Chapter 2 of Logic Games

Basic Ordering

In This Chapter. . .

As of PrepTest 66, the June 2012 LSAT, Logic Games have been printed on two pages. This leaves you with lots of space for drawing your diagram. To save space, we've printed all games on one page, so feel free to grab a blank sheet of paper for each game to enjoy the extra space you'll see on test day.

Getting Familiar

You're probably wondering why we're throwing a game at you when we haven't taught you much of anything. No matter how much you prepare for the LSAT, there are going to be some unexpected curves on your test. One way we'll train you is by throwing curveballs at you from time to time—like a timed trial you're not ready for! Do your best to complete the following game in **8 minutes or less**. Use whatever approaches you see fit.

Exactly seven swimmers—Hewitt, James, Kopov, Luis, Markson, Nu, and Price—will race in the 50-meter freestyle event. Each swimmer will swim in exactly one of seven lanes, numbered 1 through 7. No two swimmers share the same lane. Lane assignments comply with the following conditions:

James swims in a lower-numbered lane than Kopov.
Nu swims in either the first lane or the seventh lane.
Markson swims in a lane numbered two lower than Price's.
Hewitt swims in lane 4.

1. Which of the following could be an accurate list of swimmers, listed in order from lane 1 through lane 7?

(A) Nu, Luis, James, Kopov, Markson, Hewitt, Price
(B) James, Luis, Markson, Hewitt, Price, Kopov, Nu
(C) Nu, Kopov, Markson, Hewitt, Price, James, Luis
(D) Luis, Markson, James, Hewitt, Price, Kopov, Nu
(E) Markson, Nu, Price, Hewitt, James, Luis, Kopov

2. Which one of the following must be false?

(A) Price swims in lane 5.
(B) Price swims in lane 7.
(C) Markson swims in lane 2.
(D) Kopov swims in lane 3.
(E) James swims in lane 6.

3. If James swims in lane 1, then each of the following could be true EXCEPT:

(A) Kopov swims in a lower-numbered lane than Hewitt.
(B) Luis swims in a lower-numbered lane than Hewitt.
(C) Markson swims in a higher-numbered lane than Hewitt.
(D) Kopov swims in a lower-numbered lane than Price.
(E) Luis swims in a lower-numbered lane than Markson.

4. If Price swims in lane 3, which one of the following could be true?

(A) Kopov swims in lane 2.
(B) James swims in lane 6.
(C) Luis swims in lane 2.
(D) Nu swims in lane 1.
(E) Kopov swims in lane 7.

5. Which of the following could be a partial and accurate list of swimmers matched with the lanes in which they swim?

(A) lane 1: Nu; lane 2: Markson; lane 6: Luis
(B) lane 5: James; lane 6: Kopov; lane 7: Luis
(C) lane 3: Luis; lane 4: Hewitt; lane 5: James
(D) lane 4: Hewitt; lane 5: Luis; lane 7: Kopov
(E) lane 2: James; lane 5: Markson; lane 6: Kopov

We will revisit this game later in the chapter.
We promise.

2

Ordering

Order is the most common means by which the LSAT writers assign elements to positions. Nearly two-thirds of LSAT games require you to order elements. This is a big topic!

Ordering games come in several flavors. In the following chapters, we will go into great detail about each of these variations, and suggest specific strategies for each of them. In this chapter, we will lay the groundwork for the entire **Ordering Family** of games by discussing Basic Ordering games. We're also going to discuss the two most common question types you're going to face.

Basic Ordering

It's usually smart to define things by their characteristics, but Basic Ordering games are best defined by what they *don't* have: Basic Ordering games do not involve subsets of the elements or positions, and they do not involve a mismatch between the number of elements and the number of positions. They're the vanilla of ordering games.

While you can think of Basic Ordering games as "simple" games that do not have adornments, by no means do we mean to suggest that all Basic Ordering games are *easy*. Admittedly, Basic Ordering games do tend to fall on the lower end of the difficulty scale, but there have been a few Basic Ordering games that have been quite difficult. If you run into a Basic Ordering game as your fourth game, it's much more likely that you'll find it to be on the higher end of the difficulty scale.

Basic Ordering games are extremely common. They show up about once in every five games. Let's get friendly with these games!

Picturing Basic Ordering Games

Basic Ordering games are simple to picture. For the purposes of discussion, let's use the following hypothetical game scenario:

> Seven runners—K, L, M, N, O, P, and S—finish a race in order. There are no other runners, and there are no ties. The following conditions apply:
>
> S finishes before O.
> N finishes fourth.
> L finishes two spots ahead of P.
> K is either first or seventh.
> If L finishes third, M finishes before K.

