LSAT LOGIC GAMES BIBLE

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About PowerScore

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For supplemental information about this book, please visit the Logic Games Bible website at www.powerscore.com/gamesbible. The website contains additions to the text and answers questions submitted by students.

CHAPTER ONE: INTRODUCTION

Introduction

Welcome to the *PowerScore LSAT Logic Games Bible*. The purpose of this book is to provide you with a complete and cohesive system for attacking the Analytical Reasoning section of the Law School Admission Test (LSAT). By carefully studying and correctly applying the techniques we employ, we are certain that you will increase your Analytical Reasoning score.

In an effort to clearly explain the fundamental principles of the Analytical Reasoning section (also known as *Logic Games*), each chapter of this book contains a variety of drills, explanations, and Logic Games. The explanations and drills have been created by the staff at PowerScore, makers of the world's best LSAT preparation course. The techniques in this book have been tested in live classes, through individual tutoring, and on the LSAT itself. Each Logic Game comes from an actual LSAT and is used with the permission of Law Services, the producers of the LSAT. We feel the use of real Logic Games is essential to your success on the LSAT, and no game in this book has been modified from its original form on the LSAT.

Each part of this book has been designed to reinforce your understanding of the concepts behind the Logic Games section. In order to effectively and efficiently apply our methods, we strongly recommend that you carefully read and then reread each of the discussions regarding game recognition, rule diagramming, and inference production. Also, we suggest that as you finish each question you look not only at the correct answer choice, but also at the incorrect answer choices. Look again at the problem and determine which elements led to the correct answer. Study the explanations and setups provided in the book and check them against your own work. By doing so you will greatly increase your chances of scoring high on the Logic Games section.

Finally, in our LSAT courses, our admissions counseling programs, and in our publications, we always strive to present the most accurate and up-to-date information available. If we can assist you in your LSAT preparation in any way, or if you have any questions or comments, please do not hesitate to contact us at our website, www.powerscore.com, or email us at lgbible@powerscore.com. Additional contact information is provided at the end of this book. We look forward to hearing from you!

A Brief Overview of the LSAT

When you take an actual LSAT, they take your thumbprint at the testing site. This is done in case of test security problems.

The Law School Admission Test is administered four times a year: in February, June, September/October, and December. This standardized test is required for admission to any American Bar Association-approved law school. According to Law Services, the producers of the test, the LSAT is designed "to measure skills that are considered essential for success in law school: the reading and comprehension of complete texts with accuracy and insight; the organization and management of information and the ability to draw reasonable inferences from it; the ability to reason critically; and the analysis and evaluation of the reasoning and argument of others." The LSAT consists of the following five sections:

- 2 Sections of Logical Reasoning (short arguments, 24-26 total questions)
- 1 Section of Reading Comprehension (4 long reading passages, 26-28 total questions)
- 1 Section of Analytical Reasoning (4 logic games, 23-24 total questions)
- 1 Experimental Section of one of the above three section types.

You are given 35 minutes to complete each section. The experimental section is unscored and is not returned to the test taker. A break of 10 to 15 minutes is given between the 3rd and 4th sections.

The five-section test is followed by a 30 minute writing sample.

The Logical Reasoning Section

At the conclusion of the LSAT, and for five business days after the LSAT, you have the option to cancel your score. Unfortunately, there is no way to determine exactly what your score would be before cancelling.

Each Logical Reasoning Section is composed of approximately 24 to 26 short arguments. Every short argument is followed by a question such as: "Which one of the following weakens the argument?" "Which one of the following parallels the argument?" or "Which one of the following must be true according to the argument?" The key to this section is time management and an understanding of the reasoning types and question types that frequently appear.

Since there are two scored sections of Logical Reasoning on every LSAT, this section accounts for approximately 50% of your score.

The Analytical Reasoning Section

This section, also known as Logic Games, is probably the most difficult for students taking the LSAT for the first time. The section consists of four games or puzzles, each followed by a series of five to eight questions. The questions are designed to test your ability to evaluate a set of relationships and to make inferences about those relationships. To perform well on this section you must understand the major types of games that frequently appear and develop the ability to properly diagram the rules and make inferences.

