

Web Movements for Clubs with Dealing Machines and Wireless Scoring

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introduction

In most club games, each pair plays 24 to 28 deals. Many clubs use Mitchell movements for sections with anywhere from four to 17 tables. These movements are simple for players and directors, but often they are unbalanced because pairs don't play all of the same deals. If two to four "extra" deals are in play, the imbalance is relatively minor, but for some table counts six to 15 extra deals are in play and 20% or more of the comparisons are "apples and oranges"—i.e., one pair's matchpoint or IMP score on one deal is, in effect, compared with another pair's matchpoint or IMP score on a different deal.

All pairs can play all or almost all of the same deals by using Web movements for table counts in which Mitchell movements require too many extra deals in play. Web movements used to be used very rarely, because they required either lots of board sharing or manually twinned boards. Now dealing machines make routinely predealing twinned boards practical (dealing about 26 boards takes about eight minutes), and wireless scoring devices make managing and scoring a Web movement simpler and more reliable, so a well-prepared director can use Web movements for regular club games.

■ terminology

To minimize ambiguity, I'll stick to these terms:

A "deal" is an arrangement of 52 cards.

A "board" holds one copy of a deal.

A "case of boards" is one copy of all the deals in play.

A "deal group" is the set of deals played in one round at one table.

A "board group" is one copy of a deal group.

t is the number of tables in a section, counting a phantom pair but not counting a rover pair or a party table.

r is the desired number of rounds to be played.

d is the number of deal groups in play. ($r \leq d \leq t$. In a Mitchell movement, $d = t$. In a Web movement, $d < t$.)

$d - r$ is the number of "extra" deal groups in play. (In a Mitchell movement, $d - r = t - r$, which may be large. In a Web movement, d is usually chosen to make $d - r$ be 0 or 1.)

As explained below, in a Web movement:

a "subsection" is a part of a section with its own case of boards,

n is the number of subsections of size d ($n \geq 0$), and

s is the size of each of the last two subsections ($0 \leq s < d$).

■ Web movements

Web movements were invented in the 1970s by ACBL tournament director John "Spider" Harris to solve a problem in major multisession single-winner events. They were little used in other situations because they required manually twinned boards (or lots of board sharing) and were more complicated to manage and score than Mitchell movements. Now clubs with dealing machines and wireless scoring can use them routinely to minimize extra deals in play and to avoid three-board sitouts.

Web movements are like Mitchell movements in many respects:

- NS pairs are stationary.
- EW pairs move up a table after each round.
- If d is even, EW pairs skip a table after round $\frac{d}{2}$. (Note that in a Mitchell movement $d = t$, so you can think of an even t requiring a skip after round $\frac{t}{2}$. In a Web movement, $d < t$. A skip is needed if d is even, regardless of whether t is even, and the skip must be after round $\frac{d}{2}$.)
- For the most part, boards move down a table after each round.

Web movements differ from Mitchell movements in that $d < t$. (The director usually chooses $d = r$ or $d = r + 1$, so the number of “extra” deal groups in play, $d - r$, is 0 or 1.) This implies that in any given round at least one deal group must be played at at least two tables. While this can be accomplished by sharing or manually twinning boards, it is most easily accomplished with multiple machine-dealt cases of boards.

■ **Web movements for even t**

The basic building block of a Web movement is two equal-size subsections of s tables, each with its own case of boards. Board the first of these two subsections in ascending order, like a Mitchell. There will be $d - s$ board groups left over. Put the left-over board groups on a bye stand from which they feed (in ascending order) into the last table of the subsection. Have the first table of the subsection pass boards to the bye stand.

The “magic” that guarantees that an EW pair will always play different boards as it passes through these two subsections is the way the second subsection is boarded. Board the second subsection in *descending* order, with board group $s - 1$ on the first table, board group $s - 2$ on the second table, ... board group 1 on the next-to-last table, and board group d on the last table. Put the left-over board groups on a bye stand from which they feed *in descending order* into the last table of the subsection. Have the first table of the subsection pass boards to the bye stand.