Start all games by reading the scenario and quickly scanning the rules. Don't start diagramming until you've taken a peek at the rules, as they will often tell you what sort of diagram to use. Once you recognize that you're dealing with a Basic Ordering game, write down the elements to be placed and draw slots for positions.

```
__  __  __  __  __  __  __     K L M N O P S
1   2   3   4   5   6   7
```

This is probably what you would do naturally, but maybe it seems more natural to you to put the first position to the far right, and to go from right to left. That can work, but we recommend that you stick with left to right, since that's how the elements in a game will be ordered in answer choices and that's how we tend to read in English! But we admire rebels; just be a consistent rebel. Develop a system and stick with it.

Keep an eye out for situations where slot 1 could be the lowest or highest value (e.g., "most popular to least popular" or "tallest to shortest"). Check which side of the spectrum gets assigned to 1. And, while we're talking about twists, there also have been some ordering games that are naturally easier to imagine in a vertical organization. Imagine you were assigning businesses to different floors of a building—floors 1 through 7—and all of the rules were about above and below; in that case, it would likely be to your benefit to visualize the game this way:

```
__
7
__
6
__
5
__
4
__
3
__
2
__
1
```

Or, perhaps you'll soon be so used to ordering games that you will feel perfectly comfortable thinking about the order of floors as going from left to right. With these types of minor decisions, go with whatever feels most comfortable for you. (By the way, that's not some "let's all get along" sort of broad advice. It is *critical* that you are comfortable with your diagram, because you need to be able to manipulate it in order to answer questions.)

Now we can move on to thinking about the rules in greater detail.

Basic Ordering Rules

The rules that accompany Basic Ordering games will give you information that falls into two general categories. They will give you details about either **assignment** or **order**.

Rules of Assignment

As we discussed in the introductory chapter, all LSAT games are about assigning elements to positions. Therefore, all games are likely to have some **rules of assignment**, and rules of assignment are the simplest rules that we will encounter.

Assignment rules give us one of two types of details:

1. An element will be assigned to a position. In our hypothetical game, we had the assignment rule "N finishes fourth."

We can notate this by placing N in the fourth position, like so:

			N			
1	2	3	4	5	6	7

(We know, this is pretty straightforward so far!)

2. An element will not be assigned to a position. Imagine that instead we were told, "N does not finish fourth." We could notate this information like so:

1	2	3	4	5	6	7
			~~N~~			

Rules about Order

Naturally, ordering games will also have rules about order. Let's consider the range of ordering rules that are possible.

Ordering rules can relate elements to elements (for example, "S finishes before O") or elements to positions (for example, "M finishes no later than third"). Most ordering rules that appear on the LSAT relate elements to elements. They can do so in a few different ways:

1. Ordering rules can relate elements without giving us any specific information about how many spaces are between them.

These rules are very common, and we call these **Relative Ordering** rules.

The rule “S finishes before O” is an example of a relative ordering rule, and we can represent it this way:

S — O

We can draw this on the side of our number line or below it.

From this rule, we know S must be before O, but we don’t know much else. They can finish right next to one another, or they can be further spread apart.

Note that we could be given the same rule with slightly trickier wording: “O does not finish before S.”

If this rule were part of a game in which elements could tie, it would mean something different (it would mean that O could tie with S or finish after it). However, since elements can’t tie in this game, “O does not finish before S” means S finishes before O.

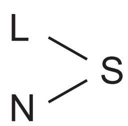
Relative Ordering rules can sometimes involve three and (rarely) even four elements.

For example:

“L finishes before M but after P.”
or
“S finishes after both L and N.”

We can diagram these rules, respectively, as follows:

P — L — M



The dash (—) will be a significant symbol in our notation system, and it will always mean the same thing: we know of a *relative* relationship between elements, but nothing more specific than that.

2. Ordering rules can tell us the exact number of positions between elements.

In our Getting Familiar game, we had the rule “L finishes two spots ahead of P.”

We can diagram this as follows:

$\boxed{L\ \_\ P}$

This rule seems simple enough, but it’s very easy to misinterpret as

$\boxed{L\ \_\ \_\ P}$

You must be vigilant about, and practiced at, interpreting and diagramming these common rules accurately.

You probably already figured out that we're using an underscore (_) to indicate a known space between elements. Just to clarify the difference, "J–S" means that J comes sometime before S, while "J_S" means that J comes exactly two spots before S.

When elements have a known number of slots in between them, they form what we'll call a **chunk**. While the name is sort of gross, as you start to solve ordering games, you'll quickly see that chunks are crucial.

3. Ordering rules can give us a somewhat specific, but not exact, relationship between elements.

Imagine that in our initial example we had the rule "L finishes at least two spots ahead of P."

In this case, we'd know something specific—L can't finish right before P—but the information is also somewhat diffuse; we don't know more beyond that. By the way, terms like "at least" might be small, but they can have a huge impact on how a game works.

