.

Bridge Baron playing in 4♠ could play South for most of the HCPs and short spades but didn't find the winning line even with help. Jack led the ♦A and shifted to small heart. Declarer won the ♥Q, cashed the ♥A and led a diamond, ducked by South to North's ♦10. North returned his third diamond, ruffed in dummy. A heart was led, ruffed by North with the ♠5 and overruffed with the ♠10. The ♦J was now ruffed with the ♠K, North pitching a club. Then a trump was led to the 2 and queen! The ♠A was cashed and another spade led to North, who still had a high spade to set the contract.

At other table, in 3♠ doubled, play started with the ♦A and a shift to the ♣J with the queen winning. The ♠6 was led to the queen, a club to the ace, ♠K, diamond to the 10, jack and queen. In desperation to reach partner, to remove trump from dummy, BB led away from the ♥K and Jack made an overtrick.

Board 5	North	
North dealer	♠ A K J 10 8	
N-S vul	♥ 10 2	
	♦ 10 4 3	
	♣ A K 7	
West		East
♠ Q 6 5 3		♠ 4 2
♥ A 7 6		♥ J 9 4
♦ K 5		♦ Q J 8 6
♣ 9 5 4 3		♣ 10 8 6 2
	South	
	♠ 9 7	
	♥ K Q 8 5 3	
	♦ A 9 7 2	
	♣ Q J	

On board 5 both sides reached 3NT after North opened 1NT and South showed his red suits.\* At both tables East led a club. Jack made 12 tricks when it took the spade finesse at trick two and then led the ♥10. Bridge Baron covered with the Jack and later pitched a heart on the run of spades. At the other table, Bridge Baron made only nine tricks when it led to the ♠K at trick two, then led the ♥10 and went up with the king when Jack did not cover — 3 imps to Jack. The first-round spade finesse was the percentage play.

\*This looks like an automated 1NT opening bid, where the computer has not taken into account suit quality and stoppers. — Editor

Board 6  
 East dealer  
 E-W vul

North  
 ♠ K 10 5  
 ♥ A Q 4  
 ♦ J 8 5 3  
 ♣ A 10 5

West  
 ♠ J 9 3 2  
 ♥ K J 10 7  
 ♦ A  
 ♣ K J 8 6

South  
 ♠ 6 4  
 ♥ 8 5  
 ♦ K Q 10 9 4 2  
 ♣ Q 4 2

West	North	East	South
BB	Jack	BB	Jack
—	—	pass	3 ♦*
pass**	3 NT	(all pass)	

\*2♦ not available, since Jack uses Flannery. Kuijff was surprised to see that Jack alerted 3♦!

\*\*Editor's Question: Why didn't Bridge Baron double 3♦ for takeout in the first auction? Levy: With a passed partner a double might be borderline with 13 HCP including the stiff ♦A; this is a question of program evaluation and risk/reward.

West	North	East	South
Jack	BB	Jack	BB
—	—	pass	2 ♦
double	2 NT	pass	3 ♦
(all pass)			

The advantage of 3NT over 3♦ is that you might get a spade lead away from the ace, as Jack did. With the heart finesse working Jack made it. Bridge Baron played in a more reasonable 3♦ after a 2NT inquiry and a 3♦ rebid showing a minimum or denying an outside feature, or both. BB went down one in 3♦ when, after a heart lead, it misplayed clubs, leading low to the ace — 10 imps to Jack. The percentage play in clubs is low to the queen and then low back to the 10, a 75% chance.