The Reading Comprehension Section

This section is composed of four reading passages, each approximately 450 words in length. The passage topics are drawn from a variety of subjects, and each passage is followed by a series of five to eight questions that ask you to determine viewpoints in the passage, analyze organizational traits, and evaluate specific sections of the passage. The key to this section is to read quickly with understanding and to carefully analyze the passage structure.

The Experimental Section

Each LSAT contains one experimental section, and it does not count towards your score. The experimental can be any of the three section types described above, and the purpose of the section is to test and evaluate questions that will be used on *future* LSATs. By pretesting questions before their use in a scored section, the experimental helps the makers of the test determine the test scale.

The Writing Sample

A 30-minute Writing Sample is given at the conclusion of the LSAT. The Writing Sample is not scored, but a copy is sent to each of the law schools to which you apply. In the Writing Sample you are asked to defend one of two possible courses of action. Each course of action is described in a short paragraph and you are given two primary criteria to consider in making your decision. You must write a short essay supporting your choice. Do not agonize over the Writing Sample; in law school admissions, the Writing Sample is not a determining element for three reasons: the admissions committee is aware that the essay is given after a grueling three hour test and is about a subject you have no personal interest in; they already have a better sample of your writing ability in the personal statement; and the committee has a limited amount of time to evaluate applications.

For many years the Writing Sample was administered before the LSAT.

You must attempt the Writing Sample! If you do not, Law Services reserves the right not to score your test.

The LSAT Scoring Scale

Each administered LSAT contains approximately 101 questions, and each LSAT score is based on the total number of questions a test taker correctly answers, a total known as the raw score. After the raw score is determined, a unique Score Conversion Chart is used for each LSAT to convert the raw score into a scaled LSAT score. Since June 1991, the LSAT has utilized a 120 to 180 scoring scale, with 120 being the lowest possible score and 180 being the highest possible score. Notably, this 120 to 180 scale is just a renumbered version of the 200 to 800 scale most test takers are familiar with from the SAT, GRE, and GMAT. Just drop the "1" and add a "0" to the 120 and 180.

Although the number of questions per test has remained relatively constant over the last eight years, the overall logical difficulty of each test has varied. This is not surprising since the test is made by humans and there is no precise

way to completely predetermine logical difficulty. To account for these variances in test "toughness," the test makers adjust the Scoring Conversion Chart for each LSAT in order to make similar LSAT scores from different tests mean the same thing. For example, the LSAT given in June may be logically more difficult than the LSAT given in December, but by making the June LSAT scale "looser" than the December scale, a 160 on each test would represent the same level of performance. This scale adjustment, known as equating, is extremely important to law school admissions offices around the country. Imagine the difficulties that would be posed by unequated tests: admissions officers would have to not only examine individual LSAT scores, but also take into account which LSAT each score came from. This would present an information nightmare.

The LSAT Percentile Table

Since the LSAT has 61 possible scores, why didn't the test makers change the scale to 0 to 60? Probably for merciful reasons. How would you tell your friends that you scored a 3 on the LSAT? 123 sounds so much better.

It is important not to lose sight of what LSATscaled scores actually represent. The 120 to 180 test scale contains 61 different possible scores. Each score places a student in a certain relative position compared to other test takers. These relative positions are represented through a percentile that correlates to each score. The percentile indicates where the test taker ranks in the overall pool of test takers. For example, a score of 163 represents the 90th percentile, meaning a student with a score of 163 scored better than 90 percent of the people who have taken the test in the last three years. The percentile is critical since it is a true indicator of your positioning relative to other test takers, and thus law school applicants.

Charting out the entire percentage table yields a rough "bell curve." The number of test takers in the 120s and 170s is very low (only 1.6% of all test takers receive a score in the 170s), and most test takers are bunched in the middle, comprising the "top" of the bell. In fact, approximately 40% of all test takers score between 145 and 155 inclusive, and about 70% of all test takers score between 140 and 160 inclusive.

There is no penalty for answering incorrectly on the LSAT. Therefore, you should guess on any questions you cannot complete.

The median score on the LSAT scale is approximately 151. The median, or middle, score is the score at which approximately 50% of test takers have a lower score and 50% of test takers have a higher score. Typically, to achieve a score of 151, you must answer between 55 and 59 questions correctly from a total of 101 questions. In other words, to achieve a score that is perfectly average, you can miss between 42 and 46 questions. Thus, it is important to remember that you don't have to answer every question correctly in order to receive an excellent LSAT score. There is room for error, and accordingly you should never let any single question occupy an inordinate amount of your time.