This type of rule is less common than the previous two types, but it is challenging and thus important to be prepared for. We can represent this rule as follows:

L _ + P

" __ +" indicates that there is at least one space, and possibly more, between L and P. (Some people prefer "L __ ... P".) While the exact number of spaces isn't known, we'll still often refer to this as a chunk.

4. Ordering rules can specify the distance between elements, without indicating order.

Imagine we had the following rule: "Exactly two people finish between K and P."

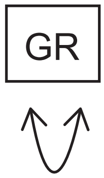
In this case, we would know that there are two spots between K and P, but we wouldn't know whether K went before P, or vice versa. We could represent this situation in the following manner:

K _ _ P

The double-sided arrow might be a bit awkward at first, but if you are consistent in your notation, it should be intuitive soon enough. Some students have found it helpful to use this alternative notation:

K _ _ P or P _ _ K

Similarly, the rule "G and R finish consecutively," could be represented in one of these two ways:



$\boxed{GR}$ or $\boxed{RG}$

We think it's faster to use the one on the left, but follow your heart on decisions like this, and then stick with your decision.

Keep in mind that many of these ordering rules could be given to us in terms of "nots." For example, we could have a rule that states, "L does not finish exactly two spots ahead of P." These types of "not" rules are rare, but if they appear, we can just adjust our common notation with a cross out, like this:

$\boxed{\cancel{L\ \_\ P}}$

As mentioned above, almost all ordering rules relate elements to one another, but if we do happen to get an ordering rule that relates an element to a position, we can handle it easily enough.

If we take the example "M finishes no later than third," we can represent this in one of two ways:

Either method would be fine, although, depending on the particular game, one might be a smidge more useful than the other.

The oval notation on the left, which we call a **cloud**, is frequently used for situations in which we know elements must fit in a certain range, but we don't know the exact positions of these elements. For example, we might know that K, L, and M have to go in the first three positions, but not know their relative order. In this case, we can put them in a cloud.

Here's a table that includes all of our diagramming suggestions thus far:

Rules of . . .

Assignment	
N finishes fourth.	___ ___ ___ N ___ ___ ___ 1 2 3 4 5 6 7
N does not finish fourth.	___ ___ ___ ___ ___ ___ ___ 1 2 3 4 5 6 7 ~~N~~ (under 4)
Order	
S finishes before O.	S – O
L finishes two spots ahead of P.	$\boxed{L\ \_\ P}$
L finishes at least two spots ahead of P.	$\boxed{L\ \_ + P}$
Exactly two people finish between K and P.	$\boxed{K\ \_\ \_\ P}$
M finishes no later than third.	M ___ ___ ___ ___ ___ ___ ___ 1 2 3 4 5 6 7

In addition to the type of information that they can give, rules are further defined by the manner in which they give that information.

Most commonly, rules give us information in a simple way:

S finishes before O.
N finishes fourth.
Q finishes immediately before T.
L finishes two spots ahead of P.

However, rules can also give us information in two other ways:

1. Rules can present *either/or (but not both)* scenarios. We've actually already dealt with a "hidden" either/or (but not both) scenario above: "Exactly two people finish between K and P" means either

$\boxed{K\ \_\ \_\ P}$ or $\boxed{P\ \_\ \_\ K}$

Additionally, the test writers are apt to take many of the other types of rules given above and convert them into either/or (but not both) scenarios. Here are some examples of common rules, as they would apply to the runner game above, along with suggestions for how to diagram these rules:

K is either first or seventh.

K/						/K
1	2	3	4	5	6	7

Either L or P finishes third.

		L/P				
1	2	3	4	5	6	7

L finishes before S or N, but not both.

The last rule is certainly the most challenging of the set above to diagram. Before you read on, take a moment to sketch how you might diagram that one.

Many test-takers would stop at this:

L — S
or
L — N

However, keep in mind that if L finishes before S, it can't finish before N, and, since they can't tie, that must mean that N finishes before L. If L finishes before N, it must finish after S. Basically, L is in the middle. We could actually write this:

N — L — S

Also, keep in mind that unless the design of a game prevents it, or unless it is explicitly stated, the phrase "either/or" does not exclude the possibility of both. The reason we know that the rule "K is in either 1 or 7" means K is in 1 or 7, but not both, is that we know, based on the parameters of the game, that K won't finish twice. For the rule "L finishes before S or N, but not both," if instead we had simply been told, "L finishes before S or N," without the "but not both," then three options would be valid:

S — L — N   N — L — S   L < N, S

Again, unless explicitly stated or prohibited by the nature of the game, the either/or phrase does not exclude both. This is a tricky concept, but fortunately one that is not particularly significant for the vast majority of ordering games. We'll cover this concept in greater detail in the chapters for which it's more relevant.

2. Rules can be *conditional*. Conditional logic is central to the construction of the LSAT, and we'll discuss it at length in other parts of this book (and also in even greater depth in our Logical Reasoning Strategy Guide), but one easy way to think about conditional rules is that they are triggers that set off a certain outcome or guarantee.

