PINEAPPLE KNOTS
NESTED BIGHT KNOTS ALGORITHM MADE EASIER

(once again inspiration is coming from ***THE BRAIDER*** - so using the mandrel frame of reference)

This is intended as a crutch for people who, for whatever reason, cannot grasp (or have no interest in) the **EMU48 / HPG48GX** programs : **PINEAPL** and **PINEAPL2**.

LEFT TO RIGHT	L - 1 =	A - 1 =	A - 1 =	[redacted]	A - 1 =	A - 1 =	A - 1 =	R - 1 =
0				[redacted]				
OVER or High	UNDER or Low	OVER or High	UND Low	[redacted]	OVER or High	UNDER or Low	OVER or High	UNDER or Low
/	\	/	\	[redacted]	/	\	/	\
UNDER or Low	OVER or High	UNDER or Low	OVER High	[redacted]	NDER or w	OVER or High	UNDER or Low	OVER or High
				[redacted]				0
L - 1 =	A - 1 =	A - 1 =	A - 1 =	[redacted]	- 1 =	A - 1 =	R - 1 =	RIGHT TO LEFT

You will make it easier for you by reading the user's tips for the afore said programs as we will be working with the same example :
2 SET (5L 4B and 7L 4B) of THK COMPONENT forming a PAK 31 LEAD (5 PASS * 4B*) BIGHT .
The documents are :
*** **ST_HERRING_PINEAPPLE.pdf**
*** **HPK-math.pdf** (see page PUBLICATIONS_3)

Fig 1 (just above)
A serious study of the Bight Sequence (Complementary and Cyclic and Bight Algorithm for knots made on a THK cordage route (shadow) in *pages Turk's head_12* is more than counselled too.

I should insist that you study the PINEAPPLE in pages *Turk's head_14 ; Turk's head_15 ; Turk's head_16 or* ***that you read two or three dozen dozens pages of SCHAAKE work !***

In here you will not even be required to engage brain gears beyond blindly following the « Schaake's recipe » without unduly worrying brain circuitry about the ' why of the how '.

Considering the experience born from the knot tyer circle endemic habit of using (it is, regrettably IMO, the quasi exclusive way) handed down recipes I feel reasonably certain that this should not constitute an Herculean task for any, and anyway I don't force anyone ! ;-)

You will recall that index-numbers are calculated for each half-period (HP) using 2 formulas
i= (HPeven – 2) / 2 and i= (HPodd – 3) / 2 depending of the fact that it is odd or even numbered.

odd-numbered HP are (mandrel frame of reference) from low-left to up-right.

even-numbered HP are from low right to up-left.

As for easily finding the Complementary and Cyclic (periodic for me) Bight Sequences just use Delta = (-L) modulo B as « step »

Fig 2

LEFT TO RIGHT	L - 1 =	A - 1 =	A - 1 =	A - 1 =	A - 1 =	A - 1 =	R - 1 =
0	1	2	3	0	1	2	
OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low
/	\	/	\	/	\	/	\
UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High
	2	1	0	3	2	1	0
L - 1 =	A - 1 =	A - 1 =	A - 1 =	A - 1 =	A - 1 =	R - 1 =	RIGHT TO LEFT

Fig 3

LEFT TO RIGHT	L - 1 =	A - 1 =	A - 1 =	A - 1 =	R - 1 =
0	3	2	1	0	
OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low
/	\	/	\	/	\
UNDER or Low	OVER or High	UNDER or Low	OVER or High	UNDER or Low	OVER or High
	0	1	2	3	0
L - 1 =	A - 1 =	A - 1 =	A - 1 =	R - 1 =	RIGHT TO LEFT

For interlocked (so called inter-braid or interwoven) TRUE THK the generalised form is :
Read **Left** to **Right**

```
           ( Left(i) – 1 )  ( A – 1)   ( A – 1) …… ( A – 1)  ( A – 1)  ( Right (i) - 1)
       0         *            *           *           *          *
       /         \            /           \           /          \          /
                 *            *           *           *          *          0
( Left(i) – 1 )  ( A – 1 )  ( A – 1) …… ( A – 1)  ( A – 1)  ( Right (i) - 1 )  read Right to Left
```

The '*' are for the i-values of the Bight Sequence of the THK THAT IS BEING PUT IN AT THE MOMENT.

