



Software Engineering

هندسة البرمجيات

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Structured Analysis (Decision Trees +Decision Tables)

Topics covered



- ✧ Structured Analysis
- ✧ Structured Analysis Models (Tools):
 - i. Data Flow Diagram
 - ii. Data Dictionary
 - iii. Decision Trees
 - iv. Decision Tables
 - v. Structured English
 - vi. Pseudocode

Decision Trees



- ✧ **Decision trees** are a method for defining complex relationships by describing decisions and avoiding the problems in communication.
- ✧ A decision tree is a diagram that shows **actions and conditions** within horizontal tree framework. Thus, it depicts which conditions to consider first, second, and so on.

Decision Trees



- ✧ Decision trees depict the relationship of each **condition** and their permissible **actions**.
- ✧ A **square node** indicates an **action**, and a **circle** indicates a **condition**. It forces analysts to consider the sequence of decisions and identifies the actual decision that must be made.

Decision Trees

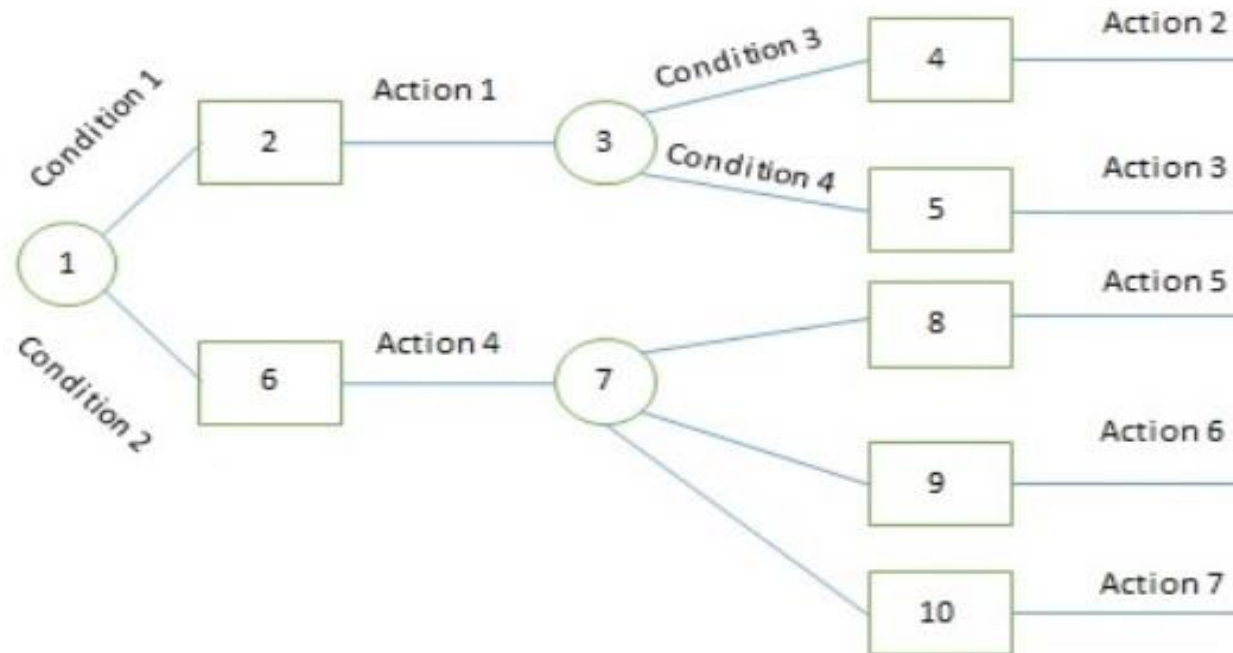


Figure 17: Decision Trees 1

Decision Trees (For example, refer the following decision tree)



✧ Conditions:

C1: Advance payment made

C2: Purchase amount = Rs 10,000/-

C3: Regular Customer

✧ Actions:

A1: Give 5% discount

A2: Give no discount

Decision Trees (For example, refer the following decision tree)



✧ Rules:

R1: Yes Advance payment made = Give 5% discount

R2: No Advanced payment made + Yes Purchase amount = Rs 10,000/- + Yes Regular Customer = Give 5% discount

R3: No Advanced payment made + Yes Purchase amount = Rs 10,000/- + No Regular Customer = Give no discount

R4: No Advanced payment made + No Purchase amount = Rs 10,000/- = Give no discount

Ru1 +R2 = Give 5% discount R3+R4 = Give no discount

Decision Trees (For example, refer the following decision tree)



Figure 18: Decision Trees 2

Decision Tables



✧ **Decision tables** are a method of describing the complex logical relationship in a precise manner which is easily understandable.

It is useful in situations where the resulting actions depend on the occurrence of one or several combinations of independent conditions.

It is a matrix containing row or columns for defining a problem and the actions.

Components of a Decision Table



- **Condition Stub** – It is in the upper left quadrant which lists all the condition to be checked.
- **Action Stub** – It is in the lower left quadrant which outlines all the action to be carried out to meet such condition.
- **Condition Entry** – It is in upper right quadrant which provides answers to questions asked in condition stub quadrant.
- **Action Entry** – It is in lower right quadrant which indicates the appropriate action resulting from the answers to the conditions in the condition entry quadrant.

Decision Tables



- ✧ The entries in decision table are given by Decision Rules which define the relationships between combinations of conditions and courses of action.
- ✧ In rules section,
 - Y** shows the existence of a condition.
 - N** represents the condition, which is not satisfied.
 - A** blank - against action states it is to be ignored.
 - X** (or a check mark will do) against action states it is to be carried out.

Decision Table (For example, refer the following decision table)



✧ Conditions:

C1: Advance payment made

C2: Purchase amount = Rs 10,000/-

C3: Regular Customer

✧ Actions:

A1: Give 5% discount

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Decision Trees (For example, refer the following decision tree)



✧ Rules:

R1: Yes Advance payment made = Give 5% discount

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R3: No Advanced payment made + Yes Purchase amount = Rs 10,000/- + No Regular Customer = Give no discount

R4: No Advanced payment made + No Purchase amount = Rs 10,000/- = Give no discount

Ru1 +R2 = Give 5% discount R3+R4 = Give no discount

Decision Tables (For example, refer the following decision table)



CONDITIONS	Rule 1	Rule 2	Rule 3	Rule 4
Advance payment made	Y	N	N	N
Purchase amount = Rs 10,000/-	-	Y	Y	N
Regular Customer	-	Y	N	-
ACTIONS				
Give 5% discount	X	X	-	-
Give no discount	-	-	X	X

Table 2: Decision Table



Thanks