The most common marker of a conditional rule is the word "if." We had one conditional rule in our original hypothetical game:

If L finishes third, M finishes before K.

We recommend that you diagram this type of rule below or off to the side of the diagram, and we recommend that you diagram it like this:

$$L_3 \rightarrow M - K$$

Note that we do not want to put L into the third slot in our main diagram, because L may or may not be in that slot. We can use subscript for this situation. We could just as easily represent it in either of the following ways:

$$L_3 \quad \text{or} \quad \frac{L}{3}$$

Use whatever feels best for you.

Let's think for a moment about the specific significance of a conditional statement. So that we can stay focused on the reasoning involved, let's use a simple conditional:

If K finishes fifth, N will finish third.

We can represent this rule as follows:

$$K_5 \rightarrow N_3$$

Let's look at various scenarios to see what this rule does and does not mean: *What do we know if K finishes fifth?*

We know for sure that N **must** finish third. Pretty straightforward, right?

Take a moment to consider what we could infer—know for sure—in each of these situations:

a. K doesn't finish fifth.

b. N finishes third.

c. N doesn't finish third.

Figured those out? Let's take a look:

a. What if K doesn't finish fifth?

Does that mean N won't finish third? Not necessarily. If K doesn't finish fifth, this rule doesn't apply, and **we can't infer anything.**

b. What if N finishes third?

Do we know for sure that K finished fifth? No. It could have, but we don't know that for sure. **We can't infer anything.**

c. What if N does not finish third?

Do we know anything about K? Yes! We know that K did not finish fifth (otherwise, N would have finished third). We know K **must not** have finished fifth.

We know that if N does not finish third, K does not finish fifth. If we wanted to, we could notate this as follows:

$$-N_3 \rightarrow -K_5$$

Notice the relationship between the original conditional statement and this valid inference—the elements have been *reversed* and *negated*. We can **always** derive inferences from conditional statements by reversing and negating both sides of the statement, and these inferences have a special name: contrapositives.

Generally, students choose to deal with contrapositives in one of two ways:

1. By diagramming them along with the original conditional statements.

This is simple enough, and it's a habit you will quickly become comfortable with.

2. By being mindful of them.

For certain game types that we will explore in depth later in the book, conditional statements are the heart and soul of the game, and for those games, we'll strongly recommend writing out all contrapositives. However, for other types of game, such as Basic Ordering, we're also fine with you not writing out contrapositives, and instead being mindful of their significance. If you feel more comfortable writing out the contrapositives, especially while you're still new to games, go for it. Figure out what works for you.

For logic games, the concept of trigger and consequence can be useful in wrapping your head around the contrapositive. Put simply, the contrapositive simply means that **if the consequence didn't happen, the trigger didn't happen.**

Here are a few examples of conditional rules, along with suggestions for how to notate them:

Statement	Notation	Contrapositive
If S finishes second, O will finish sixth.	$S_2 \rightarrow O_6$	If O doesn't finish sixth, S doesn't finish second.
If L finishes before S, P will finish before O.	$L - S \rightarrow P - O$	If P doesn't finish before O, L doesn't finish before S.
If L and O finish next to one another, though not necessarily in that order, M will finish second.	$\boxed{LO} \rightarrow M_2$	If M doesn't finish second, L and O don't finish next to one another.

2

Smart Tip: Combine Rules as You Go

It is fairly common that you will find the same element mentioned in more than one rule, and oftentimes when that happens you can combine the two rules. Combining rules will pay off nicely by helping you fill in the number line and reducing the amount of uncertainty in the game.

For example, imagine we had the following two rules for a game:

K finishes before S.
S finishes immediately before T.

We can combine these two rules in the following notation:

K – $\boxed{\text{ST}}$

Keep in mind that the test writers will not always conveniently place rules sharing like elements next to one another. Some test-takers aggressively look to combine rules as they first notate them. For example, when they've dealt with a rule about G and P, instead of simply moving to notate the next rule, these folks will scan the other rules looking for a reference to G or P. For some games, "reordering" rules is essential, so it's not a bad habit to employ all the time. At a minimum, try to combine related rules as you notate them.