The value **ABOVE** or **UNDER** a * increases **by 1 WHEN THE ASSOCIATED VALUE IN THE BIGHT SEQUENCE IS LESS OR EQUAL TO THE i for the HP concerned** (i= (HPeven – 2) / 2 and i= (HPodd – 3) /) **ADDING ONE IS ONE-TIME ONLY , NEVER TWICE AT THE SAME PLACE.**
The last entry (in the direction of reading) for the odd numbered low-left to up-right HP (Right (i) - 1) stay identical for the whole of them.
Idem for the even numbered low-right up-left HP, the last entry (Left(i) – 1) stay the same.

'A' **PASS** as you will immediately and unfailingly remember imply A! or 'factorial A' DIFFERENT WAYS of making the knot.

Please no silly remark such as I have seen from the keyboard of nevertheless very competent "spiders" about "you **HAVE to do** it in that order" : this is meaningless and just show abominable ignorance of the reality of those knots.
5! = 5 * 4 * 3 * 2 * 1 = **120**
We chose one way so leaving aside the 119 other ways EXACTLY IDENTICAL IN FINISHED PRODUCT.

PASS 1 , PASS 2, PASS 3 will use a SET of THREE THK COMPONENT 7S 4B* (S is the L or P of the component THK ; you may 'think' 7L 4B but this can lead to ambiguity as L and B should be applied to the final nested bight knot)

PASS 4 , PASS 5 will use a SET of TWO THK COMPONENT 5S 4B* (B* == the number of **BIGHT NEST** as you already know from previous attentive reading)

7 - 7 - 7 - 5 - 5 could have been **7 - 7 - 7 - 5 - 5** or **5 - 7 - 5 - 7 -7** or **7 - 5 - 7 - 5 - 7** or **5 - 5 - 7 - 7 - 7** or **5 - 7 - 5 - 7 -7** or **5 - 7 - 5 - 7 -7** or **7 - 7 - 7 - 5 - 5** or ……take your pick !

in here **LEFT** (L not to be confused with the L of Lead) and **RIGHT** refer to the **BIGHT BOUNDARIES**

PASS 1 S = 7 B* = 4 LEFT = **1** RIGHT = **1**

PASS 2 S = 7 B* = 4 LEFT = **2** RIGHT =**1**

PASS 3 S = 7 B* = 4 LEFT = **3** RIGHT = **1**

PASS 4 S = 5 B* = 4 LEFT = **4** RIGHT = **4**

PASS 5 S = 5 B* = 4 LEFT = 5 RIGHT = 4

REMEMBER that those 'bight boundary' numbers
ARE NOT THOSE IN THE FINISHED KNOT
but those
IN THE PROCESS OF MAKING THE KNOT, IN THE ORDER THEY ARE APPEARING !
so LEFT or RIGHT CANNOT BE SUPERIOR TO 'A'.(remember that when using program or making your own paper & pencil calculation.)

FINISHED KNOT 1 2 3 4 5 ………5 4 3 2 1
PASS 1 | **1……….1**
PASS 2 | **1 2……….2 1**
PASS 3 | **1 2 3……….3 2 1**
PASS 4 | **1 2 3 4……….4 3 2 1**
PASS 5 | **1 2 3 4 5……….5 4 3 2 1**

Example 1 : L = 5 B = 4 L
Delta = (-5)mod 4 = 3
So
4 B lead to
x x x x .... 0 x x x

0 3 6 9 which with applying modulo B (with B = 4) is
0 3 2 1
this Bight sequence give for 5 L
0 3 2 1 0 3 2 1

. . . . .
to be read **LEFT to RIGHT**
and the *cyclic*

. . . . .
0 1 2 3 0
to be read to **RIGHT is LEFT**

Example 2 : L = 7 B = 4 L
Delta = (-7)mod 4 = 1
So
4 B x x x x .... 0 x x x

0 1 2 3 which do not need that modulo 4 (or modulo B) be applied.

this Bight sequence give for 5 L
0 1 2 3 0 1 2 3

. . . . .
to be read **LEFT to RIGHT**

and the *cyclic*

. . . . .
0 3 2 1 0
to be read to **RIGHT is LEFT**

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Suppose that after writing ***Fig 2*** we want to use it with bight algorithm as main tool :
SEE ANNEXE FOR THE 'working' of the tool