Board 7  
 South dealer  
 All vul

North  
 ♠ A 9 8  
 ♥ 8 6 5 4 3  
 ♦ Q 6 4  
 ♣ A 2

West  
 ♠ K J 10 2  
 ♥ J 7  
 ♦ A 2  
 ♣ K 9 8 7 6

East  
 ♠ 7 6 5 4 3  
 ♥ A Q 2  
 ♦ K 10 9 7  
 ♣ 5

South  
 ♠ Q  
 ♥ K 10 9  
 ♦ J 8 5 3  
 ♣ Q J 10 4 3

West	North	East	South
BB	Jack	BB	Jack
1 ♣	pass	1 ♠	pass
2 ♠	pass	3 ♠	(all pass)

West	North	East	South
Jack	BB	Jack	BB
1 ♣	pass	1 ♠	pass
2 ♠	pass	2NT*	pass
3 ♥*	pass	4 ♠	(all pass)

At Table One, Bridge Baron stopped in 3♠ and made only three after a diamond lead. He did not ruff out the ♦J later in the hand.

At Table Two, as Jack plays, the 2♠ support bid is often based on a three-card fit; 2NT is asking for a min/max and the number of spades; and 3♥ shows a minimum hand with four trumps. On the more routine ♣Q lead Jack ducked and set up the ♣K with one club ruff, making ten tricks — 10 imps to Jack.

Board 8	North	
West dealer	♠ 10 9 8 7 5 3	
None vul	♥ 4	
	♦ K 8 3 2	
	♣ 5 2	
West		East
♠ A		♠ K 2
♥ A Q 10 7 6 5		♥ K J 9 8
♦ A 7 5		♦ Q 9 4
♣ Q 10 7		♣ K J 9 4
	South	
	♠ Q J 6 4	
	♥ 3 2	
	♦ J 10 6	
	♣ A 8 6 3	

Six hearts by West was unbeatable as the cards lie and was bid and made at both tables. No swing.

BB		BB	
West	North	East	South
1 ♥	pass	2 NT (Jacoby)	pass
3 ♥ (16+)	pass	4 ♥	pass
4 ♠ (cue, 19+)	pass	6 ♥	(all pass)

Jack		Jack	
West	North	East	South
1 ♥	pass	2 NT	pass
3 ♣	pass	3 ♦	pass
3 NT	pass	4 ♥	pass
4 NT	pass	5 ♣	pass
5 ♦*	pass	5 ♥	pass
6 ♥	(all pass)		

2NT = strong heart raise  
 3♣ = 14+ and any singleton  
 3♦ = relay  
 3NT = singleton spade  
 5♣ = 1 or 4 aces  
 5♦ = asking for ♥Q  
 5♥ = I do not have it

\*Comment by Kuijf: "I admit asking for the ♥Q looks silly here. The tenth trump, also the ♥Q in some situations, will be helpful. Clearly, holding six trumps to the queen, this ask is futile here."

Board 9	North	
North dealer	♠ 6	
E-W vul	♥ K Q J 8 4	
	♦ K 9 7 2	
	♣ 6 3 2	
West		East
♠ K 10 5		♠ 9 3 2
♥ A 10 5 2		♥ 6
♦ A 8 4		♦ J 10 6 3
♣ 10 9 4		♣ A Q J 8 7
	South	
	♠ A Q J 8 7 4	
	♥ 9 7 3	
	♦ Q 5	
	♣ K 5	

West	North	East	South
—	pass	pass	1 ♠
pass	1 NT*	pass	2 ♠
(all pass)			

\*North, in my opinion, should bid 2♥ as a passed hand. — Editor

At one table Jack defended 2♠ accurately. West led the obvious ♣10 to East's ace followed by a heart return to the ace, a heart ruff, a diamond to the ace and a second heart ruff. Along with the ♠K, 2♠ was down one. At other table Bridge Baron's defense was not successful. West led the ♦A and continued diamonds and Jack made an overtrick — 5 imps to Jack.