The Use of the LSAT

The use of the LSAT in law school admissions is not without controversy. It is largely taken for granted that your LSAT score is one of the most important determinants of the type of school you can attend. At many law schools a multiplier made up of your LSAT score and your undergraduate grade point average is used to help determine the relative standing of applicants, and at some schools a sufficiently high multiplier guarantees your admission.

For all the importance of the LSAT, it is not without flaws. As a standardized test currently given in the paper-and-pencil format, there are a number of skills that the LSAT cannot measure, such as listening skills, note-taking ability, perseverance, etc. Law Services is aware of these limitations and as a matter of course they warn all law schools about overemphasizing LSAT results. Still, since the test ultimately returns a number for each student, it is hard to escape the tendency to rank applicants accordingly. Fortunately, once you get to law school the LSAT is forgotten. For the time being consider the test a temporary hurdle you must leap in order to reach the ultimate goal.

For more information on the LSAT, or to register for the test, contact Law Services at (215) 968-1001 or at their website at www.lsac.org.

The Analytical Reasoning Section

As you know, the focus of this book is on the Analytical Reasoning section. Each Analytical Reasoning section contains four games and a total of 23-24 questions. Since you have thirty-five minutes to complete the section, you have an average of eight minutes and forty-five seconds to complete each game. Of course, the amount of time you spend on each game will vary with the difficulty and the number of questions per game. For many students, the time constraint is what makes Logic Games the most difficult section on the LSAT, and as we progress through this book, we will discuss time management techniques as well as timesaving techniques that you can employ within the section.

On average, you have 8 minutes and 45 seconds to complete each game.

Each logic game contains three separate parts: the scenario, the rules, and the questions. The scenario introduces sets of variables—people, places, things, or events—involved in an easy to understand activity such as sitting in seats or singing songs. Here is an example of a game scenario from the September 1998 LSAT:

> A messenger will deliver exactly seven packages—L, M, N, O, P, S, and T—one at a time, not necessarily in that order. The seven deliveries must be made according to the following conditions:

Always write down and keep track of each variable set.

In the above scenario there are two variable sets: the packages L, M, N, O, P, S, and T, and the seven delivery positions, which would be numbered 1 through 7.

The second part of every game is the rules—a set of statements that describe the relationships between the variables. Here are the rules that accompanied the above game scenario:

> P is delivered either first or seventh.
> The messenger delivers N at some time after delivering L.
> The messenger delivers T at some time after delivering M.
> The messenger delivers exactly one package between delivering L and delivering O, whether or not L is delivered before O.
> The messenger delivers exactly one package between delivering M and delivering P, whether or not M is delivered before P.

The third and final part of each logic game is a set of approximately five to eight questions that test your knowledge of the relationships between the variables, the structural features of the game, and the way those relationships and features change as conditions in the game change.

The initial rules apply to every question unless otherwise indicated.

Each of the initial rules in a game applies to each and every question; however, on occasion a question will explicitly suspend one or more rules for the purposes of that question only. These "suspension" questions always occur at the end of the game.

Approaching the Games

As you begin each game you should carefully and completely read through the entire game scenario and all of the rules *before* you begin writing. This initial reading will help you determine the type of game you are facing, as well as what variable sets exist and what relationships govern their actions. This advice will save you time by allowing you to formulate an exact plan of action, and it will save you from diagramming a rule and then re-diagramming if you find a later rule that alters the situation. At this point in the game you must also fix the rules in your memory. Students who fail to identify strongly with the rules inevitably struggle with the questions. It is also important to identify the most powerful rules in a game and to consider how the rules interact with one another. Of course, we will discuss how to do this throughout our analysis. In general, these are the initial steps you must take to efficiently move through each game:

Always read through the entire scenario and each rule *before* you begin diagramming.

1. Read through and fix the rules in your mind.
2. Diagram the scenario and the rules.
3. Make inferences.
4. Use the rules and inferences to attack the questions.

Setups and Diagramming

Your initial reading of the game will also indicate what setup to use to attack the game. Many students are not aware of the best ways to set up logic games, and waste far too much time during the actual exam wondering what approach to take. Because you must read the rules and set up a diagram quickly and efficiently, the key to succeeding on the Logic Games section is to know the ideal approach to every game type before walking into the exam.

