SYMMETRY AND ASYMMETRY IN FOLK DANCE

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DANCE IS OFTEN DESCRIBED
AS CULTURALLY-PATTERNED
MOVEMENTS
OF THE HUMAN BODY
THROUGH
TIME AND SPACE.

Liebman, R. (unpublished manuscript, 2012)

FOLK DANCE : CULTURALLY-SITUATED MATHEMATICS IN MOTION, REFLECTING THE GESTALT OF A PEOPLE.

In this workshop we will experience and compare traditional Balkan dances from Central Bulgaria and Macedonia with western contra dance.

- Western European /White North American folk dance forms are based on symmetries in 4/4 or 3/4 time.

- Examples: Contra dance, square dance, waltz, Scandinavian couple dances

- Traditional western couple dances are based on the archetypal male (leader) female (follower) roles.

- All beats are equal "Δt" increments

- MOST TRADITIONAL DANCES ARE CHOREOGRAPHED and individual improvisation is discouraged, though personal flare is encouraged (exception: swing, but this is not really a folk style)

- DANCE PATTERN FOLLOWS MELODIC LINE

• Balkan folk dance utilizes symmetric and asymmetric rhythms.

• Common rhythms: 4/4, 5/8, 7/8, 'sprung 8', 9/8, 11/8 or 11/16, 12/8 or 12/16, 13/16, 18/16, 22/16 (though the denominator is somewhat meaningless outside the western musical transcription)

• Unequal "Δt" increments often in the uneven meters

• Done in a community open circle (The Horo), traditional dances reflect a sense of social order, harmony with the cosmos, and village identity

• TRADITIONAL DANCES HAVE A BASIC PATTERN, BUT INDIVIDUAL STYLE AND IMPROVISATION ARE ENCOURAGED.
           Being an accomplished dancer is cultural capital in traditional communities, even today.

DANCE PATTERN OFTEN WEAVES IN AND OUT OF MELODIC LINE, FOLLOWING THE BEAT, NOT THE MELODY.

Origins of Western Contra Dance

First codified by John Playford in 1651 in *The English Dancing Master. Plaine and easie Rules for the Dancing of Country Dance,* first published in London.

The second edition printed in 1652, the title shortened to "The Dancing Master". **The 18th edition appeared in 1728 with over 600 dances in two volumes.**

From England this style of dance spread to France, Europe, and eventually America. Originally, there was no caller; the lead couple demonstrated the patterns

Once done in court, now done in dance halls, with a caller and a band. Recreational, non-performing, done for social interaction on a regular basis, organized by established associations or clubs.

Emphasis on male-female flirtatious interaction via direct eye contact, within a dance community.

What else was going on in Europe during the time that Playford was publishing his books of contra dance, and contra dance was rising in popularity?

René Descartes (1596 - 1650) : The beginning of the **Age of Reason - the so-called "Enlightenment" in Western Europe**

Isaac Newton (1642 – 1727) : The beginning of the **Scientific Method, considered part of the Enlightenment in Western Europe.**

A few luminaries from that time:

Gottfried Wilhelm Leibnitz (1646 - 1716)

Edmund Halley (1656 - 1742)

Leonhard Euler (1707 - 1783)

Joseph Louis Lagrange (1736 - 1813)

Carl Friedrich Gauss (1777 – 1855)

J.S. Bach (1685 – 1750)

Balkan Dance = Bulgarian, Macedonian, Northern Greek, Croatian, Serbian, Bosnian, Albanian, Kosovar dances, and dances of the Roma people of these countries.

Turkish influences can be seen in Macedonian and Bulgarian dance, particularly from the urban areas of Macedonia and southern Bulgaria, due to the 500-year Ottoman occupation.

During the Western Enlightenment, the Balkans were mostly under Ottoman rule. They did not emerge and join the west until the mid-20th century.

Origins of Balkan folk dance

*Unknown - *in antiquity** Some of the meters believed to have originated in Greek poetry.

Not written down until the 20th century by dance ethnogaphers and western scholars and folk dance afficionados.

Everyone in the village danced in the village center, for holidays and public celebrations. For diaspora Balkan communnities, traditional dances done at church celebrations preserve national identity.
Emphasis on village as-a-whole. Often men and women danced in separate lines.

After WWII Balkan dance became popular in America and Europe, and Balkan countries developed national ensembles for the purpose of preserving the dances and expressing national pride.

Koprivshtitsa Music and Dance Festival, Koprivshtitsa, Bulgaria, 2010

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Liebman analyzes Balkan dances in terms of linear combinations of measures of even and odd parity.