Board 10	North	West	North	East	South
East dealer	♠ K Q 10 6	BB	Jack	BB	Jack
All vul	♥ Q J 10 9 6	—	—	pass	1 ♣
	♦ 10 9 6	pass	1 ♥	pass	2 ♥
	♣ 7	(all pass)			
West		West	North	East	South
♠ A 4	East	Jack	BB	Jack	BB
♥ 7 5	♠ J 9 8 7 5 2	—	—	pass	1 ♦
♦ Q J 4 2	♥ A 4	2 ♣	2 ♥*	pass	4 ♥
♣ K Q J 9 2	♦ 8 5	(all pass)			
	♣ 10 6 5				
	South				
	♠ 3				
	♥ K 8 3 2				
	♦ A K 7 3				
	♣ A 8 4 3				

West	North	East	South
BB	Jack	BB	Jack
—	—	pass	1 ♦
pass	1 ♥	pass	2 ♥
(all pass)			

\*negative free bid

At Table One, Jack failed to make the value bid of 3♥ and played in 2♥. At Table Two, Bridge Baron easily bid and made 4♥ after North bid a nonforcing 2♥ — 9 imps to Bridge Baron.

Board 11	North	West	North	East	South
South dealer	♠ Q 8 7 5	Jack	BB	Jack	BB
None vul	♥ 5	—	—	—	1 ♥
	♦ 10 5 4 3	1 ♠	pass	4 ♥*	pass
	♣ J 6 5 2	4 ♠	(all pass)		
West		West	North	East	South
♠ K 6 4 3 2	East	Jack	BB	Jack	BB
♥ K 10	♠ A J 9	—	—	—	1 ♥
♦ A 9 6	♥ A J 6 4	1 ♠	pass	4 ♥*	pass
♣ 9 7 3	♦ 8 7	4 ♠	(all pass)		
	♣ A Q 8 4				
	South				
	♠ 10				
	♥ Q 9 8 7 3 2				
	♦ K Q J 2				
	♣ K 10				

In 3NT Bridge Baron played perfectly. Winning the second diamond to avoid making a premature discard, BB crossed to the ♠A, finessed a heart with the 10, a club to the ace noting the drop of the 10, a heart to the king and the ♣9 (unblocking) ducked to South's king. Now the ♠K was an entry to take the club finesse against North's jack. Yes, a spade to the jack would have worked, but South's opening bid made the finesse unlikely to succeed.

West	North	East	South
BB	Jack	BB	Jack
—	—	—	1 ♥
pass	pass	double	pass
2 ♠	pass	3 NT	(all pass)

In 4♠ Jack had an easy time with a heart lead, and made an overtrick when South played the ♥Q at trick one. Based on the bidding, Jack played for the ♣K doubleton offside. Well played by Jack in 4♠ and brilliantly played by Bridge Baron in 3NT — 2 imps to Jack.

Board 12	North	West	North	East	South
West dealer	♠ J 7	Jack	BB	Jack	BB
N-S vul	♥ Q J 10 8 4 3 2	pass	3 ♥	(all pass)	
	♦ 7 3				
	♣ 9 8				
West		East			
♠ 10 9 3		♠ K			
♥ 7 5		♥ A K			
♦ A 10 9 5 4 2		♦ K Q J 8			
♣ A 6		♣ K J 10 7 5 4			
	South				
	♠ A Q 8 6 5 4 2				
	♥ 9 6				
	♦ 6				
	♣ Q 3 2				

West	North	East	South
BB	Jack	BB	Jack
2 ♦	pass	3 ♣	3 ♠
pass	pass	4 ♦	(all pass)

In contrast to Board 11, both sides performed poorly on Board 12, not getting to game when 6♦ is cold. At Table One, Bridge Baron's 3♣ was natural and forcing — 4♦ made six while 3♥ went down two, 1 imp to Jack.

Editor's Note: This auction gives an indication that the software needs better programming for preemptive openings or opponents' preempts. Humans would bid 5♦ with the East cards opposite a weak 2♦, and would *automatically* overcall 3NT over 3♥.