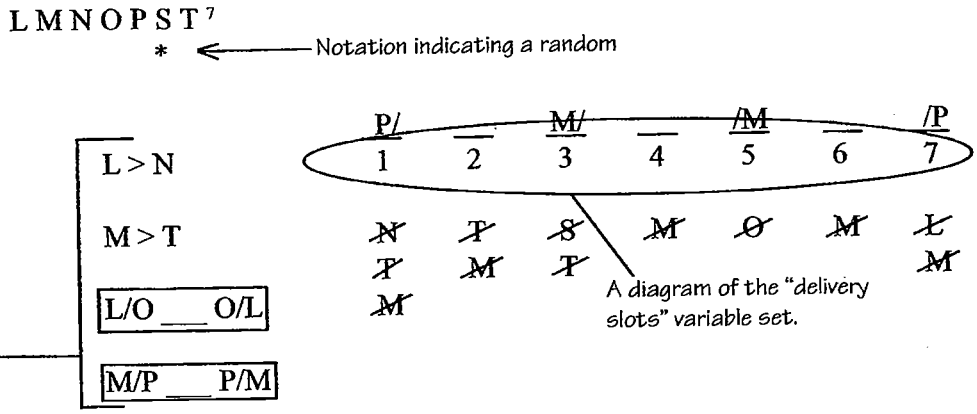
You should use the space at the bottom of each game page to diagram your initial setup. This setup should include:

Make a main diagram at the bottom of the page.

1. A list of the variables and their number. For example: L M N O P S T [7]
2. An identification of any randoms in the game (randoms are variables that do not appear in any rules).
3. A diagrammatic representation of the variable sets.
4. A diagrammatic representation of the rules.
5. A list of inferences. Making inferences involves deducing hidden rules or facts from the given relationships between variables. Inferences almost always follow from a combination of the rules or limiting structural factors within the game.

By following the above list and using the scenario and rules from the September 1998 game on the previous page, we can produce the setup on the following page:

You will have the opportunity to do this game from the September 1998 LSAT at the end of the next chapter.



The above setup is linear in nature, and in the next chapter, we will further discuss this type of game, as well as how to create this type of diagram.

After making the initial setup, do not write on your main diagram.

Once you have completed your game setup, you should *not* draw or otherwise write on your main diagram again. As you do each question, use the space *next* to the question to reproduce a miniature diagram with the basic structural features of your main diagram. You should *not* use your main diagram for the work of individual questions. For example, if a question introduces the condition that L sits in the third of seven chairs, draw the seven chair spaces next to the question, place L in the third space, make inferences, and then proceed with the question. Refer to your main setup for the details of the relationship between the variables. There are several important benefits that you receive from working next to the question: First, should you need to return to the question later, your work will be readily available and accessible; second, keeping the individual conditions of each question separate from the main setup reduces the possibility that you will mistake a local condition for a global rule; and third, you will be able to more clearly see which conditions produced which results.

Do the work for each question next to that question.

Do not erase unless you make a mistake.

As you complete each question, it is absolutely essential that you *not* erase your previous work. Each question you complete adds to your repository of game knowledge, and that knowledge can be invaluable when answering other questions. For example, suppose the first question in a game produces a scenario where A is in the first position. Then the second question asks for a complete and accurate listing of the positions A can occupy. Based on the first question, A can clearly be in the first position, and thus you can eliminate any answer in the second question which does not contain the first position as a possibility. Thus, the work you do in *some* questions can be used to help answer other questions. This is true as long as the work you are referencing conforms to the conditions in the question you are currently answering. For example, if the third question in the same game states, "If A is in the third position, which of the following can be true?" then you cannot use the information from the first question to help answer the third question.

The work done on some questions can be used to help solve other questions.

For students who ignore the above recommendations, the results are often quite negative: confusion, disorganization, constant rereading of the rules, and missed questions. Some students say that they save time by using their main diagram for each question. While they may save a short amount of time, the overall costs always outweigh the benefits, particularly since those same students have a tendency to erase during the game. As we proceed with our analysis of the games section, we will revisit this topic from time to time and ultimately prove the efficacy of our recommendations.