Even parity = weight change (R, L, e.g.)
Odd parity = no net weight change
(step R, lift L; or step R, step L, step R)

He designates even parity measures as "0"
and odd parity measures as "1"

Thus the sequence:
"step R, lift L+ step L over R, step R + lift L, step L + lift R"
is written as "011"
and is the most ubiquitous asymmetric dance measure.

The simple, two-part rhythm can be understood as "an endeavour toward social and cosmic order" (Ivanova, 2003).

The two-part regular rhythm is characteristic of the most ancient ritual dances known in Bulgaria (Ivanova, 2002).

Some simple Balkan Dances
done in an open circle with a Leader

Form a circle - Everybody dance!

1) Lesnoto (Pravoto) in 4/4 and 7/8

2) Pravo horo in 2/4 or 6/8

3) Pajdushko horo in 5/8

4) Devetorka in 9/8

5) Kopanitsa in 11/8 or 11/16

6) Beranche in 12/8

SYMMETRY OPERATIONS AND PERMUTATIONS IN AMERICAN CONTRA DANCE

American Contra Dance
is based on permutations
of a group of 4.

Embedded in the dance structure
is the tension between symmetry
breaking and a return to order.
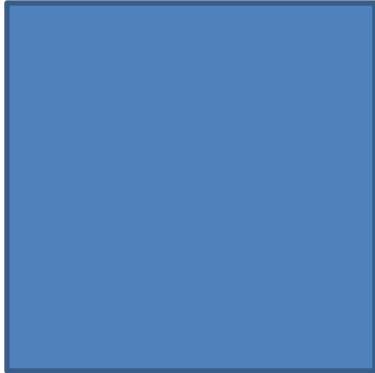
Symmetry operations of a square under which the square is unchanged:

4 Rotations by multiples of 90^0
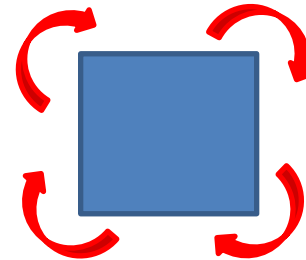
4 Reflections about vertical, horizontal, and diagonal axes
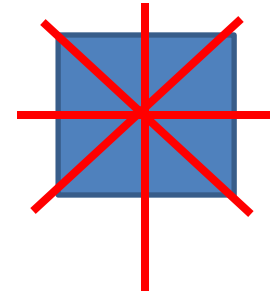
Infinite number of translations that simply move the square in any direction
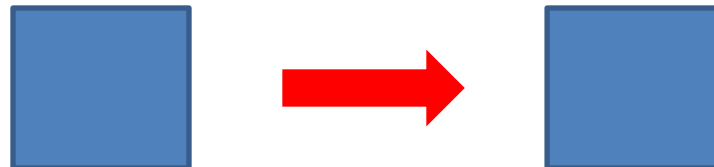
Permutations of a set of four numbers:

1 2 3 4

There are 4! (4 x 3 x 2 x 1) = 24 unique ways to permute a set of four numbers (or any four individual objects).

For convenience, let's bend the line of numbers into a square:

1 2 3 4 ➡

1   2
4   3
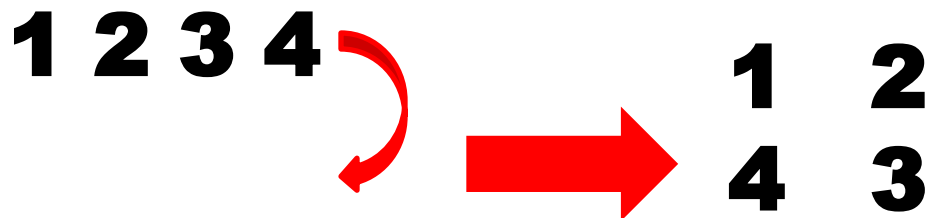
8 of the permutations of the set of 4 numbers are the same as the
8 symmetry operations of a square:

"Rotations"

4 1 2 3
3 4 1 2
2 3 4 1
1 2 3 4

"Reflections"

2 1 4 3
4 3 2 1
3 2 1 4
1 4 3 2

like rotating the vertices of a square

like reflecting about horizontal, vertical, and diagonals
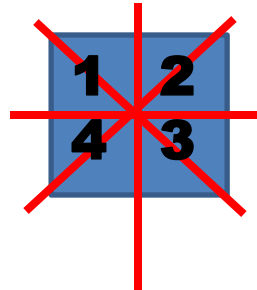
Permutations of the 4 numbers that flip two numbers are like "twists" of the square:

1 2
4 3

2 1
4 3

1 3
4 2

1 2
3 4

4 2
1 3

Note that twists are NOT symmetry operations, because they distort the square into a bow tie, thus creating tension...