Here are five other pairings of rules that can be notated together. See if you can figure out a way to bring the two rules together and sketch out the combined notation before looking at the solutions. Keep in mind that we're still working with the same basic race scenario:

1. S finishes immediately before or immediately after L.
   K finishes before L.

2. S finishes before O.
   K finishes after O.

3. P finishes after N but before L.
   M finishes immediately before or immediately after P.

4. N finishes fourth.
   K finishes before N.

5. O finishes at least two spots ahead of or behind M.
   Exactly one runner finishes between L and O.

Solutions

1. S finishes immediately before or immediately after L.
   K finishes before L.

   K – $\boxed{\text{SL}}$

2. S finishes before O.
   K finishes after O.

   S – O – K

3. P finishes after N but before L.
   M finishes immediately before or immediately after P.

   N – $\boxed{\text{PM}}$ – L

4. N finishes fourth.
   K finishes before N.

   K N
   __ __ __ __ __ __ __

   or

   K – N_4

5. O finishes at least two spots ahead of or behind of M.
   Exactly one runner finishes between L and O.

   Did you struggle with this one? Curveball! While you could write out a pretty complex notation for this combination of rules, since there are so many options, it's fine to not combine their notations but simply know that you'll have to keep an eye on how they interact. If you were brave, perhaps you came up with something like this:

   L_or_ L
   $\boxed{\text{M \_ + O}}$

   or

   L_or_ L
   $\boxed{\text{O \_ + M}}$

DRILL IT: Basic Ordering Diagrams

Now that we've discussed the full spectrum of rules that you are likely to see for a Basic Ordering game, let's practice setting up our diagrams.

In this drill, we've got four stripped-down mini versions of Basic Ordering games. For each one, practice creating your diagram and notating rules. As you are doing so, you may notice and uncover additional truths about the game—inferences—by bringing the rules together. Notate these inferences as you'd like.

Two last tips before you start:

1. When you're done notating all the rules, **circle any elements that are not obviously affected by any rules**. (One of our teachers calls them "free radicals.") This will tighten your grasp on how a game works, and once in a while the move pays off handsomely in the questions.

2. As much as possible, put the rules *into* the number line instead of off to the side. The more that your rules are in the number line (or whatever diagram a game requires), the more they'll be front and center in your mind. That said, some rules are too complex to be immediately included, and others, like conditional rules in Basic Ordering, don't really fit into the diagram at all.

Timing is less important at this stage in your prep, but if you can complete each setup accurately in one and a half minutes or less, you are in great shape at this point.

1. Seven circus clowns—Roy, Stew, Tony, Urma, Xi, Yang, and Zip—are to emerge one at a time from a suitcase. No other clowns are to emerge from the suitcase. The following conditions apply:

   Urma emerges either first or last.
   Stew emerges immediately after Xi.
   Yang emerges at least two spots before Roy.
   Tony emerges at some point after Xi.

2. A scientist is testing each of seven experimental medicines—N, P, Q, R, S, T, U. No medicine can be tested at the same time as another, and the scientist will test only those medicines. The testing of the medicines must be conducted according to these rules:

   If R is tested third, N cannot be tested first.
   If S is tested first, T is tested immediately after P.
   P is tested either fifth or seventh.
   If U is tested before S, Q is tested after N.

3. Six race cars—F, G, H, I, J, K—will be lined up in starting positions 1–6, going from left to right. The following conditions apply:

   J is not in position five.
   H is positioned to the left of K.
   Either G or K is in position four.
   F is after G or J, but not both.

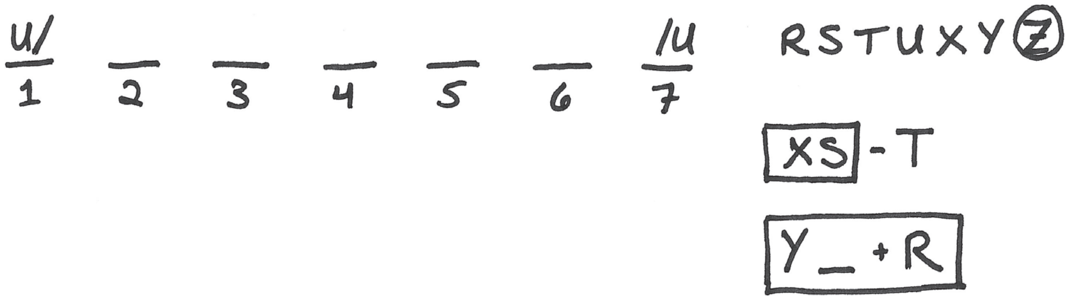
4. Six office departments—legal, management, operations, personnel, shipping, and tech—are to be assigned to floors 1–6 in a new office building. Each department will occupy its own entire floor and no other departments will be in the building. The assignment of departments to floors must follow the following rules:

   Tech cannot occupy the top or bottom floor.
   Management must occupy either the fifth or sixth floor.
   Shipping must be placed directly above or below operations.
   Personnel must be placed either on a floor higher than tech or on one higher than shipping, but not both.

SOLUTIONS: Basic Ordering Diagrams

Here are solutions to the diagramming drill. Note that in some places you may have put in additional inferences that we did not, and perhaps in other places we notated inferences that you did not. This is fine. We'll discuss inferences in greater detail in just a bit. For now, the most critical thing to review is that you notated each rule correctly.

1.