The Questions

Once you have completed your diagram and made inferences, you will be ready for the questions. Keep in mind that each question has exactly the same value and that there is no penalty for guessing. Thus, if you cannot complete the section you should guess on the questions that remain. If you cannot complete an individual question, move on and complete the others.

Games questions are either global or local. Global questions ask about information derived only from the initial rules, such as "Who can finish first?" or "Which one of the following must be true?" Use your main diagram to answer global questions. Local questions occur when the question imposes a new condition in addition to the initial rules, such as "If Laura sits in the third chair, which one of the following must be true?" The additional conditions imposed by local questions apply to that question only and do not apply to any of the other questions. It is essential that you focus on the implications of the new conditions. Ask yourself how this condition affects the variables and the existing rules. For local questions, reproduce a mini-setup next to the question, apply the local condition, and proceed. We will discuss how to do this in our games discussion in the next chapter.

Local questions almost always require you to produce a "mini-setup" next to the question.

Within the global/local designation all questions ultimately ask for one of four things: what must be true, what is not necessarily true, what could be true, and what cannot be true. All questions are a variation of one of these four basic ideas, which we will discuss in greater detail in Chapter Two. At all times, you must be aware of the exact nature of the question you are being asked, especially when "except" questions appear. If you find that you are missing questions because you miss words such as "false" or "except" when reading, then take a moment at the beginning of the game to circle the key words in each question, words such as "must," "could," etc.

If you frequently misread games questions, circle the key part of each question before you begin the game. You will not forget about a word like "except" if you have it underlined!

The key to quickly answering questions is to identify with the rules and inferences in a game. This involves both properly diagramming the rules and simple memorization. If you often find yourself rereading the rules during a game, you are failing to identify with the rules. And do not forget to constantly apply your inferences to each question!

Attacking the Section

The key to optimal performance on Logic Games is to be focused and organized. This involves a number of factors:

1. Play to your strengths and away from your weaknesses
You are not required to do the games in the order presented on the test, and you should not expect that the test makers will present the games in the best order for you. Students who expect to have difficulty on the games section should attack the games in order of their personal preferences and strengths and weaknesses.

2. Create a strong setup for the game
The key to powerful games performance is often to create a good setup. At least 80% of the games on the LSAT are "setup games" wherein the quality of your setup dictates whether or not you are successful in answering the questions.

3. Look to make inferences
There are always inferences in a game, and the test makers expect you to make at least a few of them. Always check the rules and your setup with an eye towards finding inferences.

4. Be smart during the game
If necessary, skip over time consuming questions and return to them later. Remember that it is sometimes advisable to do the questions out of order. For example, if the first question in a game asks you for a complete and accurate list of the positions "C" could occupy, because of time considerations it would be advisable to skip that question and complete the remaining questions. Then you could return to the first question and use the knowledge you gained from the other questions to quickly and easily answer the first question.

5. Do not be intimidated by size
A lengthy game scenario and a large number of initial rules do not necessarily equal greater difficulty. Some of the longest games are easy because they contain so many restrictions and limitations.

6. Keep an awareness of time
As stated previously, you have approximately eight minutes and forty-five seconds to complete each game and bubble in your answers. Use a timer during the LSAT so you always know how much time remains, and do not let one game or question consume so much time that you suffer later on.

7. Maintain a positive attitude and concentrate
Above all, you must attack each game with a positive and energetic attitude. The games themselves are often challenging yet fun, and students who actively involve themselves in the games generally perform better overall.

Chapter One QuickReview

Chapter One is a basic overview of the games section; subsequent chapters will explain and expand on the ideas presented in this chapter.

If you do all four games, you have 8 minutes and 45 seconds to complete each game, inclusive of answer transferring. If you do only three games, you have 11 minutes and 40 seconds to complete each game. If you do just two games, you have 17 minutes and 30 seconds to complete each game.

Memorize these points! They are basic principles you must know in order to perform powerfully.

You can do the games out of order and according to your strengths and weaknesses.

There are three parts to every Logic Game: the scenario, the rules, and the questions.

Always read the scenario and rules once through before you begin diagramming.

Fix the rules in your mind.

Make a main diagram for each game. Include the following:

- List the variables and their exact total number
- Identify Randoms
- Diagram the variable sets
- Diagram the rules
- Make inferences
- Identify the powerful rules and variables

Write neatly.