Symmetry-preserving Moves

Any combination of rotations and reflections that preserves the symmetry of the square (keeps partners together).
Balance, Order, & Harmony

Symmetry-breaking Moves

Twists that destroy the original symmetry of the square (mixes the couples).
Tension waiting to be resolved

Contra Dance Musical Structure

Music: 2/4 time
32 measures (64 counts)
Melody "A" is played twice (A1, A2)
Melody "B" is played twice (B1, B2)

Dance pattern: 4 sections, 16 counts each
A1: 16 counts
A2: 16 counts
B1: 16 counts
B2: 16 counts

After 64 counts, each couple has shifted one place up or down the hall to face a new couple, and the pattern begins again.

SPRING FEVER
A CONTRA DANCE BY
TONY PARKS

Find a partner & get in long lines
Everybody dance!

"proper"
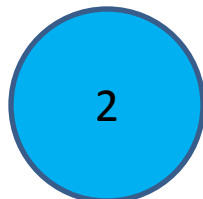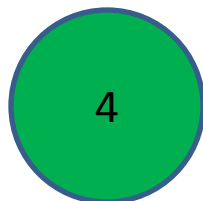
Gent #1 — (2)	★ 1 — Lady #1
Gent #2 — (4)	★ 3 — Lady #2

1:
Start with all ladies on right, all men on left

"improper"
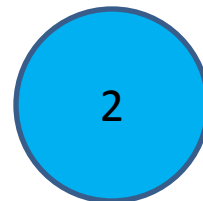
Lady #1 — ★ 1	(2) — Gent #1
Gent #2 — (4)	★ 3 — Lady #2

2:
Every odd couple switch places

Face into your group of four

A1
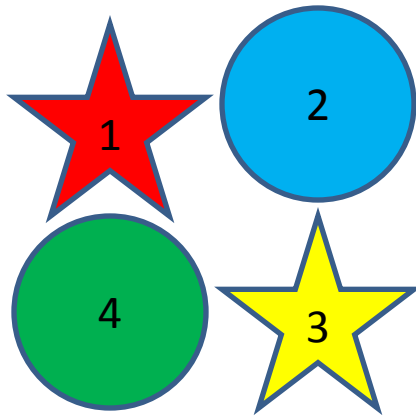
start ing position:
Couple 1:   Lady (red star, 1)
                  Man (blue circle, 2)
Couple 2:   Lady (yellow star, 3)
                  Man (green circle, 4)

Symmetric square: all couples are together in starting position
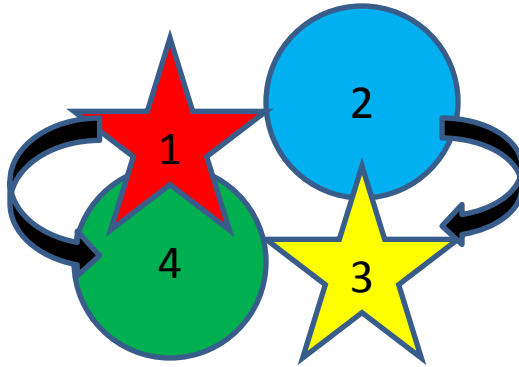
1) **Long lines go forward & back**
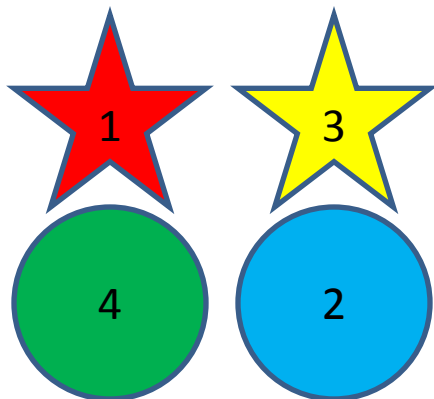**(4 counts in, 4 counts back)**
(null operation)

