Advanced CRaMS: Controlling the Stations
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Introduction

CRaMS is a system of calling that encourages the use of modules or extemporaneous calling while working within a framework of known dancer relationships. The fundamental tenet of CRaMS is this: If you know the relationships between the dancers, then resolving the square is simple.

This paper explains some of the more technical concepts and details of CRaMS. If you're new to the system, see the "Beginning CRaMS" paper for an overview. In particular, this paper explores exactly how various calls affect the station that the dancers are in. We also introduce the concept of "sub-stations", bringing sequence into play, and providing get-outs for each of the possible sub-stations.

Stations

In the "Beginning CRaMS" paper, we emphasized that there are just four possible stations: Partner, Corner, Opposite Lady and Right-Hand Lady. We asserted that no matter what calls you used, exactly one of the four following statements would be true at any given moment for each group of four dancers:

- Each man's partner is somewhere within his group
- Each man's corner is somewhere within his group
- Each man's opposite lady is somewhere within the group
- Each man's right-hand lady is somewhere within his group

Let's talk about that assertion a little more. While it sounds sweeping, it's really not true for *every* possible state a square could be in. In fact, the assertion is true only if we maintain the original symmetry of the square: where each dancer's opposite of the same sex remains exactly symmetric with respect to the flagpole center of the square.

In fact, this symmetry is the fundamental principal underlying CRaMS, and specifically applies to the way we choose our groups of four: Within each group of four, each dancer's diagonal opposite may not also be in the group. That is, if the #1 man is in one group, then the #3 man must be in the *other* group. But as long as you maintain those symmetric exclusions, the assertion will be true for all groups of two men and two ladies.

It is possible to mathematically prove that the assertion is true, but that proof is beyond the scope of this paper. (Actually, we just think it's beyond the interest of most readers!)

Moving Between Stations

The "C" in CRaMS stands for "Controlled". You, as the caller, can retain control over the stations that the dancers are in. You can call sequences that will keep the dancers in the same station, or you can knowingly move them to a different station.

For the sake of simplicity in this paper, let's bring arrangement back into play: Let's look at facing BGBG lines, and split those lines into two boxes for our station.

Furthermore, let's assume that in our station, the ladies are in the same sequence as the men: for example, in a corner station, each man will have his original corner as his current partner.

We can convert from a corner station to an opposite lady station fairly easily:
>Touch ¼, Column Circulate

This trades the #4 lady for the #2 lady, and changes the station. Try it out using checkers: You'll see that the two ladies in each box are the opposite ladies for the men. Let's get back to lines:
>Boys Run, Slide Thru

We're still in our opposite lady station; what's more, every man has his opposite lady as a partner. We can convert it to another station by trading two ladies again:
>Touch ¼, Column Circulate

(and get back to facing lines with Boys Run, Slide Thru)

This will take us to the right-hand lady station. Doing that sequence again will convert us to the partner station, and doing it a fourth time will convert us to the original corner station.

With a little more work, we see that any call that trades two ladies between the boxes will convert any station to the next in a clockwise or counter-clockwise manner. In fact, trading any two men will also rotate the station[1].
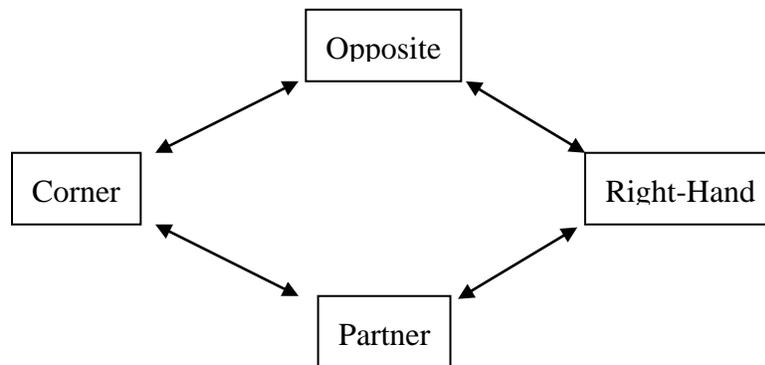
Conversion 1: Trade Any 2 Ladies or Men

Other conversions are possible, too. If you move *two people* from one side of the square to another, you will either stay within the same station or move to the station across from the it.