You can do the questions out of order if it saves time or is more efficient.

For local questions, do your work next to the question.

Always look to use your inferences when answering questions.

Do not erase unless you have made a mistake.

Do not forget that work from one question might be useful on other questions.

Maintain a positive attitude, concentrate, and try to enjoy yourself.

CHAPTER TWO: LINEAR GAMES

The Concept of Linearity

Linearity involves the fixed positioning and ordering of variables. In every Linear game, one of the variable sets is chosen as the "base" and is diagrammed in a straight line, either horizontally or vertically, and the remaining variable sets are placed into slots above or next to the base. For example, consider this game scenario from the June 1996 LSAT:

> During a period of six consecutive days—day 1 through day 6—each of exactly six factories—F, G, H, J, Q, and R will be inspected. During this period, each of the factories will be inspected exactly once, one factory per day.

Linearity and Grouping are the two core concepts that appear in the Games section. Grouping will be discussed in Chapter Four.

In this game, the days would be chosen as the base because they have an inherent sense of order (day 2 comes immediately after day 1 and immediately before day 3, etc.). The six factories would then be placed into individual slots above the six days, as follows:

F G H J Q R ⟶ ___ ___ ___ ___ ___ ___
1 2 3 4 5 6

The game could also be set up vertically, and the six factories would be placed into individual slots next to the days:

F G H J Q R
↓
1 ___
2 ___
3 ___
4 ___
5 ___
6 ___

Variable sets with the greatest sense of inherent order are always chosen as the base because they provide a logical framework within which to place all other variable sets. Certain types of variable sets are always chosen as the base—days of the week, for example. In the above game, if you decide to choose the six factories as the base, throughout the questions you will have to keep in mind an extra fact: the order of the days. Since choosing the days as the base eliminates this problem, it is a superior choice.

Always choose a base which has an inherent sense of order.

It is your choice whether to diagram the game horizontally or vertically,

although some games demand a vertical setup, such as a game about floors of an office building, and some games demand a horizontal setup, such as a game about houses on a street.

The diagrams above reflect what is known as a one-to-one variable set relationship. In a one-to-one relationship, each variable fills exactly one slot and there are the same number of slots as variables to be placed. For example, there are six days and six factories, and one factory will be inspected each day. Thus, there is one factory for each day, and a total of six factories for six days (a numerical distribution of 1-1-1-1-1-1). Understanding the numerical relationship of the variable sets is one of the key indicators of the difficulty of a game, and we will discuss it again later in this chapter.

Rule Representation

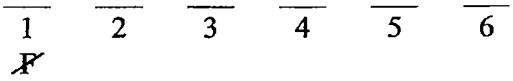
As you begin setting up each game, always search for what must be true and what cannot be true.

Unfortunately, many students have a tendency to focus initially on what could be true instead of what must or cannot be true. The problem with this approach is that there can be many possibilities within a game. If you spend time showing what can occur, this time may end up being wasted if the questions never test those possibilities. You can focus on what could be true as you do each question.

Your representation of the rules is critical to your success on a game. Many students inefficiently diagram the rules and pay a heavy price when attempting to answer the questions. In representing the rules, there are two primary considerations: how to diagram the rule itself and how to show the implications of the rule on your main diagram. The following will discuss many of the rule types that commonly appear in Linear games.

Not Laws™

Not Laws physically notate where a variable cannot be placed. For example, if a rule states, "F cannot go first," then this can be represented with a Not Law underneath the first slot:



By crossing out (also known as "negating") F under the first slot, you can easily see where F can never be placed. Not Laws are very useful since it is essential that you establish the events that cannot be true in a game. In fact, in representing the rules, you should always search for what must be true and what cannot be true. These two characteristics represent the "endpoints" of the spectrum of possibilities within a game, and by defining the endpoints you define the range of possibilities within a game. Additionally, global questions often appear in order to test your knowledge of what must and what cannot be true, such as "Which one of the following must be true?" (Answer: F cannot be in the first slot). Interestingly, with the above rule, the Not Law is the representation of the rule itself. In many other cases, however, Not Laws will follow after the rule has been separately represented. One such case is with blocks.

Blocks

Basic blocks indicate adjacency.

