

# Chapter 2

## Goals

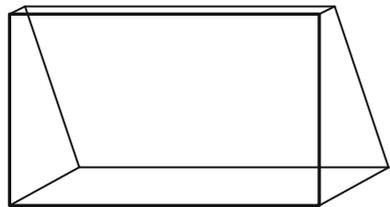
**Abstract** The Goal Structuring Notation is a notation for structuring Goals but, what is a Goal and why would we want to structure them?

When using the notation to represent arguments, the Goals represent claims. We can use Goal Structures to persuade others of the truth of our claims. This chapter introduces the symbol and text convention to be used to represent Goals in these structures.

### 2.1 What is a Goal?

Look up “goal” in a dictionary and you are likely to find something along the lines of: A rectangular opening through which, in order to score, a soccer player must pass the ball, see Fig. 2.1.

Fig. 2.1 A Goal?



This definition is irrelevant to our needs, although the GSN symbol for a Goal is indeed a rectangle. Another definition of goal is: An outcome that one strives to attain.

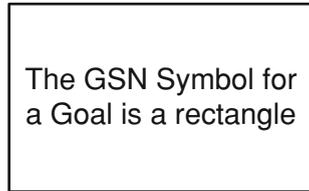
This is closer to the mark, and was the original meaning when the notation was proposed for representation of engineering requirements. When using GSN to represent an argument, we strive to attain the goal of persuading the reader of something, but the GSN Goal in an argument is not that type of goal either. This

would be a more appropriate definition: A Goal is a proposition to be established, i.e. shown to be true.

In formal logic, a proposition is a statement that can be either proved “True” or “False” (and, in some schemes, it could also be proved “Undecidable”). The guidance I provide in this book is not directed at proving anything formally with GSN, rather we will use it to persuade. You can think of the proposition as a claim that is being made and the truth of which will be demonstrated to the reader. A GSN Goal represents a claim, the truth of which is to be demonstrated by argument.

The GSN symbol for a Goal is a rectangle, which encloses the text of the Goal statement (Fig. 2.2). That text should be a succinct statement that can be either true or false; the argument will be that it is true.

**Fig. 2.2** The Goal symbol



Grammatically, the Goal text should be of the form subject-verb-object. Often the claim will be referring to a real thing, the subject, and ascribing to it an objective property. The claim must be clear. Do not use informal abbreviations, or miss out articles (“a” or “the”), and only use acronyms or initialisms if you have already established what they mean. For example, do not write, “Comm System is FFP” when you mean “The Communication System is fit for purpose”.

## 2.2 The Top Goal: Declaring the Proposition

The overall subject of our argument, the primary claim, is called the Top Goal. There is no hidden meaning here, it is called that merely because it appears at the top of the diagram. We will construct the argument to persuade others of the truth of our claim. The purpose of a Goal Structure is to present an argument that gives the reader a high confidence that the proposition is true. It is sufficient for our arguments to be compelling, rather than incontrovertible.

I must emphasise again that you must state a Goal such that it can either be True or False; it cannot be Blue or Pulse, neither can it turn out to be 42. If it can, there is something wrong; what you have is not a Goal, not a proposition that can be argued.

It may be that you believe a claim to be true, but it is in fact false. An advantage of using GSN to prepare your argument in advance is that you are likely to find out that you are mistaken before having told the world of your conclusion...

We are not trying to prove things in GSN, merely persuade. A claim can be purely subjective, for example I could make a claim about wine grape varieties, “Syrah is better than Merlot”. I may believe it to be true and make an argument on that basis, but you may believe the opposite and refute my argument. At this point bottles of wine could be opened, and we may lose track of the arguments...

### 2.3 Subverting a Proposition

In some circumstances you will be arguing against something; arguing that a proposition is false. If this is the case, do not “subvert the proposition”; instead, change your Goal text. Make it an opposing statement. For example, a developer wants to buy a local coppice for building houses; you want to argue against this on principle. Do not argue against the developer’s statement, “This land is ideal for new housing”; rather argue for your principle: “This Ancient Woodland must not be destroyed”. You can then argue that this is true, making the point along the way that to give it up for housing is, in effect, to destroy it. Of course, you would also need to demonstrate that the coppice in question is indeed ancient woodland.

### 2.4 How do Goals Make Arguments?

We argue for the Top Goal by decomposing it into Sub-Goals. A very simplistic example would be a Top Goal, “2012 marks the centenary of the cryptanalyst Alan Turing”. This Goal can be decomposed into two Sub-Goals:

1. A person’s centenary is the hundredth anniversary of his or her birth
2. Alan Turing, the cryptanalyst, was born in 1912

Once we have split the Top Goal into Sub-Goals, we then do the same to each in turn until we have a Goal Structure representing the whole argument, which would not be very large for this Turing example. Before looking in more detail at how to do that, there is something else to address in the next Chapter. It is the key ingredient that gives GSN its expressive power...

### 2.5 Question

- Formal logicians consider some of the compelling arguments that we will present in GSN to be “defeasible”. That is, the arguments are capable of being invalidated. For example, you may attempt to persuade someone by claiming, “Well-known experts on this subject state that...”. You and your readers may

have confidence in those experts, whereas the logician would point out that they do not constitute the whole set of such experts, so there may be other, competing, views. Do you think that this matters when we are presenting our arguments to persuade, rather than to prove?

## 2.6 Problems

Which, if any, of the following are claims that could be used as a Top Goal, the basis of an argument? Can any of the others be reworded such that they can be claimed?

1. Our Quality Management System is ISO9001:2008 compliant (ISO 2008)
2. My Business Plan is complete and ready for review by the Board
3. This burial site is probably that of Rædwald, King of the East Angles
4. This painting should be attributed to Albrecht Dürer
5. This equipment fulfils the essential requirements of the RTTE Directive
6. Beryllia is a carcinogen
7. Hazard Identification and Risk Assessment
8. Assurance is provided that safety requirements raised on the software are valid
9. The GSN Symbol for a Goal is a rectangle
10. The colour of the sky

Answers to these problems can be found near the back of the book.

## Reference

International Standards Organization (2008) Quality management systems. Requirements, ISO 9001



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