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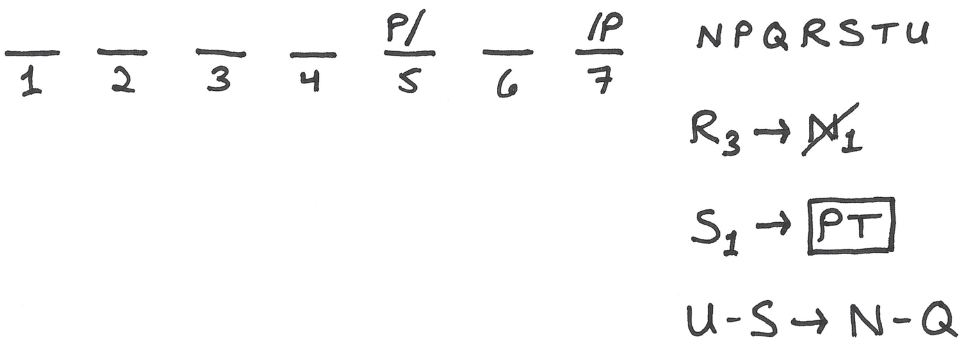

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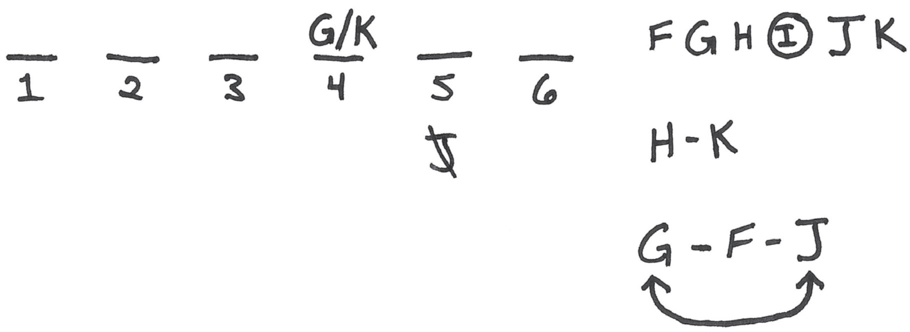

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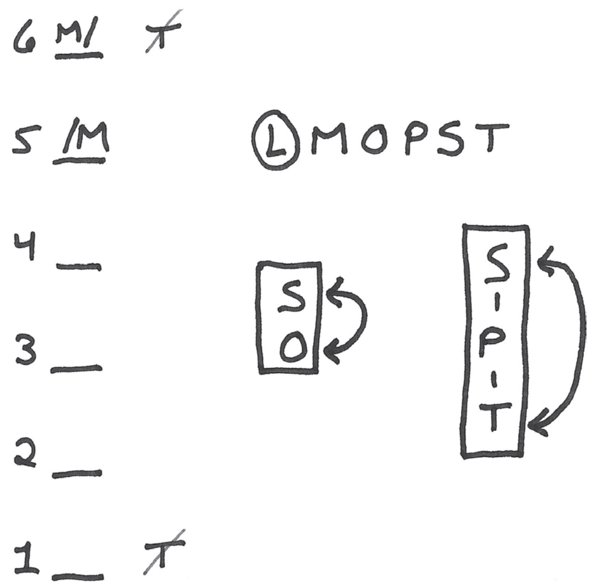

Inferences

If an LSAT question asks, "Which of the following must be true?" the right answer will *not* be something that must be true directly according to the rules that we are given.

Huh?

Here's what we mean. If we're given a rule that specifically tells us that T must go in the fourth position, we'll never be asked "Which of the following must be true?" and have "T is fourth" as an answer choice.

The correct answer to that problem will be one that we can **infer**, or deduce, by bringing together the various things we know about the game. When it comes to logic games, inferences are our best friends. We love inferences because they frequently allow us to answer a question in ten seconds rather than a hundred, or to solve a complete game in six minutes rather than twelve. We're going to be making inferences at every point in our game-solving process: as we initially picture games, as we absorb the rules, and as we answer the questions.

Inferences are the key to solving logic games quickly, but before we talk about what to do, let's lay out some common misunderstandings on either side of the inference spectrum.

At one end are test-takers who do not understand the significance of inferences. These students often fail to make up-front inferences, and, even more commonly, fail to make inferences when questions include a new rule (such as "If G is fourth, which of the following…"). Failing to make inferences forces these students to use more deliberate, error-prone, and time-consuming methods, such as trial-and-error.

At the other end of the spectrum are test-takers who are overly eager to make all inferences—to "solve" games—during the initial setup of a game. This mentality can lead to false inferences, and it can also lead to a lot of extra work that ultimately proves to be of little worth. Finally, this mentality can lead to panic when games are invariably *not* solved during the setup.

The reality is, certain games are "front-end" games, designed to yield key up-front inferences, while others are "back-end," designed with few inferences up front and more work in the questions. You want to able to recognize and be comfortable with both of these tendencies. As we discuss individual game types, we'll talk about the front-end/back-end tendencies of each type of game. More importantly, you'll develop your own ability to see which category a game falls into.