2) **Swing neighbor**
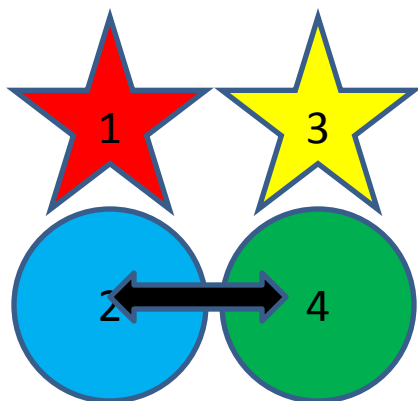**(8 counts)**
End with the
lady on the man's right
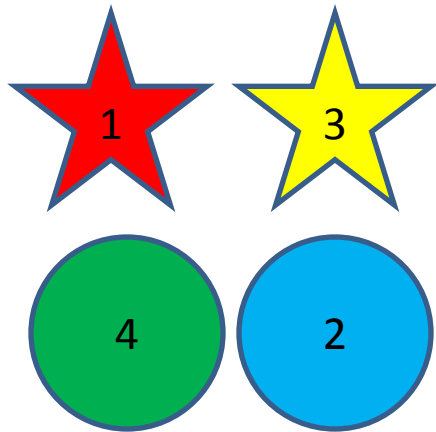
This operation effectively
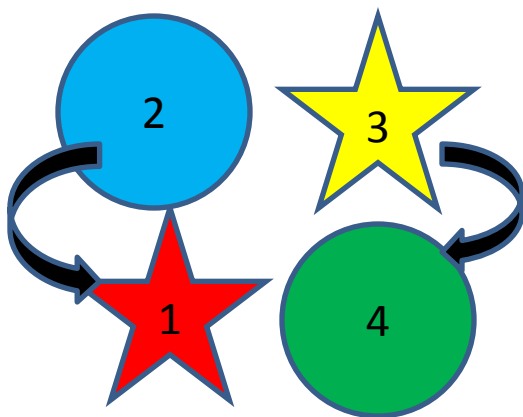**'twists' the square**
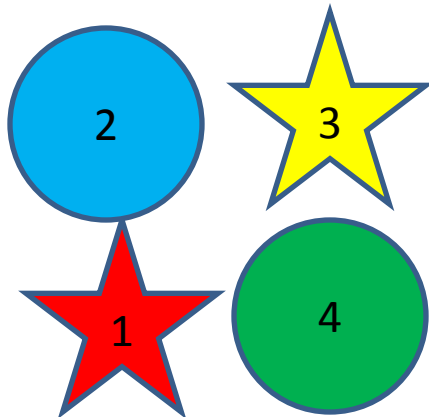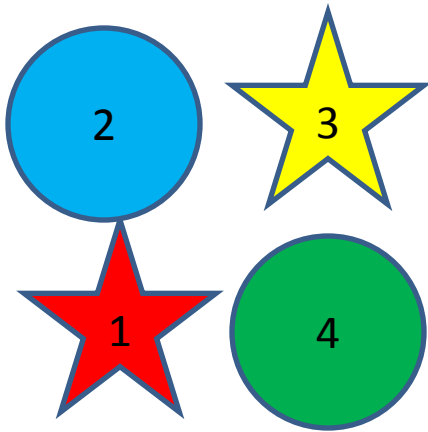**(creates asymmetry)**

A2

From this (twisted) position,

3) Men allemande by the left, 1 ½ times to trade places (adding another twist)
(8 counts)

4) Swing partner on the side, end facing across with the lady on the man's right
(8 counts)

Note: the set is now 'untwisted' and rotated by 270^0
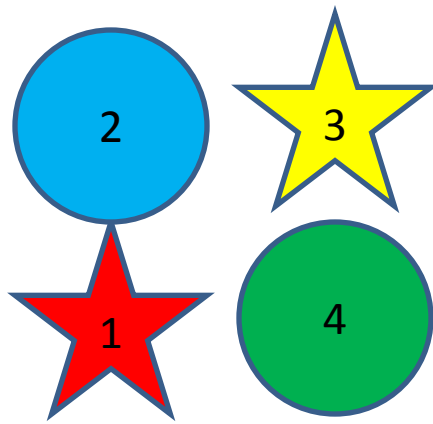**Symmetry is restored!**

B1

From this (symmetric) position:
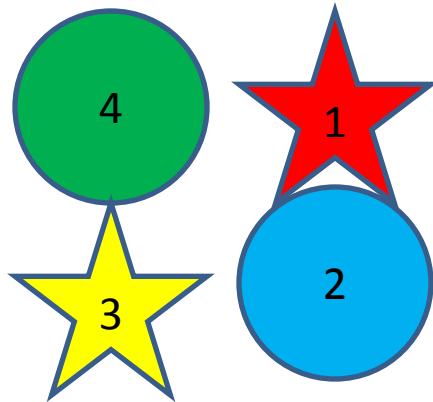
5) All four circle to the left, once around
(8 counts)

6) Left Hand Star (put left hands in, hold each others' wrists and turn the group once around to the right
(8 counts)