Here’s an example with $t = 6$, $d = r = 5$, $s = 3$, a blue case of boards, and a red case of boards:

table	round 1		round 2		round 3		round 4		round 5	
	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp
1	1	1	6	2	5	3	4	4	3	5
2	2	2	1	3	6	4	5	5	4	1
3	3	3	2	4	1	5	6	1	5	2
bye		4		5		1		2		3
bye		5		1		2		3		4
4	4	2	3	1	2	5	1	4	6	3
5	5	1	4	5	3	4	2	3	1	2
6	6	5	5	4	4	3	3	2	2	1
bye		4		3		2		1		5
bye		3		2		1		5		4

This example, with $t = 6$, $d = r = 4$, and $s = 3$, requires a skip after round $\frac{d}{2} = 2$:

	round 1		round 2			round 3		round 4	
table	EW	bdgrp	EW	bdgrp		EW	bdgrp	EW	bdgrp
1	1	1	6	2	skip	4	3	3	4
2	2	2	1	3	skip	5	4	4	1
3	3	3	2	4	skip	6	1	5	2
bye		4		1			2		3
4	4	2	3	1	skip	1	4	6	3
5	5	1	4	4	skip	2	3	1	2
6	6	4	5	3	skip	3	2	2	1
bye		3		2			1		4

■ Web movements for odd t

Obviously, two equal-size subsections can only handle an even t . However, the two subsections of size s can be preceded by a subsection of size d , which is boarded in ascending order like a Mitchell. For an odd t , choose an odd d ($r \leq d \leq t$).

Here's an example with $t = 11$, $d = r = 5$, and $s = 3$:

	round 1		round 2		round 3		round 4		round 5	
table	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp
1	1	1	11	2	10	3	9	4	8	5
2	2	2	1	3	11	4	10	5	9	1
3	3	3	2	4	1	5	11	1	10	2
4	4	4	3	5	2	1	1	2	11	3
5	5	5	4	1	3	2	2	3	1	4
6	6	1	5	2	4	3	3	4	2	5
7	7	2	6	3	5	4	4	5	3	1
8	8	3	7	4	6	5	5	1	4	2
bye		4		5		1		2		3
bye		5		1		2		3		4
9	9	2	8	1	7	5	6	4	5	3
10	10	1	9	5	8	4	7	3	6	2
11	11	5	10	4	9	3	8	2	7	1
bye		4		3		2		1		5
bye		3		2		1		5		4

Note that allowing boards to flow between the first subsection—tables 1-5—and the second subsection—tables 6-8 with a 2-board-group bye stand—may simplify the board movement:

table	round 1		round 2		round 3		round 4		round 5	
	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp	EW	bdgrp
1	1	1	11	2	10	3	9	4	8	5
2	2	2	1	3	11	4	10	5	9	1
3	3	3	2	4	1	5	11	1	10	2
4	4	4	3	5	2	1	1	2	11	3
5	5	5	4	1	3	2	2	3	1	4
6	6	1	5	2	4	3	3	4	2	5
7	7	2	6	3	5	4	4	5	3	1
8	8	3	7	4	6	5	5	1	4	2
bye		4		5		1		2		3
bye		5		1		2		3		4
9	9	2	8	1	7	5	6	4	5	3
10	10	1	9	5	8	4	7	3	6	2
11	11	5	10	4	9	3	8	2	7	1
bye		4		3		2		1		5
bye		3		2		1		5		4

■ generalized Web movements

Most generally, a Web movement has $t = nd + 2s$ tables, comprising n subsections of size d and two subsections of size s , where $n \geq 0$, $d \geq r$, and $0 \leq s < d$.

When using pre-dealt boards, the director normally chooses $d = r$, so that no extra deal groups are in play—everybody plays all the deals. Note, however, that if t is odd, then n and d must both be odd. This implies that if t and r are both even, then $d \neq r$. In this case, the director normally chooses to have one extra deal group in play, $d = r + 1$. (An alternative is to start with a movement for $t - 1$ tables with $d = r$ and add a rover and a party table, but having one extra deal group in play is probably a lesser evil than the added complexity of a rover and a party table.)