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[1] How can you tell whether the conversion will be clockwise or counter-clockwise? It depends on whether the dancers being traded were in sequence or not – the rotation will go one way if they're in sequence, and the other way if they are not. Do some experimentation, and you'll see what I mean.

Consider the case of a Zero Box: an in-sequence Eight Chain Thru formation with everyone facing their corner (which means the paired couple is on the outside). By definition, this would be considered a corner station. From that position, a Pass Thru, Trade By will take the paired couple to the other box. We've converted the setup to a right-hand lady station (the "opposite" of the corner station) by trading two couples.

On the other hand, from our original Zero Box the sequence 2 Ladies Chain, Pass Thru, Trade By would *not* convert from a corner station to a right-hand lady station. If you're in a corner station and the man trading across the boxes takes his corner with him, then (by symmetry) every man still has his corner. And no matter how you shuffle those couples around, they'll always be in the corner station.

So that can become a generalized conversion rule. Any call that moves two dancers to the other box will do one of two things: If the two dancers being traded match the station (if they're in a partner station and the two dancers are partners), then the overall station does not change. Otherwise, if the dancers do not match their station, then the overall station will convert to the opposite station: corner to right-hand lady (or back), or partner to opposite (or back).
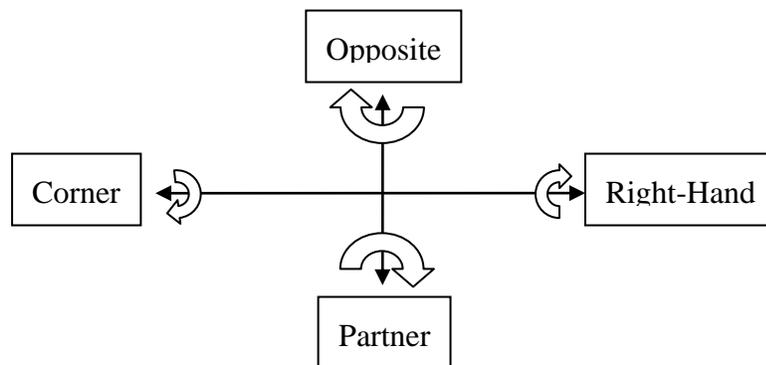
Conversion 2: Trade Any 4 Dancers

If, for the moment, we disregard the formations that don't easily split into two groups of four dancers (like a generalized quarter tag or hourglass), then there simply aren't any other cases. Every call will either trade zero dancers between the two boxes, will trade two dancers, or will trade four dancers. If we understand the conversion rules for the two-dancer and four-dancer trades, then we can very safely say that *for any call, we'll know how it affects the station.*

That's a pretty powerful statement. It says that as we call, we can always know exactly which station the dancers are in. Furthermore, it says we can consciously *change* the station that the dancers are in by using any call that trades dancers from one group to another.

This works for even the most complex calls. Consider Spin Chain and Exchange the Gears. When all is said and done, from the perspective of stations, the call simply trades

two dancers between the waves (those two that chained across the center in the middle of the call). We know that will rotate our station one direction or the other.

Spin Chain the Gears, on the other hand, trades four dancers between the waves (two that chain across early in the call, and two other dancers that chain across later in the call). Since four dancers are switching waves, this call will either retain the station or convert to its opposite.

What works for a call also works for any given sequence of calls (like a module). Any single module will either retain the four dancers in the group, trade two dancers between groups, or trade four dancers between groups. That means that any given module will convert stations in the same fashions as individual calls.

Recognizing Stations

Given the generalized rules that tell you how a given call affects the station that the dancers are in, a caller can (in theory) know exactly what station the dancers are in at every moment and know, as each call is performed, how the station changes.