Note: Rotations by 360^0 preserve the symmetry of the square.
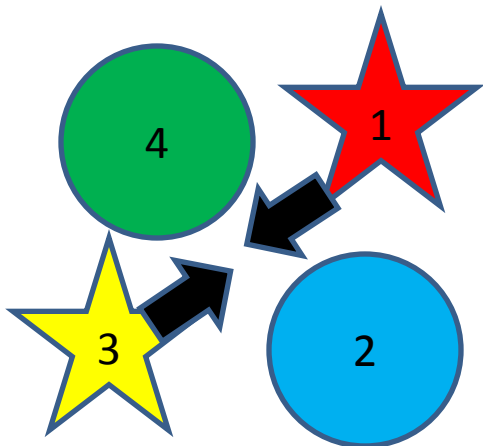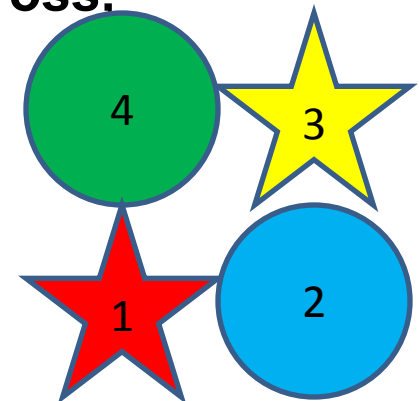**Symmetry is maintained!**
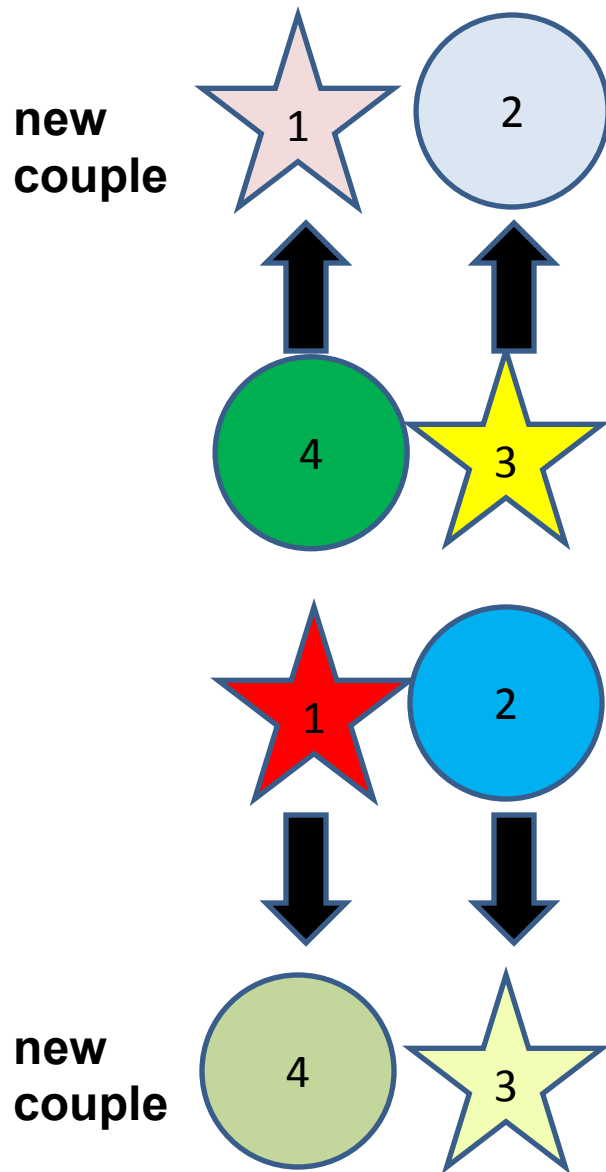
B2

From this (symmetric) position:

7) Half promenade across the set (mirror reflection – right-left invert) **(8 counts)**

8) Ladies' chain across, end up next to own partner again, **(8 counts)** but…

…each couple now faces a new couple, up or down the set.

Symmetry operation: translation! Each couple has TRANSLATED BY ONE PLACE .

The dance starts again with new sets of 4.

Note: when couples get to the end, they must switch places to come back down the line, when they switch roles! (Ones become Twos, and vice versa.)

Now Let's dance it!

1) Long lines go forward and back – 8 cts
2) Swing your neighbour – 8 cts

3) Men allemande left in the centre, once and a half – 8 cts
4) Swing your partner, end facing across – 8 cts

5) All four circle left once around – 8 cts
6) All four make a left-hand star, once around – 8 cts

7) Half promenade across the set – 8 cts
8) Ladies' chain, and onto the next – 8 cts

HAPPY DANCING!

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Solstice Parade, 2013
Santa Barbara, California