Board 13	North	West	North	East	South
North dealer	♠ A 7	BB	Jack	BB	Jack
All vul	♥ K 10 9 8 3 2	—	2 ♥	2 NT	pass
	♦ 10 3	3 ♥*	pass	3 ♠	(all pass)
	♣ 10 7 2				
West		East			
♠ 10 8 6 4 2		♠ Q J 5			
♥ Q		♥ A 6 5 4			
♦ J 8 6 4		♦ A Q 2			
♣ Q J 3		♣ A 8 4			
	South				
	♠ K 9 3				
	♥ J 7				
	♦ K 9 7 5				
	♣ K 9 6 5				

\*transfer

West	North	East	South
Jack	BB	Jack	BB
—	2 ♥	2 NT	(all pass)

At Table Two, 2NT was not a success when Jack went down three tricks. At Table One, Bridge Baron made a better choice of strains, transferring to spades, and was rewarded with +140 — 10 imps to Bridge Baron.

Board 14	North	West	North	East	South
East dealer	♠ 8 5 4 3	BB	Jack	BB	Jack
None vul	♥ K Q J 7	—	—	pass	1 ♦
	♦ K 2	1 NT	double	(all pass)	
	♣ 10 9 6				
West		West	North	East	South
♠ K J 10 6		Jack	BB	Jack	BB
♥ A 6	East	—	—	pass	1 ♦
♦ A 9 8 4	♠ Q 7 2	1 NT	double	pass	pass
♣ K 8 2	♥ 9 4 3 2	2 ♠	(all pass)		
	♦ 5 3				
	♣ J 7 4 3				
	South				
	♠ A 9				
	♥ 10 8 5				
	♦ Q J 10 7 6				
	♣ A Q 5				

Bridge Baron went down two in 1NT doubled. At Table Two, East's pass over 1NT double denied a five-card suit. West tried playing in its best suit and was rewarded when North chose not to double with four small spades. Jack was also down two tricks — 5 imps to Jack.

Board 15	North	West	North	East	South
South dealer	♠ K Q 4 3	Jack	BB	Jack	BB
N-S vul	♥ 8 2	—	—	—	pass
	♦ A J 4	pass	1 ♣	double	1 ♠
	♣ J 9 8 4	pass	2 ♠	double	pass
West		3 ♦	pass	3 ♥	(all pass)
♠ 8 6 5 2	East				
♥ Q J 7	♠ J				
♦ Q 9 8	♥ A K 10 9 4				
♣ 7 6 5	♦ K 7 6 3				
	♣ A K 3				
	South				
	♠ A 10 9 7				
	♥ 6 5 3				
	♦ 10 5 2				
	♣ Q 10 2				

At Table One, after a strange 1NT balance by Jack, followed by a takeout double, Bridge Baron bid aggressively to 4♥, down one on a club lead. As the cards lie 4♥ makes on a diamond lead.

After North opened the bidding at Table Two, Jack competed to 3♥ and strongly invited game, but West, with very little to contribute, passed — 3♥ making three, 5 imps to Jack.

West	North	East	South
BB	Jack	BB	Jack
—	—	—	pass
pass	pass	1 ♥	pass
pass	1 NT	2 ♦	pass
2 ♥	double	pass	2 ♠
3 ♥	pass	4 ♥	(all pass)

Board 16	North	West	North	East	South
West dealer	♠ 8 3	Jack	BB	Jack	BB
E-W vul	♥ Q 6 4	pass	pass	2 ♠	(all pass)
	♦ J 10 7 4				
	♣ A Q 8 5				
West		East			
♠ 4		♠ A 9 7 6 5 2			
♥ A 10 9 5		♥ K J 3 2			
♦ K 9 8 6		♦ Q			
♣ K J 9 3		♣ 10 4			
	South				
	♠ K Q J 10				
	♥ 8 7				
	♦ A 5 3 2				
	♣ 7 6 2				

West	North	East	South
BB	Jack	BB	Jack
1 ♦	pass	1 ♠	pass
1 NT	pass	2 ♣*	pass
2 ♥	pass	3 ♥	(all pass)

\*new minor forcing

At Table One, Bridge Baron reasonably stopped short of game and made 11 tricks after North led the ♣A (!) and continued clubs.\* Two hearts in response to New Minor Forcing shows a minimum hand and four hearts and denies three or more spades.