For example, consider a partner station with two-faced lines. If you call Couples Circulate, you know that will either keep dancers in the partner station (if the couple was paired), or change it to the opposite lady station. After the call is complete, you could just glance at one of the groups of four. Does any man have his partner in the group? Yes or No? If yes, then you're in a partner station and *every* man has his partner in the same group. If no, then you're in an opposite lady station, and *no* man has his partner in the same group.

Suppose that you know the current station, and you trade any two dancers. Then you know you're rotating your station. For example, rotating out of a partner or opposite lady station will take you to a corner or right-hand lady station. But which one is it? Take a look: Does any man have his corner somewhere in the group? If so, then you're in the corner station and *every* man has his corner in the group! If not, you're in the right-hand lady station.

If you ever get lost, you can reestablish the stations by recognizing paired dancers anywhere within the groups, as we discussed in the "Starting CRaMS" paper. Of course, you can also keep a hint of the station just by tracking whether the dancers are in the Partner / Opposite Lady or Corner / Right-Hand Lady station groups.

Stations without Boxes

We've said that CRaMS can be used with any formation, but all of our discussions so far have focused on formations that are easily split into two groups of four. Can the concept of stations be applied to other formations that don't split up as easily?

Certainly they can. It's easy to see in some non-box formations. For example, consider a static square at the beginning of a tip. The dancers are, obviously, in a partner station because every man's current partner is his original partner! Now chain all four ladies across. Again, obviously, we're in an opposite lady station (since each man is with his opposite lady).

But go back to our original square, and have the head ladies chain. Looking at the square as a whole, we're not in any one of our four declared stations: Some men have their original partner, while others have their opposite lady. Taken as a whole group of 8, all we can say is that the entire square's station is in the Partner / Opposite Lady group (as opposed to the Corner / Right-Hand lady group).

In fact, that's a general rule of thumb: As long as we've been using symmetric choreography, the station of the square *as a whole* will be on one of the two axes. If you then break the group of 8 into any two groups of four (where each group has 2 men and 2 ladies), then you'll see exactly which of the four stations each group is in.

Consider a quarter-tag formation with the ladies in the center wave. For ease of illustration, now have the center two ladies run, so you've got a two-faced line of ladies in the center, with men on the outside looking in. If you group the dancers "on the diagonal" by considering each pair of ladies with the men facing them, you'll see that each group of four is in one of our four stations. If the ladies partner trade (to be grouped with the men on the other side of the square), you'll see that the new station is different – it's the one "across" from the other station.

You might have to be a little more creative in identifying CRaMS stations in more exotic formations (like an hourglass, or facing lines of 3 with lonesome dancers on the sides), but it will still work. The only caveats are that your two groups of four dancers each need to have two men and two ladies, and that no person is in the same group as their diagonal opposite.

Of course, putting the dancers into facing BGBG lines is perhaps the *easiest* way to recognize stations, but you aren't limited to just that formation and arrangement.

Sub-Stations

Throughout this paper, we've discussed the four possible stations (partner, corner, opposite lady and right-hand lady), and said that those stations exist independently of arrangement and sequence. Advanced CRaMS users incorporate arrangement and sequence into the four stations, and have memorized get-outs for each of the possible "sub-stations" within a station.

If the couples are in a 0 arrangement (each couple is BG), then it turns out that there are only four sub-stations within each primary station:

- Normal: (men are in sequence, and each man has the "appropriate" lady for the station. For example, in the corner station, each man has his corner as a partner.)

- Out of Sequence (OS): Each man has the appropriate lady, but are out of sequence

- Girls Out of Sequence (GOS): Men are in sequence, but the ladies are chained across (for example, in the corner station but each man has the other man's corner as his current partner).

- Men Out of Sequence (MOS): Men are out of sequence, but the ladies are in sequence. Again, each man will have the other man's lady

Advanced CRaMS callers will know get-outs for all four of these sub-stations, not just the "normal" setup of the station.

