3.0: Prelude to Description Logics

Figure 3.1.1 shows a basic overview of the principal components of a DL knowledge base, with the so-called TBox containing the knowledge at the class-level and the ABox containing the data (individuals). Sometimes you will see added to the figure an RBox, which is used to make explicit there are relationships and the axioms that hold for them.

![Figure 3.1.1: A Description Logic knowledge base. Sometimes you will see a similar picture extended with an “RBox”, which denotes the DL roles and their axioms.](image)

The remainder of this section contains, first, a general introduction to DL (3.1: DL Primer), which are the first five sections of the DL Primer [KSH12], and is reproduced here with permission of its authors Markus Krötzsch, František Simančík, and Ian Horrocks. (Slightly more detailed introductory notes with examples can be found in the first 8 pages of [Tur10] and the first 10 pages of [Sat07]; a DL textbook is in the pipeline). We then proceed to several important DLs out of the very many DLs investigated, being \( \mathcal{ALC} \) and \( \mathcal{SROIQ} \), in 3.2: Important DLs. We then proceed to describing and illustrating the standard reasoning services for DLs in 3.3: Reasoning Services, which essentially applies and extends the tableau reasoning of the previous chapter. Note that DLs and its reasoning services return in Chapter 4 about OWL 2, building upon the theoretical foundations introduced in this chapter.
Footnotes

1 I harmonised the terminology so as to use the same terms throughout the book, cf. adding synonyms at this stage, and added a few references to other sections in this book to integrate the text better. Also, I moved their \( \mathcal{SROIQ} \) section into 3.2: Important DLs and inserted \( \mathcal{ALC} \) there, and made the family composition examples more inclusive.