S = 7 B* = 4 A = 1 Left(i) = 1 Right(i) = 1

starting point is :
Read Left to Right

	(0)	(0)	(0)	(0)	(0)	(0)	(0)
0	1	2	3	0	1	2	
/	\	/	\	/	\	/	\
	2	1	0	3	2	1	0
(0)	(0)	(0)	(0)	(0)	(0)	(0)	read Right to Left

hence

HP 1 (odd numbered HP) FREE RUN

HP 2 (even numbered HP) (i = 0) O1
HP 3 (odd numbered HP) (i = 0) O1

HP 4 (even numbered HP) (i = 1) U1 – O1 – U1
HP 5 (odd numbered HP) (i = 1) U1 – O1 – U1

HP 6 (even numbered HP) (i = 2) U1 – O2 – U1 – O1
HP 7 (odd numbered HP) (i = 2) U1 – O2 – U1 – O1

HP 8 (even numbered HP) (i = 3) U1 – O1 - U1 – O1 - U1 – O1

S = 7 B* = 4 A = 2 Left(i) = 2 Right(i) = 1

starting point is :
Read Left to Right

	(1)	(1)	(1)	(1)	(1)	(1)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(1)	(1)	(1)	(1)	(1)	(1)	(0)		read Right to Left

hence

HP 1 U1 – O1 - U1 – O1 - U1 – O1 - U1 – O1
HP 2 (i = 0) O1 - U1 – O2 - U1 – O1 - U1 – O1 – U1
HP 3 (i = 0) U1 – O1 - U1 – O2 - U1 – O1 - U1 – O1
HP 4 (i = 1) U1 – O1 - U1 – O2 - U2 – O1 - U1
HP 5 (i = 1) U2 – O1 - U1 – O2 - U2 – O1
HP 6 (i = 2) U1 – O2 - U1 – O2 - U2 – O2 –U1
HP 7 (i = 2) U2 – O2 - U1 – O2 - U2 – O2
HP 8 (i = 3) U1 – O2 – U2 – O2 – U2 – O2 - U1

S = 7 B* = 4 A = 3 Left(i) = 3 Right(i) = 1

starting point is :
Read Left to Right

	(2)	(2)	(2)	(2)	(2)	(2)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(2)	(2)	(2)	(2)	(2)	(2)	(0)		read Right to Left

hence

HP 1 U2 – O2 – U2 – O2 – U2 – O2
HP 2 (i = 0) O2 – U2 – O3 – U2 – O2 – U2
HP 3 (i = 0) U2 - O2 – U2 – O3 – U2 – O2
HP 4 (i = 1) U1 – O2 – U2 – O3 – U3 – O2 – U2
HP 5 (i = 1) U3 – O2 – U2 – O3 – U3 – O2
HP 6 (i = 2) U1 – O3 – U2 – O3 – U3 – O3 –U2
HP 7 (i = 2) U3 – O3 – U2 – O3 – U3 – O3
HP 8 (i = 3) U1 – O3 – U3 – O3 – U3 – O3 – U2

S = 5   B* = 4   A = 4   Left(i) = 4   Right(i) = 4

starting point is :
Read Left to Right

	(3)	(3)	(3)	(3)	(3)	
0	3	2	1	0		
/	\	/	\	/	\	
	0	1	2	3	0	
(3)	(3)	(3)	(3)	(3)	read Right to Left	

hence

HP 1 U3 – O3 – U3 – O3 – U3
HP 2 (i = 0) U3 – O3 – U3 – O4 – U3
HP 3 (i = 0) U3 – O3 – U3 – O4 – U3
HP 4 (i = 1) U3 – O3 – U4 – O4 – U3
HP 5 (i = 1) U3 – O3 – U4 – O4 – U3
HP 6 (i = 2) U3 – O4 – U4 – O4 – U3
HP 7 (i = 2) U3 – O4 – U4 – O4 – U3
HP 8 (i = 3) U4 – O4 – U4 – O4 – U3

S = 5   B* = 4   A = 5   Left(i) = 5   Right(i) = 4

starting point is :
Read Left to Right

	(4)	(4)	(4)	(4)	(3)	
0	3	2	1	0		
/	\	/	\	/	\	
	0	1	2	3	0	
(4)	(4)	(4)	(4)	(3)	read Right to Left	

hence

HP 1 U4 – O4 – U4 – O4 – U3
HP 2 (i = 0) U3 – O4 – U4 – O5 – U4
HP 3 (i = 0) U4 – O4 – U4 – O5 – U3
HP 4 (i = 1) U3 – O4 – U5 – O5 – U4
HP 5 (i = 1) U4 – O4 – U5 – O5 – U3
HP 6 (i = 2) U3 – O5 – U5 – O5 – U4
HP 7 (i = 2) U4 – O5 – U5 – O5 – U3
HP 8 (i = 3) U4 – O4 – U4 – O4 – U3

TRUE, the result is attained….even if somewhat painstakingly.