Let's discuss inferences in more specific detail. It can be helpful to organize our thinking in terms of inferences made during the setup and inferences made during the questions themselves.

Inferences in Our Setup

As we just mentioned, *front-end* games yield significant inferences during the setup stage of a game, and *back-end* games do not. In general, Basic Ordering games are back-end games. We may be able to uncover a few truths up front, but it's likely we will do most of our inferring in the questions themselves.

Still, there are usually a few front-end inferences we can make that we definitely want to put down on our papers, and often there are even more that we can make that we simply want to keep in mind. (Since you're just starting out with Basic Ordering games, err on the side of over-diagramming inferences until you figure out for yourself which inferences you don't need to write out.)

Remember that inferences are based on bringing information together, and, when it comes to Basic Ordering games, we are simply bringing together information about order and assignment. Let's use the hypothetical ordering rule "K is two positions ahead of N" to illustrate all the ways one ordering rule might come together in holy inference matrimony with another piece of information in the game.

We can diagram the rule like this:

K _ N

Using that, here are three types of combinations you'll encounter:

1. Ordering Rules + Other Ordering Rules.

We already worked on this a bit—when two ordering rules share a common element, they can often be combined.

For example, what do we know if "L is immediately before K" and "K is two positions ahead of N?" We can infer that L is three positions before N, and we can diagram the combination like this:

L K _ N

While some rules easily fuse together like that, sometimes we can make inferences by thinking about how ordering rules link up, even if they don't share a common element.

For example, imagine that we have a game involving six slots, and along with the rule "K is two positions ahead of N" is the rule "There are three people who finish after L but before P."

This second rule we could diagram like this:

L _ _ _ P

Now, before you read on, think for a minute about how these two rules interact with one another.

Is it possible for the two chunks not to overlap? No. We'd need a minimum of eight spaces for them not to overlap. In how many different ways could they overlap? Not too many. Here they are:

KLN _ _ P
_ LK _ NP
LK _ NP _
L _ _ KPN

2. Ordering Rules + Rules of Assignment

Very commonly, Basic Ordering games are defined by the interaction between an ordering chunk and the assignment of an element to some position in the middle of our order.

Imagine that, in addition to our "K is two positions ahead of N" rule, we had one that stated, "F is fourth." What could we infer in our six-slot game? Take a moment to think about it before reading on.

If K is exactly two positions ahead of N, and if F is fourth, K cannot be second. Furthermore, N cannot be sixth. Did you figure out where the K _ N chunk can go? It can go only in slots 1 _ 3 or 3 _ 5. Notice a commonality between those options? Wherever that chunk goes, part of it is going in slot 3, so we can write "K/N" there.

This sort of inference is not too easy to spot, and will surely be useful during the questions, so we definitely want to note it on our diagram:

		K/N	F		
1	2	3	4	5	6
	~~K~~				~~N~~

Far less commonly, we may also make inferences based on "not" assignment rules. If, in addition to knowing "K is two positions ahead of N," we knew "N is not fifth," we would know that K could not be third.

3. Ordering Rules + The Construction of the Game

Almost all ordering rules will allow us to make at least some inferences about where elements can't go, based on the construction of the game—more specifically, based on the fact that there is a beginning and an end to the number lines we're using!

Again, imagine that our rule "K is two positions ahead of N" came in a game involving six positions. What would we know about where K and N could and, perhaps more importantly, could not go?

N cannot be in positions one or two, because then there would be no place for K. Similarly, K cannot be in positions five or six, because then there would be no place for N.

We *could* notate these inferences as follows:

1	2	3	4	5	6
~~N~~	~~N~~			~~K~~	~~K~~

To Note or Not to Note, That Is the Question

Did you notice we just said that you *could* notate those inferences? For some folks, perhaps you, those inferences are so obvious, it wouldn't be worth writing them out, especially if there were multiple restrictions for various slots. In terms of what you do actually diagram on your paper and what you don't, there is no perfect diagram, and the "right" amount of inference-notating is based in large part on your personal preferences, strengths, and style. In general, we suggest that you start off by overdoing it; diagram more rather than less, especially whenever you are not confident that you will remember a particular inference.

However, inferences that involve ordering rules coming into conflict with the beginning or end of the order are so common that after serious prep, most people end up not needing to notate them on their diagrams. There are also certain games for which there are so many such inferences that, if one were to carefully diagram each one, it would be a waste of time and energy. It's tempting to write these out since it *feels* like productive work, but start noticing whether noting that particular level of inference is actually productive.

Speaking of temptations to resist, you may be tempted to look for inferences based on conditional rules. After all, if they give you a rule that begins "If P is second…," it makes sense to think about the consequences of P being second. However, this generally will not be to your advantage. Usually, we want the inferences we make up front to be always true. Conditional rules, by definition, are rules that are triggered *only in certain situations.* That means that when you make inferences from conditional rules, these inferences represent what *could* be true of the game. That's why it's usually best to put these types of inferences to the side, to be reached for when necessary.

