



**Business
Rule
Solutions, LLC**

RuleSpeak[®] Sentence Forms

Specifying Natural-Language Business Rules in English

This original English version developed by ...

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*RuleSpeak was one of three reference notations used in the creation of SBVR,
Semantics of Business Vocabulary and Business Rules,
and is consistent with that standard.*

*RuleSpeak[®] is a technique of Proteus[®] –
the BRS Methodology for Business Analysis and Business Rules*

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RuleSpeak^R Sentence Forms

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What is a Sentence Form?

Definition and Purpose

A *Sentence Form* is a basic pattern or template in natural language that can be used to express a certain kind of Business Rule in a consistent, well-organized manner. Each Sentence Form is aimed for a particular kind of guidance.

The purpose of the Sentence Forms is to ensure that written Business Rules are more easily understood. They also help ensure that different practitioners working on a large set of Business Rules express the same ideas in the same way. Such consistency would not be possible if Business Rules were expressed in a completely “free-form” manner.

The Sentence Forms are not technical in nature. In other words, they do not represent a formal language or syntax for implementing Business Rules using a software platform (e.g., a rule engine). Rather, they are aimed at expressing Business Rules to improve communication at the *business* level.

Success Factors for the Sentence Forms

What is important – and what is *not* important – when applying the *RuleSpeak* Sentence Forms? One thing that should not be considered is how the Business Rules will actually be implemented using a particular rule engine or programming language. What matters above all else is effective business communication. Sticking to that perspective sometimes proves difficult for those responsible for technical implementation. They may want to get to the IT versions directly. But doing that will not help with capturing the Business Rules succinctly from the business perspective.

Using the Sentence Forms to express Business Rules does require a modest measure of discipline. This discipline can be achieved through a bit of practice, and by understanding certain fundamentals. These fundamentals are discussed later in this document.

Finally, it is important to understand the level of Business Rules to which the Sentence Forms should be applied. As above, the Sentence Forms are not aimed at system design or automation. They are also not aimed at the highest forms of guidance – that is, the language of laws, regulations, contracts, business policies, etc.

Rather, the Sentence Forms are aimed at what is called *practicable* guidance. Practicable Business Rules are ones used to make operational business decisions on a day-in-and-day-out basis. If a business worker is properly authorized, and understands the business vocabulary, he or she should be able to apply the practicable Business Rules directly in the conduct of on-going business activity.

Often, these practicable Business Rules must be interpreted from the higher forms of guidance in order to clarify, disambiguate and solidify their business intent. The Sentence Forms facilitate such interpretation by providing predictable patterns of expression. The same is true if practicable Business Rules are being reversed-engineered bottom-up from existing implementations or documentation, or harvested on a facilitated basis from subject matter experts.

Usage Notes

- **“Shall”** - Highest forms of guidance – laws, regulations, contracts, business policies, etc. – often use the word “shall”. We prefer the less formal word “must”, which is generally more appropriate for practicable Business Rules.
- **“Should”** - Any Business Rule can be stated using “should” instead of “must”. Using “should,” however, reflects an assumption or decision about the appropriate *enforcement level* of a Business Rule. We prefer to document any sense of how strictly a Business Rule is to be enforced separately from the expression of the Business Rule itself. We therefore prefer always using the word “must” instead of “should”.
- **“May”** - We always use the word “may” in the sense of something being allowed (or disallowed). We never use “may” in the sense of “might” – i.e., that something *might* occur or *might* be true. Unfortunately, “may” does have this double usage in English, but no suitable alternative exists. In any event, experience has proven that the correct sense “is allowed” quickly wins out.

Basic Concepts

Understanding fundamental ideas about expressing Business Rules will assist greatly in writing them effectively. Briefly, these ideas are as follows.

Every Business Rule Statement should use a Rule Keyword

Every Business Rule can be expressed using one of the following two words.

- “must”
- “only”

These fundamental words are called the RuleSpeak *Rule Keywords*. It is very important that every Business Rule Statement include exactly one of these two Rule Keywords.

Practicable guidance comes in two varieties

A Business Rule always removes a degree of freedom. The presence of one of the two Rule Keywords in a sentence clearly indicates that intent.

A large majority of sentences typically expressed to give guidance are Business Rule Statements. Sometimes, however, practicable guidance is worth expressing that does not remove a degree of freedom. Such a Statement, which simply clarifies that something *is* allowed, or that something is *not* required, is called a Statement of Advice.

A Statement of Advice should never include either of the two Rule Keywords. Instead, it should use exactly one of the following two RuleSpeak *Advice Keywords*.

- “may”
- “need not”

Note that “may” coupled with “only” in the same sentence always produces a Business Rule, not an Advice. Statements of Advice and Business Rule Statements are both Guidance Statements.

Every Guidance Statement has a Sentence Form

A Sentence Form reflects the kind of guidance a sentence intends to express. The RuleSpeak Sentence Forms are presented in the table below. Examples of actual Guidance Statements are given later.