Instead of working successively FIVE different algorithms a much better and easier way is to use only TWO algorithms, one for EACH OF THE TWO SET of THK COMPONENTS BORROWING THE READY-MADE by SCHAAKE & TURNER.
Here they are.

DO NOT OVER TAX YOUR BRAIN ! DO NOT ATTEMPT TO UNDERSTAND : JUST DO THE USUAL KNOT TYER TRICK : THE ONE WHERE “RECIPE HANDED DOWN ARE SLAVISHLY OBEYED”. ;-)
For those wanting to exercise their brain as it should **always** be exercised in other words to its fullest, then just read 300 or 400 pages of SCHAAKE & col and do not squander precious time here.

Fig 4

SET NUMBER	1	2	3	4	5	**S = 5**
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	
Reference for LEFT to RIGHT	L - 1	A - 1	A - 1	A - 1	R - 1	
Reference for RIGHT to LEFT	R - 1				L - 1	
HP-1 LEFT to RIGHT	L - 1	A - 1	A - 1	A - 1	R - 1	
HP-2 RIGHT to LEFT	R - 1	A - 1	A - 1	A	L - 1	
HP-3 LEFT to RIGHT	L - 1	A - 1	A - 1	A	R - 1	
HP-4 RIGHT to LEFT	R - 1	A - 1	A	A	L - 1	
HP-5 LEFT to RIGHT	L - 1	A - 1	A	A	R - 1	
HP-6 RIGHT to LEFT	R - 1	A	A	A	L - 1	
HP-7 LEFT to RIGHT	L - 1	A	A	A	R - 1	
HP-8 RIGHT to LEFT	R	A	A	A	L - 1	

First row is for **SET NUMBER** : concerned here are **not** the **THK COMPONENT SET** but the **SET OF CROSSINGS** in a standard herringbone pineapple knot. If you have read what I counselled you to read that will be clear for you. If not then I am sorry but I will not lose precious time (mine) repeating what is written elsewhere just for the sake off those having not made their own effort.

Second row is self-explaining

Third and fourth rows are giving the "general" algorithm" and will serve as "memory" cells for already laid PASS.

Fifth to last rows (number depending on B*) are the coding for each half-period (HP) in the COMPONENT studied.

You will note that the rightmost column has cells with a violet background : there is NEVER ANY MODIFICATION IN THE *FORMULATION" in those cells.
All the other columns for SET of CROSSINGS see some modification at a given point.
Note that once a modification has happened it 'survive' in all the cells that are below in the same column. (background in those cells is in sky blue colour to highlight them to your attention.)

Needless to say that *__this__* 'specific repartition' is only for *__this__* GIVEN TABULATION.

Now for using it on the same PAK that we used before.

Fig 5

SET NUMBER	1	2	3	4	5	6	7	**S=7**
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	OVER	UNDER	
Reference for LEFT to RIGHT	L - 1	A - 1	A - 1	A - 1	A - 1	A - 1	R - 1	
Reference for RIGHT to LEFT	R - 1						L - 1	
HP-1 LEFT to RIGHT	L - 1	A - 1	A - 1	A - 1	A - 1	A - 1	R - 1	
HP-2 RIGHT to LEFT	R - 1	A - 1	A - 1	A	A - 1	A - 1	L - 1	
HP-3 LEFT to RIGHT	L - 1	A - 1	A - 1	A	A - 1	A - 1	R - 1	
HP-4 RIGHT to LEFT	R	A - 1	A - 1	A	A	A - 1	L - 1	
HP-5 LEFT to RIGHT	L	A - 1	A - 1	A	A	A - 1	R - 1	
HP-6 RIGHT to LEFT	R	A	A - 1	A	A	A	L - 1	
HP-7 LEFT to RIGHT	L	A	A - 1	A	A	A	R - 1	
HP-8 RIGHT to LEFT	R	A	A	A	A	A	L - 1	

Just under is a completed table :