Note that some other movements are special cases of generalized Web movements:

Mitchell: $n = 1, s = 0$

Continuous Mitchell: $n > 1, s = 0$

Bowman, Ewing: $n = 1, s = 1$

1½-table appendix Mitchell: $n = 1, s = 1$, NS pair t is a phantom

■ Web movements for ACBLscore

The only web movements that are built into ACBLscore are for even t and odd d . This package includes ACBLscore .MOVement files for all of the following Web movements:

```

TraditionalForm[
  TableForm[Table[If[d ≥ t ∨ EvenQ@d ∧ OddQ@t, "", StyleForm["WEB" <> IntegerString[t, 10, 2] <>
    IntegerString[d, 10, 2], "Program"]], {t, 10, 39}, {d, {8, 9, 12, 13}}],
    TableHeadings → {(HoldForm[t = #1] &) /@ Range[10, 99], (HoldForm[d = #1] &) /@ {8, 9, 12, 13}}]]

```

	$d = 8$	$d = 9$	$d = 12$	$d = 13$
$t = 10$	WEB1008	WEB1009		
$t = 11$		WEB1109		
$t = 12$	WEB1208	WEB1209		
$t = 13$		WEB1309		
$t = 14$	WEB1408	WEB1409	WEB1412	WEB1413
$t = 15$		WEB1509		WEB1513
$t = 16$	WEB1608	WEB1609	WEB1612	WEB1613
$t = 17$		WEB1709		WEB1713
$t = 18$	WEB1808	WEB1809	WEB1812	WEB1813
$t = 19$		WEB1909		WEB1913
$t = 20$	WEB2008	WEB2009	WEB2012	WEB2013
$t = 21$		WEB2109		WEB2113
$t = 22$	WEB2208	WEB2209	WEB2212	WEB2213
$t = 23$		WEB2309		WEB2313
$t = 24$	WEB2408	WEB2409	WEB2412	WEB2413
$t = 25$		WEB2509		WEB2513
$t = 26$	WEB2608	WEB2609	WEB2612	WEB2613
$t = 27$		WEB2709		WEB2713
$t = 28$	WEB2808	WEB2809	WEB2812	WEB2813
$t = 29$		WEB2909		WEB2913
$t = 30$	WEB3008	WEB3009	WEB3012	WEB3013
$t = 31$		WEB3109		WEB3113
$t = 32$	WEB3208	WEB3209	WEB3212	WEB3213
$t = 33$		WEB3309		WEB3313
$t = 34$	WEB3408	WEB3409	WEB3412	WEB3413
$t = 35$		WEB3509		WEB3513
$t = 36$	WEB3608	WEB3609	WEB3612	WEB3613
$t = 37$		WEB3709		WEB3713
$t = 38$	WEB3808	WEB3809	WEB3812	WEB3813
$t = 39$		WEB3909		WEB3913

(A Web movement can handle an arbitrarily large section. It seems unlikely that a single section larger than $t = 25$, $d = 13$ would ever be desirable, but I've generated .MOVement files up to $t = 39$, $d = 13$, which is the largest Web that works with three cases of boards, just in case.)

■ half tables, late pairs, rovers, and party tables

Web movements, like Mitchell movements, can handle half tables with either a phantom pair or a rover pair.

If a late pair arrives after you have started boarding a full-table Mitchell movement, you can simply add a table and put another board group in play, or you can make the late pair a rover, which avoids putting an extra board group in play. On the other hand, if a late pair arrives after you have started boarding a full-table Web movement, adding a table switches between an even and an odd number of tables, which have quite different boarding patterns, so you'll have to reboard about half the tables. Making the late pair a rover avoids reboarding.

If you already have a rover and a(nother) pair arrives late, you can add a "party table." The party table is so named because pairs move to it only when "invited"—the normal movement of EW pairs and boards bypasses the party table.

The two extra pairs play the first round at the party table (time permitting). After the first round, one of these pairs remains stationary at the party table and the other is a rover. The pairs bumped by the rover don't sit out—they're invited to the party table.

After the first round, the party table always plays the same deal group as the rover. In the first round, the party table plays a/the deal group that it won't play in later rounds. (The order in which the party table plays deals and opponents is not obvious—you just have to look it up.)