Table 1. RuleSpeak Sentence Forms

Sentence Form	Description	<i>Might be Used to:</i>
1.0 A Business Rule Statement Indicating that Something is Required		
... <i>must</i> ...	Indicates that something is mandatory.	Require that certain orders have to be credit-checked.
... <i>must be computed as</i> ...	Indicates that a formula involving some mathematical operation(s) (e.g., sum, multiply, average, etc.) is to be used to compute some result.	Provide a formula to compute a customer's annual order volume.
... <i>must be considered ... if</i> ...	Indicates that something is to be classified or derived a certain way if some condition(s) hold true.	Express the circumstances under which a customer is a bad credit risk.
... <i>must be performed ... when</i> ...	Indicates that some process or procedure is to be performed when some condition(s) become true.	Reorder stock when the quantity on hand drops below a certain point.
2.0 A Business Rule Statement Indicating that Something is Disallowed		
... <i>must not</i> ...	Indicates that something is not allowed.	Require that a product is not to be sold to a bad credit risk.
3.0 A Business Rule Statement Indicating that Something is Conditionally Allowed		
... <i>may ... only</i> ...	Indicates that something is allowed only in certain situations.	Require that certain orders have to be credit checked, but waive the requirement for others.
4.0 A Statement of Advice Indicating that Something is Allowed		
... <i>may</i> ...	Indicates that something is allowed.	Clarify that any customer is allowed to hold an account.
5.0 A Statement of Advice Indicating that Something is not Required		
... <i>need not</i> ...	Indicate that something is not mandatory.	Clarify that certain orders do not have to be credit-checked.

Every Guidance Statement should be a complete sentence

English helps ensure wonderful completeness in the communication of thoughts (propositions) through grammatical rules about forming sentences. Follow those rules religiously in writing all Guidance Statements.

Every Guidance Statement should have a subject

In good English construction, every sentence has a subject. Although this subject may be implied or the sentence inverted, more often than not an explicit subject appears as the first word or phrase in the main body of the sentence. Such sentences are usually direct, and if well written, easy to follow. (The subject in the previous sentence, for example, is “sentences”.)

RuleSpeak prescribes that Guidance Statements have an explicit subject at the beginning. This subject should be a noun, possibly qualified. The singular form is preferred. This approach promotes overall clarity and consistency.

Many IT notations feature “If ... then...” syntax for implementing Business Rules in rule engines or programming languages. In such notations, the true subject does not appear until after the ‘if’ clause.

Besides being ‘unfriendly’ for business communication, such syntax is problematic for expressing certain types of guidance. What, for example, is the “if” of the Business Rule Statement, “An employee must have a name.”?

Any Guidance Statement may reference an instance

An instance is a single thing, rather than a class of things. Instances can be referenced by Guidance Statements just as can classes of things. If there could be any doubt as to whether a term in a Guidance Statement refers to an instance or a class, the prudent approach is to put the term in single quotes.

Example: A yearly personal U.S. tax return is due on April 15.

In this example, there is only one “April 15” on a calendar, so there is little chance of confusion. Similarly, there is only one country “U.S.”, so this reference too is probably clear.

Example: A ‘flammable’ sticker must be displayed on a tank containing a combustible fuel.

In this example, “flammable” refers to an instance of the class of things “sticker”, rather than to a kind or category of sticker (i.e., a sticker that is flammable). Therefore the word “flammable” has been enclosed in single quotes.

Qualifying Guidance Statements

Most Guidance Statements include some qualification(s) indicating the circumstances under which they apply. Often but by no means always such qualification is expressed using “if”.

Example: A shipment must be insured if the value of the shipment is greater than \$500.

Many qualifications can be expressed without using “if”.

Example: A retired employee must not be assigned to a project.

Here the qualification “retired” is used to modify “employee” directly. This natural means of qualification is perfectly acceptable.

Example: A shipment fee may be waived only for an order placed by an in-state customer.

Here the qualification “placed by an in-state customer” modifies “order” in a natural manner. It too is acceptable.

Guidance that applies only at some point(s) in time

The word “if” indicates that qualification is continuous over time. The word “when” should be used if a Guidance Statement applies only at certain point(s) in time.

Example: The total enrollment fee amount owed by a student for a semester must be \$5,065 when the student registers for that semester.

As stated, this Business Rule applies only at each point in time when a student registers for some semester. At any other time, the Business Rule is assumed not to apply; that is, the total enrollment fee amount owed for the semester does not have to be \$5,065 (and probably increases!).

Allowing something conditionally

The Sentence Form “... may ... if ...” (without an “only”) *should always be avoided*. Statements using that Sentence Form are quite tricky and can be easily misunderstood.

Example: An item may be returned if some proof of purchase is provided.