SET NUMBER	1	2	3	4	5	6	7	S=7
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	OVER	UNDER	5 PASS B* = 4
Reference for LEFT to RIGHT	0	0	0	0	0	0	0	A = 1
Reference for RIGHT to LEFT	0						0	LEFT boundary = 1
HP-1 LEFT to RIGHT	0	0	0	0	0	0	0	RIGHT boundary = 1
HP-2 RIGHT to LEFT	0	0	0	1	0	0	0	
HP-3 LEFT to RIGHT	0	0	0	1	0	0	0	
HP-4 RIGHT to LEFT	1	0	0	1	1	0	0	
HP-5 LEFT to RIGHT	1	0	0	1	1	0	0	
HP-6 RIGHT to LEFT	1	1	0	1	1	1	0	
HP-7 LEFT to RIGHT	1	1	0	1	1	1	0	
HP-8 RIGHT to LEFT	1	1	1	1	1	1	0	

SET NUMBER	1	2	3	4	5	6	7	S=7
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	OVER	UNDER	5 PASS B* = 4
Reference for LEFT to RIGHT	1	1	1	1	1	1	0	A = 2
Reference for RIGHT to LEFT	0						1	LEFT boundary = 2
HP-1 LEFT to RIGHT	1	1	1	1	1	1	0	RIGHT boundary = 1
HP-2 RIGHT to LEFT	0	1	1	2	1	1	1	
HP-3 LEFT to RIGHT	1	1	1	2	1	1	0	
HP-4 RIGHT to LEFT	1	1	1	2	2	1	1	
HP-5 LEFT to RIGHT	2	1	1	2	2	1	0	
HP-6 RIGHT to LEFT	1	2	1	2	2	2	1	
HP-7 LEFT to RIGHT	2	2	1	2	2	2	0	
HP-8 RIGHT to LEFT	1	2	2	2	2	2	1	

SET NUMBER	1	2	3	4	5	6	7	S=7
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	OVER	UNDER	5 PASS B* = 4
Reference for LEFT to RIGHT	2	2	2	2	2	2	0	A = 3
Reference for RIGHT to LEFT	0						2	LEFT boundary = 3
HP-1 LEFT to RIGHT	2	2	2	2	2	2	0	RIGHT boundary = 1
HP-2 RIGHT to LEFT	0	2	2	3	2	2	2	
HP-3 LEFT to RIGHT	2	2	2	3	2	2	0	
HP-4 RIGHT to LEFT	1	2	2	3	3	2	2	
HP-5 LEFT to RIGHT	3	2	2	3	3	2	0	
HP-6 RIGHT to LEFT	1	3	2	3	3	3	2	
HP-7 LEFT to RIGHT	3	3	2	3	3	3	0	
HP-8 RIGHT to LEFT	1	3	3	3	3	3	2	

SET NUMBER	1	2	3	4	5	S = 5
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	5 PASS B* = 4
Reference for LEFT to RIGHT	3	3	3	3	3	A = 4
Reference for RIGHT to LEFT	3				3	LEFT boundary = 4
HP-1 LEFT to RIGHT	3	3	3	3	3	RIGHT boundary = 4
HP-2 RIGHT to LEFT	3	3	3	4	3	
HP-3 LEFT to RIGHT	3	3	3	4	3	
HP-4 RIGHT to LEFT	3	3	4	4	3	
HP-5 LEFT to RIGHT	3	3	4	4	3	
HP-6 RIGHT to LEFT	3	4	4	4	3	
HP-7 LEFT to RIGHT	3	4	4	4	3	
HP-8 RIGHT to LEFT	4	4	4	4	3	

SET NUMBER	1	2	3	4	5	**S = 5**
TYPE OF CROSSING	UNDER	OVER	UNDER	OVER	UNDER	5 PASS B* = 4
Reference for LEFT to RIGHT	4	4	4	4	3	A = 5
Reference for RIGHT to LEFT	3				4	LEFT boundary = 5
HP-1 LEFT to RIGHT	4	4	4	4	3	RIGHT boundary = 4
HP-2 RIGHT to LEFT	3	4	4	5	4	
HP-3 LEFT to RIGHT	4	4	4	5	3	
HP-4 RIGHT to LEFT	3	4	5	5	4	
HP-5 LEFT to RIGHT	4	4	5	5	3	
HP-6 RIGHT to LEFT	3	5	5	5	4	
HP-7 LEFT to RIGHT	4	5	5	5	3	
HP-8 RIGHT to LEFT	3	5	5	5	4	