The party table is numbered $t + 1$. (To minimize the chance of an EW pair trying to move from table t to the party table, put a note on table t telling EW pairs to move to table 1 and don't put the party table near table t .)

For every `WEBttd` movement in this package, there is a NS-rover-plus-party-table variant, named `WEBttdNSR`, and an EW-rover-plus-party-table variant, named `WEBttdEWR`. These movements are for $t + 1$ tables (e.g., `WEB1812NSR` is for a total of 19 tables—18 “regular” tables plus the party table). With a half table (i.e., a rover but no party table), make the stationary pair at the party table a phantom.

■ board cases

Even-table Web movements with $t \leq 2d$ require two cases of boards. Odd-table Web movements with $t \leq 3d$ generally require three cases of boards, but when $s = 1$ the two single-table subsections can share a case with little difficulty (they play the same deal group in just one round—round $\frac{d+1}{2}$).

A party table can borrow or share boards (in Web movements, copies of the boards the party table needs are often on one of the bye stands), but it's much simpler if a party table has its own case of boards. (A non-playing director with a dealing machine on site can deal for a party table during the game.)

A club that wants to be prepared for the possibility of a movement that needs three cases of boards doesn't have to deal three cases for every game (unless it's a special game that requires a particular set of deals)—they can keep a set of three cases ready to be used when needed.

■ acknowledgments

Tim Francis-Wright, the master of funky movements, led the way.

Pete Matthews' `bridgemats` program <http://web.mit.edu/mitdlbc/www/bridgemats/> creates placemats from ACBLscore movement files and dumps movement files. These placemats are a big help when running a Web, Rover, or Party-table movement without a wireless scoring system. Pete's code also helped me figure out how to generate movement files.

David Metcalf learned about odd-table-count Web movements from his fellow ACBL tournament director, Doug Grove.

Despite their initial skepticism, Bob Simpson and David Metcalf have allowed me to run Web movements in their clubs.

■ percentage of “apples and oranges” comparisons

This table gives the fraction of comparisons in some common Mitchell movements that are “apples and oranges”—i.e., one pair's matchpoint or IMP score on one deal is, in effect, compared with another pair's matchpoint or IMP score on a different deal.

```

Style[TableForm[Function[{t(*tables*), r(*rounds*), dpr(*deals per round*)},
  {t, r, r dpr, (t - r) dpr, Round[100  $\frac{t - r}{t - 1}$ ] "%"}] @@@
  (
  (
  (
  (4 4 5 6 6 7 7 8 8 9 9 9 10 10 11 11 12 12 12 13 13 13 13 14 14 15 15 16 16 17
  (4 4 5 6 5 6 7 6 7 7 8 9 8 9 8 9 8 9 12 8 9 12 13 12 13 12 13 12 13 12
  (6 7 5 4 5 4 4 4 4 4 3 3 3 3 3 3 3 3 2 3 3 2 2 2 2 2 2 2 2
  )
  )
  )
  )], TableHeadings →
  {None, {"tables", "rounds", "deals", "extra deals", "apples-and-oranges"},
  {"played", "in play", "comparisons"}},
  TableAlignments → Center], FontFamily → "Times"]

```

tables	rounds	deals played	extra deals in play	apples-and-oranges comparisons
4	4	24	0	0
4	4	28	0	0
5	5	25	0	0
6	6	24	0	0
6	5	25	5	20 %
7	6	24	4	17 %
7	7	28	0	0
8	6	24	8	29 %
8	7	28	4	14 %
9	7	28	8	25 %
9	8	24	3	12 %
9	9	27	0	0
10	8	24	6	22 %
10	9	27	3	11 %
11	8	24	9	30 %
11	9	27	6	20 %
12	8	24	12	36 %
12	9	27	9	27 %
12	12	24	0	0
13	8	24	15	42 %
13	9	27	12	33 %
13	12	24	2	8 %
13	13	26	0	0
14	12	24	4	15 %
14	13	26	2	8 %
15	12	24	6	21 %
15	13	26	4	14 %
16	12	24	8	27 %
16	13	26	6	20 %
17	12	24	10	31 %
17	13	26	8	25 %