This Statement expresses an Advice. (This interpretation is dictated by logic.) It covers only the situation in which some proof of purchase is provided. It literally does *not* say anything about whether an item may be returned if some proof of purchase is *not* provided. Most likely, however, the business intent was to disallow returns without

providing some proof of purchase. Assuming that to be the case, the Rule Keyword “only” should be inserted as follows, thereby turning the Advice into a Business Rule.

Example: An item may be returned only if some proof of purchase is provided.

Qualifications in Statements of Advice based on the Sentence Form “... may ...” expressed without using “if” are not as easily misunderstood. They are therefore acceptable if used carefully.

Example: A retired employee may work part-time in Alberta.

This Statement must be taken to express an Advice. It does not imply anything about employees who are not retired, not working part-time, or not working in Alberta. It just says what it says. If some Business Rule is intended covering some or all of these circumstances, it must be expressed separately, as the following Business Rule Statement illustrates.

Example: A retired employee must not work part-time outside Alberta.

How to say something is not a Business Rule under certain circumstances

If something is not a Business Rule under certain circumstances, the best Sentence Form to express the Advice is generally “ ... need not ... if ...”.

Example: A credit check need not be requested for an order if the amount of the order is under \$1,000.

Note that by itself, this Statement of Advice leaves open the question of whether credit checks are required for orders that total \$1,000 or more. If such credit checks are required, a separate Business Rule Statement must be expressed. The general point to remember about expressing guidance is that nothing is ever required (that is, everything is allowed) unless a Business Rule explicitly removes some degree of freedom.

Sample Guidance Statements

The following table gives examples for the RuleSpeak Sentence Forms.

Table 2. Examples of the RuleSpeak Sentence Forms

Kind of Guidance	Sentence Form	Sample Guidance Statements
1.0 A Business Rule Statement Indicating that Something is Required		
1.1.1 Something is to be required unconditionally	<i>... must ...</i>	An order must have a promised shipment date. A shipment must have a status. The amount paid for an order must be greater than or equal to the amount due for the order.
1.1.2 Something is conditionally required using “if”	<i>... must ... if ...</i>	A shipment must be insured if the value of the shipment is greater than \$500. The applicable sales tax for an order must be 6.25% if the order is taken in Texas and shipped in-state.
1.1.3 Something is conditionally required without using “if”	<i>... must ...</i>	A student must be enrolled in at least 2 courses by the close of registration. A purchase order taken during a snowstorm must be approved by at least two managers.
1.2 Something is to be computed a certain way	<i>... must be computed as ...</i>	A product’s cost must be computed as the sum of the cost of all the product’s components. The amount paid for an order must be computed as the sum of all payment amounts applied to the order.
1.3 Something is to be derived a certain way	<i>... must be considered ... if ...</i>	A customer must be considered high-risk if the outstanding balance exceeds \$1,000 on each of their last three successive invoices. An item must be considered big-ticket if its cost exceeds \$500. A person must be considered a woman if the person is female and at least 21 years old.
1.4 Something is to be performed	<i>... must be performed ... when ...</i>	The procedure ‘Send-Advance-Notice’ must be performed for an order when the order is shipped.
2.0 A Business Rule Statement Indicating that Something is Disallowed		
2.1 Something is to be	<i>... must not ...</i>	The number of seats for a course section must not exceed 30.

disallowed unconditionally.		
2.2 Something is to be conditionally disallowed using “if”	<i>... must not ... if ...</i>	An order must not be shipped if the outstanding balance of the customer’s account exceeds the customer’s credit authorization.
2.3 Something is to be conditionally disallowed without using “if”	<i>... must not ...</i>	An order on credit over \$1,000 must not be accepted without a credit check. A high-risk customer must not place an order for a big-ticket item. A project team member must not be rotated off the project until the project is finished.
3.0 A Business Rule Statement Indicating that Something is Conditionally Allowed		
3.1 Something is to be conditionally allowed using “if”	<i>... may ... only if ...</i>	A customer may purchase a pesticide from a supplier only if the supplier sells that pesticide. A customer may place an order only if the customer holds an account. A withdrawal for an account may be made only if the account is active.
3.2 Something is to be conditionally allowed without using “if”	<i>... may ... only ...</i>	A shipment fee may be waived only for an order placed by an in-state customer.
4.0 A Statement of Advice Indicating that Something is Allowed		
4.1 Something is to be allowed unconditionally	<i>... may ...</i>	A person of any age may hold a bank account.
4.2 Something is to be allowed conditionally without using “if”	<i>... may ...</i>	A retired employee may work part-time in Alberta. An order on credit \$1,000 or less may be accepted without a credit check.
5.0 A Statement of Advice Indicating that Something is not Required		
5.1 Something is not to be required, unconditionally.	<i>... need not ...</i>	A customer need not place an order.
5.2 Something is conditionally not required using “if”	<i>... need not ... if ...</i>	A credit check need not be requested for an order if the amount of the order is under \$1,000.
5.3 Something is conditionally not required without using “if”	<i>... need not ...</i>	A gold customer need not pay in cash for an order with an international destination.