Now you can make the code of any **Herringbone Pineapple knot** that you care to ‘invent’ or if you don’t want to overtax your brain system just borrow one of the ready-made by S & T

B* = 3	S = 5	S = 7	
B* = 3	S = 11	S = 13	
B* = 4	**S = 3**	**S = 5**	**training exercise coming just after that**
B* = 4	S = 5	S = 7	
B* = 4	**S = 5**	**S = 7**	**what we just did**
B* = 4	S = 11	S = 13	
B* = 5	S = 3		
B* = 5	S = 7	S = 9	
B* = 5	S = 9	S = 11	
B* = 5	S = 11	S = 13	
B* = 6	S = 5	S = 7	
B* = 6	S = 11	S = 13	
B* = 7	S = 3	S = 5	
B* = 7	S = 9	S = 11	
B* = 7	S = 11	S = 13	

LET US TRY AND BUILT TABLES *" A LA MODE DE"* SCHAAKE & TURNER

We will aim for **S = 3** **S = 5** **B* = 4**

We will built together the S = 3 table and will let you built the S = 5 as personal training, just giving your the end-solution for verification.

First let us calculate the **DELTA** , the step, to built the Complementary (hence also the Cyclic) BIGHT SEQUENCE

L(ead) = S = 3 B(ight) = B* (bight-nest) = 4

Delta = (-L) modulo B == (-3) mod 4 = 1

Complementary is 0 X X X hence with Delta = 1

Complementary is **0 1 2 3**

Cyclic is **3 2 1 0**

L(ead) = S = 5 B(ight) = B* (bight-nest) = 4

Delta = (-L) modulo B == (-5) mod 4 = 3

Complementary is 0 X X X hence with Delta = 3

Complementary is 0 3 6 9 to which we must apply modulo B == **0 3 2 1**

Cyclic is **1 2 3 0**

----

using **i = (HPodd – 3) / 2** and **i = (HPeven – 2) / 2** we can calculate the 'i' for each half period

----

remember that (in the direction of reading) the very last entry (**R-1**) for ODD HP and (L-1) for EVEN HP (those cells are with a yellow background in the following illustrations)

Let us do the **S = 3 B* = 4** table

Next page is showing the different steps that you will have to study to fully get "the easy recipe".

→	L - 1	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -1	R - 1	←

HP 1

→	L - 1	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -1	R - 1	←

HP 2

→	L - 1	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -1	R - 1	←

HP 3

→	L - 1	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -1	R - ~~1~~ R	←

HP 4

→	L L - ~~1~~	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -1	R	←

HP 5

→	L	A - 1	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A -~~1~~ A	R	←

HP 6

→	L	A A - ~~1~~	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A	R	←

HP 7

→	L	A	R - 1
0	1	2	3
/	\	/	\
3	2	1	0
L - 1	A	R	←

HP 8

Here is the **S = 3 B* = 4** tabulation completed :

SET NUMBER	1	2	3	S = 3
Type of crossing	U	O	U	B* = 4
Ref for LEFT to RIGHT	L - 1	A - 1	R - 1	
Ref for RIGHT to LEFT	R - 1		L - 1	
HP 1 read Left to Right	L - 1	A - 1	R - 1	i = neg
HP2 read Right to Left	R - 1	A - 1	L - 1	i = 0
HP 3 read Left to Right	L - 1	A - 1	R - 1	i = 0
HP 4 read Right to Left	R	A - 1	L - 1	i = 1
HP 5 read Left to Right	L	A - 1	R - 1	i = 1
HP 6 read Right to Left	R	A	L - 1	i = 2
HP 7 read Left to Right	L	A	R - 1	i = 2
HP 8 read Right to Left	R	A	L - 1	i = 3

To use the table just enter the **PARTICULAR VALUES FOR** '**A**' , **L** (left bight boundary) and **R** (right bight boundary applying to what THK component you are doing.