At Table Two, Jack opened 2♠ and went down one — 7 imps to Bridge Baron.

\*Kuijf's comment:

"I admit the lead is somewhat awkward and overaggressive. Humans might lead a diamond or even a spade. Jack's rules direct him towards unbid suits. Note: both a diamond and a spade can be wrong with a different layout."

Bridge Baron had a good fourth quarter, in part due to Board 53.

Board 53	North	West	North	East	South
North dealer	♠ J 7 6 5 4	♠ 9	Jack	BB	BB
N-S vul	♥ A J 8 4	♥ K 10 3 2	pass	pass	pass
	♦ K 5 4	♦ J 10 8 7			
	♣ 9	♣ K Q 10 5			
West		East			
♠ 9		♠ Q 10 8 2			
♥ K 10 3 2		♥ 9 7 6			
♦ J 10 8 7		♦ A 9 6			
♣ K Q 10 5		♣ 8 4 3			
	South				
	♠ A K 3				
	♥ Q 5				
	♦ Q 3 2				
	♣ A J 7 6 2				

Bridge Baron reached 4♠ after South opened 1NT and North, using Smolen, forced to game (Stayman followed by 3♥). West led the ♦J, ducked to South's queen. It looks as if there are two certain trump losers and two more in diamonds after this start. Bridge Baron executed perfectly, playing the ♣A followed by a club ruff, a spade to the ace and a second club ruff, a spade to the king followed by the ♥Q to the king and ace, then the ♥J and a heart ruff with the ♠3. Then the ♣7 ruffed with the ♠7. Declarer already had nine tricks so East had to over-ruff. East could cash the ♠Q but had to lead a diamond to North's king for declarer's tenth trick — 10 imps to Bridge Baron, since Jack had stopped in 3♠ at the other table.

Bridge Baron finished strongly, winning back 39 imps in the fourth quarter to go out in style, but it was not nearly enough as Jack won its unprecedented third championship in a row.

Editor's Question: Al, was Bridge Baron programmed to bid and play more aggressively in the fourth quarter, as humans do when way behind in a match?

Levy: Settings cannot be changed during a set of boards. In the round robin and semifinals and final we played 16-board sets. Changing settings between sets or between matches, even in the round robin, is allowed. There were no reported changes by any participant.

Hans Kuijf and Stephen Smith report that their programs never changed settings at any time. Generally, the official (me) would be informed of changes. In the future we expect that the programs will be required to make the decision, with input of the state of the match.

#### Wrap-Up

The play in the semifinals and final demonstrated that computer-bridge has come a long way since these championships

began in 1997. Regarding the top programs, the level of play is much higher than ever before. Declarer play often shows signs of brilliance as would be expected when using single and double dummy simulations. Defensive play is less consistent with some spotty and some accurate play. Defensive play is more difficult to simulate. The bidding is far from expert but, using simulations, good decisions are often made. On the sequence of boards (1-16) shown here, Jack's consistent good bidding and declarer and defensive play was representative of its play throughout the event.

All the contestants participated with great sportsmanship and cooperation. Their collective goal is to push the state-of-the-art as far as possible as well as to use their software programs to educate and amuse. Maybe one day we will see Jack and company defeat a team of Zia and company.

For more information on the World Computer-Bridge Championship, including its history, past championship results, articles and photos, go to [computerbridge.com](http://computerbridge.com) or [ny-bridge.com/allevy/Menton](http://ny-bridge.com/allevy/Menton).

---

*Al Levy is President of the ACBL.*