Philosophy

Decision Procedure

CONCEPT OF DECISION PROCEDURE

In the earlier chapter, we have studied about the nature of proposition, its kinds and its basic truth values. In this chapter, we are going to study the procedure for deciding the validity of arguments. In logic, we use the decision procedure (method) to decide whether a truth functional form is Tautologous, Contradictory or Contingent. It also tests whether an argument is valid or invalid. Decision Procedure may be defined as a method of deciding whether an object belongs to a certain class. There are five types of Decision Procedures: (1) Truth Table (2) Shorter Truth Table (3) Truth Tree (4) Conjunctive Normal Form (5) Disjunctive Normal Form In this text we shall study the method of constructing Truth Table as a decision procedure. Characteristics of decision procedure : A decision procedure must be effective, to be an effective decision procedure certain conditions need to be fulfilled. – (1) Reliable : A decision procedure must be reliable. A reliable procedure is one which always gives a correct answer, provided we use the method and rules correctly. (2) Mechanical : A decision procedure is mechanical ie just by following certain steps in a certain order one can get an answer. There is no scope for one's imagination and intelligence. (3) Finite : A decision procedure must be finite ie it should have limited number of steps. There should be a last step for getting the answer. 3.2 NATURE OF TRUTH TABLE Truth table is one of the decision procedures. A truth table is defined as a tabular way of expressing the truth value of expressions containing propositional connectives (a truth functionally compound statement). Procedure of Construction of a truth table (for truth – functional statement form) (1) To construct a truth table we shall first make two columns: one on the left hand side for the matrix and the other on the right hand side for the truth – functional form for which the truth table is constructed. Example : (q Ú p) º [(p · q) ⊃ p] Matrix Truth – Functional Form (q Ú p) º [(p · q) ⊃ p] The first step is to write down the Truth functional form in the column for Truth functional form. (2) The second step is to write down in the matrix column all the distinct variables occurred in the truth functional form. In above example, there are two, distinct variables 'p' and 'q'. So we write them as follows. Matrix Truth – Functional Form p q (q Ú p) º [(p · q) ⊃ p] (3) The third step is to determine the number of rows the truth table will have. The number of rows depends upon the number of propositional variables, occurred in the truth functional form. The simple formula.

Also, highlight the column under the main connective of each premise and conclusion. v Next step is the criteria of deciding the validity of an argument. In the first chapter, we have learnt that in case of a valid deductive argument, if all the premises are true, its conclusion is also true. It cannot be false. Accordingly, to determine whether the given argument form is valid, one should see all

the rows in which all the premises are true. If in these rows, the conclusion is also true, then the argument is valid. Even if in one such row where all the premises are true, and the conclusion is false. Then the argument is invalid. v We need to select those rows where premises are true. In our example, only in the first row, all the three premises are true and conclusion is also true. Therefore the given argument form is valid. The argument being substitution instance of this form is also valid. Let's Determine the validity of some more arguments: (1) Macro Economics and Micro Economics are sub branches of Economics. Macro Economics is a sub branch of Economics. Therefore, the Micro Economics is not a sub branch of Economics,