Doing the **S = 5 B* = 4** by yourself you should find the table given just under :

SET NUMBER	1	2	3	4	5	S = 5
Type of crossing	U	O	U	O	U	B* = 4
Ref for LEFT to RIGHT	L - 1	A - 1	A - 1	A - 1	R - 1	
Ref for RIGHT to LEFT	R - 1				L - 1	
HP 1 read Left to Right	L - 1	A - 1	A - 1	A - 1	R - 1	i = neg
HP2 read Right to Left	R - 1	A - 1	A - 1	A	L - 1	i = 0
HP 3 read Left to Right	L - 1	A - 1	A - 1	A	R - 1	i = 0
HP 4 read Right to Left	R - 1	A - 1	A	A	L - 1	i = 1
HP 5 read Left to Right	L - 1	A - 1	A	A	R - 1	i = 1
HP 6 read Right to Left	R - 1	A	A	A	L - 1	i = 2
HP 7 read Left to Right	L - 1	A	A	A	R - 1	i = 2
HP 8 read Right to Left	R	A	A	A	L - 1	i = 3

ANNEXE

This is the starting point of S = 7 B* = 4 A = 1 Left(i) = 1 Right(i) = 1

Read Left to Right								
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(0)	(0)	(0)	(0)	(0)	(0)	(0)		read Right to Left

Doing HP 1 that is ODD numbered HP and i for this HP is negative so you read an EMPTY upper Complementary hence HP 1 is FREE RUN

Doing HP 2 that is an EVEN numbered HP with i = 0
so you will ADD 1 to what is under the lower cyclic hence you get

Read Left to Right								
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(0)	(0)	(0)	(**1**)	(0)	(0)	(0)		read Right to Left

so reading from RIGHT TO LEFT you get
HP 2 (even numbered HP) (i = 0) O1

Now doing the HP 3 an ODD numbered (so upper part and left to right) with i = 0
so you get to add 1 above the 0 and you have to read

Read Left to Right								
	(0)	(0)	(0)	(1)	(0)	(0)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(0)	(0)	(0)	(**1**)	(0)	(0)	(0)		read Right to Left

hence
HP 3 (odd numbered HP) (i = 0) O1

Now doing the HP 4 an EVEN numbered (so lower part and right to left) with i = 1
so you get to add 1 under the 1 and you have to read

Read Left to Right								
	(0)	(0)	(0)	(1)	(0)	(0)	(0)	
0	1	2	3	0	1	2		
/	\	/	\	/	\	/	\	
	2	1	0	3	2	1	0	
(0)	(0)	(**1**)	(**1**)	(0)	(0)	(**1**)		read Right to Left

hence
HP 4 (even numbered HP) (i = 1) U1 – O1 – U1

Now doing the HP 5 an ODD numbered (so upper part left to right) with i = 1
so you get to add 1 above the 1 and you have to read

Read Left to Right							
	(1)	(0)	(0)	(1)	(1)	(0)	(0)
0	1	2	3	0	1	2	
/	\	/	\	/	\	/	\
	2	1	0	3	2	1	0
(0)	(0)	(1)	(1)	(0)	(0)	(1)	read Right to Left

hence
HP 5 (odd numbered HP) (i = 1) U1 – O1 – U1

Now doing the HP 6 an EVEN numbered (so lower part and right to left) with i = 2
so you get to add 1 under the 2 and you have to read

Read Left to Right							
	(1)	(0)	(0)	(1)	(1)	(0)	(0)
0	1	2	3	0	1	2	
/	\	/	\	/	\	/	\
	2	1	0	3	2	1	0
(0)	(1)	(1)	(1)	(0)	(1)	(1)	read Right to Left

hence
HP 6 (even numbered HP) (i = 2) U1 – O2 – U1 – O1

Now doing the HP 7 an ODD numbered (so upper part and left to right) with i = 2
so you get to add 1 above the 2 and you have to read

Read Left to Right							
	(1)	(1)	(0)	(1)	(1)	(1)	(0)
0	1	2	3	0	1	2	
/	\	/	\	/	\	/	\
	2	1	0	3	2	1	0
(0)	(1)	(1)	(1)	(0)	(1)	(1)	read Right to Left

hence
HP 7 (odd numbered HP) (i = 2) U1 – O2 – U1 – O1

Now doing the HP 8 an EVEN numbered (so lower part and right to left) with i = 3
so you get to add 1 under the 3 and you have to read

Read Left to Right							
	(1)	(1)	(0)	(1)	(1)	(1)	(0)
0	1	2	3	0	1	2	
/	\	/	\	/	\	/	\
	2	1	0	3	2	1	0
(0)	(1)	(1)	(1)	(1)	(1)	(1)	read Right to Left

hence
HP 8 (even numbered HP) (i = 3) U1 – O1 - U1 – O1 - U1 – O1