Sample Get-Outs

In the "Starting CRaMS" paper, we discussed resolving the square from the four primary stations. But in that paper, we limited ourselves to the simplest cases: facing lines with everyone in sequence. We left it to the caller to sort out arrangement and sequence before pulling the trigger on a get-out.

It is certainly possible to create get-outs for other arrangements and combinations of sequence. Here, we present additional get-outs that are still limited to 0 arrangements (BGBG) of facing lines.

Within each station, "Normal" means that each man has the appropriate lady for that station: that is, for a Right-Hand Lady Station, each man would have his original right-hand lady as his current partner.

"OS" means out of sequence. "LOS" means "Ladies Out of Sequence" (that is, the ladies are chained across from the "normal" position). "MOS" means that only the men are out of sequence.

Corner Station

> Normal: Star Thru, Dive Thru, Square Thru 3, Left Allemande
> OS: Slide Thru, Left Allemande
> LOS: Pass the Ocean, Recycle, Left Allemande
> MOS: Pass Thru, Wheel and Deal, Centers Pass Thru, Left Allemande

Partner Station

> Normal: Slide Thru, Square Thru 3, Left Allemande
> OS: Star Thru, Pass Thru, Left Allemande
> LOS: Dixie Style to an Ocean Wave, Boys Circulate, Left Allemande
> MOS: Spin the Top, Right and Left Grand

Right-Hand Lady Station

> Normal: Square Thru 4, Trade By, Left Allemande
> OS: Star Thru, Pass Thru, Trade By, Left Allemande
> LOS: Pass Thru, Wheel and Deal, Centers Pass Thru, Left Allemande
> MOS: Touch ¼, Circulate 1½, Girls Trade, Girls U-Turn Back, Left Allemande

Opposite Lady Station

> Normal: Star Thru, Pass Thru, Trade By, Square Thru 3, Left Allemande
> OS: Star Thru, Pass Thru, Trade By, Pass Thru, Left Allemande
> LOS: Pass Thru, Boys Trade, Courtesy Turn, Promenade
> MOS: Spin the Top, All 8 Circulate, Right and Left Grand

Sample Get-Ins

These get-ins can be used from an initial static square to get into each of the four stations:

Corner: Heads Square Thru 4
Partner: Heads Lead Right, Circle to a Line
Opposite Lady: Side Ladies Chain, Heads Star Thru, Pass Thru, Circle to a Line
Right-Hand Lady: Heads Star Thru, Pass Thru, Slide Thru, Right and Left Thru

Learning the Next Steps

Once you know the four stations and can recognize them "on the fly", you can proceed to the next step: consciously controlling the station.

Learn how to switch the dancers from one station to another: for example, get the dancers into a corner station, then rotate to either the partner or opposite lady stations by trading just one dancer from each group to the other. Then move to the "opposite station" by moving any couple to the other group, and rotate station by trading just two. That will leave you either back in your original corner station or in the right-hand lady station. If you're in the right-hand lady station, get back to corners by trading a non-paired couple back across the street. That will leave you in a box with corners, so resolve it!

Exercises where you consciously move dancers from one station to another will give you mastery over the stations. Develop and practice your get-outs from each of the stations, especially from the right-hand lady and opposite lady stations.

Once you know how to get dancers into the stations, move them from one station to another, and get them out from any station, you've done it! You've mastered the Controlled Resolution and Manipulation System.

Summary

Using the principles of the Controlled Resolution and Manipulation System, callers can easily recognize and track which of the four primary stations the dancers are in at any time. For each station, a caller can memorize get-outs to use for different combinations of arrangement and sequence.

CRaMS doesn't have to be learned "as a whole" before being useful: Even learning one piece of it (such as learning how to recognize the current station the dancers are in) can simplify resolution of the square. When the ability to recognize the station is combined with the simple rules for transforming from one station to another, the caller is truly controlling the manipulation and resolution of the squares.