In Linear games, blocks reflect the idea of a fixed spatial relationship between variables. Blocks represent variables that are next to one another, not next to one another, or separated by a fixed number of spaces. The basic block indicates that two variables are adjoining, as shown by the following rule:

> Q is inspected on the day immediately before R is inspected.

This rule should be diagrammed using the block notation [QR]. Furthermore, since Q is always ahead of R, R can never be first and therefore an R Not Law should be placed under the first slot as indicated below. And, since R is always behind Q, Q can never be last and a Q Not Law should be placed under the last slot (using the example on page 13, it's the sixth slot):

1	2	3	4	5	6
~~R~~					~~Q~~

Split-blocks indicate that there are a fixed number of spaces between two or more variables. Split-blocks can play a powerful role within certain games.

A split-block indicates that the variables are separated by a fixed number of spaces, as shown by the following rule:

> Q is inspected two days before R is inspected.

The rule should be diagrammed as [Q ___ R] (Even though Q is inspected two days before R, that means that there is exactly one day between Q and R). As in the previous rule, Not Laws can again be drawn:

1	2	3	4	5	6
~~R~~	~~R~~			~~Q~~	~~Q~~

Note the difference between the previous rule and the following rule, also a split-block:

> There are two days between the day Q is inspected and the day R is inspected.

This rule should be diagrammed as [Q/R ___ ___ R/Q]. In this case, the rule specifies that there must be two days between Q and R, but it does not specify whether Q or R is inspected first, thus the Q/R notation. Also, it is no mistake that the first option is Q/R and that the second option is R/Q. This notation allows for an efficient representation of both possibilities: [Q ___ ___ R] (the option represented by the variables before the slash) and [R ___ ___ Q] (the option represented by the variables after the slash).

Not-blocks

In Linear games, blocks tend to be much more useful than not-blocks since the placement of blocks is always a concern, whereas not-blocks only come into play once one of the variables has been placed.

Not-blocks indicate that variables cannot be next to one another. Consider the following rule:

> Q is not inspected the day before R is inspected.

This rule should be diagrammed as $\not{[QR]}$, which means that Q can never appear in the slot before R. Interestingly, no Not Laws can be drawn from this rule until either Q or R is placed into the setup by another rule or by one of the questions.

Verticality and Horizontality in Blocks

Once you decide to diagram a game horizontally or vertically, make sure your blocks properly reflect the orientation of the setup. As we have seen, in horizontal setups a block such as [QR] indicates adjacency. But in a vertical setup, a block diagrammed the same way would indicate similarity, that is, the variables would both be placed in the same slot:

In games with vertical setups, vertical blocks indicate adjacency. In games with horizontal setups, vertical blocks indicate similarity.

[QR]

1 ___
2 ___
3 ___
4 ___
5 ___
6 ___

In the diagram above, the QR block indicates that Q and R will be inspected on the same day, not adjoining days. To indicate that Q is inspected the day before R in the above diagram, the block should be diagrammed as:

This block is known as a vertical block. Again, Not Laws (R not in 1, Q not in 6) would follow as before.

In a horizontal setup, vertical blocks indicate identicalness or similarity:

1 2 3 4 5 6

In the diagram above, the QR block indicates that Q and R will be inspected on the same day, not adjoining days. No Not Laws would follow from this block.

Sequencing Rules

Sequencing rules establish the relative positioning of variables. The key to differentiating a sequencing rule from a block rule is that block rules precisely fix the variables in relationship to each other (for example, one space ahead or two spaces in between) and sequencing rules do not. For example, a rule might state that

> Q is inspected before R is inspected.

This rule should be diagrammed as Q > R. From this rule, we only know that Q is inspected before R, but not by how many days. However, since Q is always inspected before R, R can never be inspected first, and because R is always inspected after Q, Q can never be inspected last, and the following Not Laws result:

1	2	3	4	5	6
~~R~~					~~Q~~

If the rule stated that

> Q is inspected before R is inspected but after H is inspected.

The diagram for the rule would be H > Q > R, and the following Not Laws would result:

1	2	3	4	5	6
~~R~~	~~R~~			~~H~~	~~H~~
~~Q~~					~~Q~~

Three variables linked in a sequence such as the one to the left always yield Six Not Laws.

On occasion, a rule such as the following will appear:

> H and Q are both inspected before R is inspected.