Again, you want to be on the lookout for inferences in all parts of your setup. We also strongly recommend pausing at the end of the rules to take one last look for inferences. We call this step in the problem-solving process *The Big Pause.*

The Big Pause

Imagine that you are a participant on a game show that somehow has managed to combine the quiet challenge of solving crossword puzzles with the frenetic ordeal of grocery shopping. Here's how the show works: first, you have to use a series of crossword puzzle-like clues to uncover eight items that exist on a grocery store shopping list. Second, you have to run through a supermarket finding the elements on that list. The contestant who finds all items first wins.

The game is on! You've just had a hell of a time figuring out the word clues. Finally, you figure out the list of elements: ice cream, toothpaste, milk, cheese, sugar cookies, frozen peas, orange juice, and earwax remover.

It took you longer than you'd like, and your competition finished figuring out the same list about ten seconds before you did.

So, as soon as you are done with figuring out the last item, you rush into the aisles, looking for the first element on your list: ice cream.

If Manhattan Prep were coaching you for this competition, we would *not* suggest that you rush in looking for that ice cream.

Why not?

Because we recognize that a few seconds spent organizing what you know can prevent you from wasting a ton of time and energy going about your task in an inefficient manner.

It would take hardly any time at all to consider the fact that ice cream and frozen peas are likely very close to one another. The milk, cheese, and orange juice are similarly likely to be adjacent, and both the toothpaste and earwax remover are likely to be found in the "non-foods" sections. Perhaps in this pause you consider which elements are easiest to find, and you start with those. Or, you see that earwax remover may be the toughest element to find (you've never had to look for it before!), and you come up with a plan of attack that focuses on that.

Whatever the strategy, a few seconds of organization and reflection can save a lot of time on the back end.

This is consistently true of LSAT games as well.

The LSAT is a time-pressured test, and it's easy to get in a mind-set where we think we have to rush, or go as fast as possible, through each part of the process. However, this reaction to the time pressure can be detrimental.

It can be helpful to think about the time pressure not as something that forces you to go faster in your general thinking, but rather as something that forces you to make decisions about where and how to invest your time. Solving a game well is somewhat like dancing well—you need *rhythm*. You have to understand when you should be swift and clean, and when you should be slow and deliberate.

One of the critical points at which it's super-helpful to remember to give yourself a beat, or a **pause**, is between setting up your diagram and jumping into the questions. At this critical moment, you are often going to feel like the person in our game show example—like you are already behind and you've got to get going. However, the way you spend the few seconds during the transition is likely going to have a key impact on how easy or how difficult the questions feel to you.

We want you to use this pause to get comfortable with your diagram and to get ready for the questions. Specifically, we want you to get in the habit of using this pause to think about three critical aspects of game solving:

1. Get comfortable with your notations.

Go one notation at a time, and make sure you've correctly understood and represented each rule. For each rule you diagrammed off the board (i.e., not on the slots), think quickly about how that rule would play out on the board.

Note which elements have no rules attached to them, and circle them.

2. Take one last look for significant inferences or possible frames.

While they're usually back-end games, Basic Ordering games do often have one or two significant inferences. You will generally be able to catch them as you diagram, but it's good to be in the habit of double-checking. Some up-front inferences for Basic Ordering games are so key that missing them will cause you significant delays when you get to the questions.

We'll talk about frames later, but in short they are diagrams to represent two (maybe three) general directions in which the game could go. Frames are rarely necessary or even useful for Basic Ordering games, but they will be more important for other types of games.

3. Pick your key rules.

As we go through the process of solving questions, over and over again we are going to have to think about how the various rules come together with one another, and with the layout of the slots. The order in which you think about these rules can have a significant impact on your pace and overall success.

Put simply, there are certain rules that are more important than others. It can be very helpful to identify and prioritize these key rules.

On a general level, we can think of the most useful rules as those that help us understand the most about a game.

For Basic Ordering games, the most significant rules are generally those that give us a chunk. A two-element chunk is great. A three- (or four-) element chunk—a "super chunk"—is even better. And of course, the more specific the relationship between the elements, the better. Often, games will have two chunks, and the key to success will involve thinking about the limited ways in which these chunks fit together. Other times, games will involve a limiting relationship between a chunk and an assignment somewhere in the middle of the board, and the key to success will be to think of the limited ways in which the chunk interacts with that assignment.

For Basic Ordering games, the least significant rules are typically conditional rules. In general, you will want to make it a habit to think about these rules last. As you go through hypotheticals in the process of solving problems, you will generally want to use other rules to fill in as much information about the board as possible, and then move on to the conditional rules if and when they're needed for a few final decisions.