Philosophy

The Method of Deduction

DEDUCTIVE PROOF Logic aims at distinguishing between good and bad reasoning. One of the basic problems in logic, therefore is to decide whether a given argument is valid. Another important task of logicians is to find out whether the given statement form is a tautology, contradiction or contingency. Various methods are used by logicians to deal with these. The methods are of two types:

(1) Decision procedure

(2) Methods that are not Decision procedures. Truth table as we have seen is a decision procedure whereas Deductive proof is another important method used in logic which is not a decision procedure as all the three conditions of an effective decision procedure are not satisfied by the deductive proof. The Deductive proof is reliable, finite but not mechanical as intelligence is required to use the method. Unlike decision procedure, deductive proof is used to prove the validity of arguments and not to decide whether it is valid or invalid and it is also used to prove that the statement form is a tautology and not to decide whether it is a tautology, contradiction or contingency. The method of deductive proof consists in deducing the conclusion of an argument from its premises by a sequence of (valid) elementary arguments. These elementary arguments are known to be valid. They are substitution instances of elementary valid argument forms which are called rules of inference. The method of deductive proof can be used to prove the validity of deductive arguments only. In a valid deductive argument the conclusion is a logical consequence of the premises i.e. in a valid deductive argument premises imply the conclusion. Therefore, if one is able to deduce the conclusion from the premises by using valid elementary arguments, the argument is proved to be valid. The proof constructed to establish the validity of an argument by deductive proof is called formal proof of validity. Deductive proof is of three types –

1. Direct Proof 2. Conditional Proof 3. Indirect Proof. In this chapter we will study direct proof. Direct proof can be used only to prove validity of arguments whereas Conditional proof and Indirect proof can be used for proving the validity of arguments as well as tautologies.

DIRECT PROOF

The method of direct proof consists in deducing the conclusion of an argument directly from its premises by a sequence of (valid) elementary arguments. This method is called direct proof

because it does not involve an assumption at any step before arriving at the conclusion Construction of formal proof of validity involves the following steps : 1. Write down the premises in order and number them. 2. Write the conclusion on the line where the last premise is written. Separate it from the premise by a slanting line as shown below: 1. Premise 2. Premise 3. Premise / \ Conclusion