This rule should be diagrammed as

```
 H
---- > R
 Q
```

This representation is known as a Double-branched Sequence. In this case, the Double-branching indicates that the relationship between H and Q is uncertain: H may be inspected before Q, Q may be inspected before H, or they may be inspected at exactly the same time. The only known relationship is that both H and Q must be inspected before R. From this sequence several Not Laws result:

1	2	3	4	5	6
~~R~~	~~R~~				~~H~~
					~~Q~~

In the above diagram, R cannot be placed either first or second because there must be room for H and Q, and H and Q cannot be placed sixth since there must be room for R.

The following rule also produces a Branched Sequence:

> H is inspected before J, Q, and R are inspected.

This Triple-branched Sequence should be diagrammed as:

```
     J
    ----
H >  Q
    ----
     R
```

From this sequence several Not Laws result:

1	2	3	4	5	6
~~J~~			~~H~~	~~H~~	~~H~~
~~Q~~					
~~R~~					

Dual Options

When only two variables can occupy a slot, this is known as a dual-option.

Certain variables or slots have a limited number of possibilities. When there are only two variables that can occupy a single slot, this can be shown with a Dual Option. Consider the following rule:

> Either H or J must be inspected on the third day.

		H/J			
1	2	3	4	5	6

In this case, since it must be true that H or J is inspected on the third day, H/J is shown on the third day. As you can see, what must be true is represented by placing the variables in the slots, and what cannot be true is represented by Not Laws below the numbers:

						must be true here
1	2	3	4	5	6	
						cannot be true here (shown as Not Laws)

In the case of the dual-option above, it is also true that no other variable besides H or J can appear third, so it might seem appropriate to show Not Laws on that slot for all other variables. This representation would be correct, but since H and J are already placed on the third day, it is obvious that no other variable can be inspected on that day, and therefore showing Not Laws on the third day would be redundant. However, if you find it helpful to show the Not Laws, by all means do what works best for you.

Split Dual-Option

Occasionally, a variable will have only two possible positions. This is known as a Split Dual-Option. Consider the following rule:

When a variable can occupy only two slots, this is known as a split dual-option, or sometimes as a split-option.

> H must be inspected on the third day or the fifth day.

		H/		/H	
1	2	3	4	5	6

Of course, if H can only be inspected on the third or fifth day, H cannot be inspected on the first, second, fourth, or sixth days. Since the positioning of H is still a bit uncertain, in this case it makes sense to show H Not Laws on the other days:

		H/		/H	
1	2	3	4	5	6
~~H~~	~~H~~		~~H~~		~~H~~

Conditional Rules

The final type of Linear game rule is the most complex. Conditional reasoning is a fundamental component of both the Logical Reasoning and Logic Games sections of the LSAT. In the Logic Games section, conditional rules appear most often in Grouping games, and thus we will discuss conditional reasoning in the Grouping chapter. However, since basic conditional rules often appear in Linear games, we will begin our discussion here.

Conditional reasoning involves sufficient and necessary conditions. A sufficient condition can be defined as an event or circumstance whose occurrence indicates that a necessary condition must also occur. A necessary condition can be defined as an event or circumstance whose occurrence is required in order for a sufficient condition to occur. In other words, if a sufficient condition occurs, you automatically know that the necessary condition also occurs. If a necessary condition occurs, then it is possible that the sufficient condition will occur, but not certain. In English, conditional statements are often brought up using the "if...then" construction. Consider the following statement:

If you get an A+, then you must have studied.

If the above statement is true, then anyone who receives an A+ must have studied. Since getting an A+ automatically indicates that studying must have occurred, "get an A+" is the sufficient condition and it follows that "must have studied" is the necessary condition. We represent this statement as follows:

Sufficient		Necessary
A+	$\longrightarrow$	Study

In a diagram of a conditional statement, the sufficient condition always comes at the "beginning" of the arrow, and the necessary condition always comes at the "end" of the arrow. Although the above example may seem relatively easy, the makers of the LSAT often use conditional reasoning to ensnare unwary test takers, especially in the Logical Reasoning section. Taking the above statement as true, consider the following three statements:

1. John studied for the test, so he must have received an A+ on the test.

2. John did not receive an A+ on the test, so he must not have studied on the test.

3. John did not study for the test, so he must not have received an A+ on the test.

Two of the three statements above are invalid, and one of the three statements is valid. Can you tell which one is true?