

## 7. DECISION TABLE GLOSSARY

### action

The statement performed or not performed, depending on the state of the conditions.

### action entry

The part of the decision table that indicates whether an action must be performed or not for the combination of condition entries appearing in the same decision rule.

### action set

A set of actions, each consisting of an action subject and a set of alternatives.

### action stub

That quadrant of the decision table which holds the action subjects.

### action subject

The action that is to be performed; that part of the action located in the action stub.

### alternatives

The different states a condition or action can take.

### 'a priori' problem statement

A problem definition that already exists in the form of written laws, rules, regulations, procedures, or a narrative description. This 'a priori' statement can be transformed into a problem specification in decision table form using the direct mode.

### branch and bound

An algorithm used to parse a decision table into its equivalent program tree, consisting of successively testing different "branches", possibly finding a lower "bound" that can be used to avoid testing other branches of the tree.

canonical form

Fully expanded set of alternatives for the condition entries in which all condition entries are combinatorically expressed.

cell

The intersection of a decision table row and column.

completeness

Completeness of a decision table can be defined on two levels. On a structural (syntactic) level completeness refers to the fact that all combinations of condition entries are represented by the decision rules. On the semantic level, completeness of a decision table means that all transactions produced by a real decision situation are satisfied by at least one rule of the decision table. This requires the complete description of condition, condition alternatives, actions, action alternatives in the decision rules. Completeness checks based on structure (syntax) are of value but are not sufficient to insure semantic completeness.

complete table

See completeness.

condition

The statement of a variable (or a function of variables) together with a specification of its alternatives.

condition entry

The upper right quadrant of a decision table which contains the set of alternatives for the conditions in the condition stub.

condition set

A set of conditions, each consisting of a condition subject and a set of alternatives.

condition stub

The upper left quadrant of a decision table, containing the condition subjects.

**condition subject**

The condition that is to be checked; that part of the condition located in the condition stub.

**consistent decision table**

A decision table is said to be consistent if its rules are pairwise mutually exclusive so that there is only one rule for each combination of conditions.

**consolidation**

Consolidation of a decision table implies the combining of all groups of rules with identical action sets into one rule. This can be done if the condition entries of these rules are irrelevant for the execution of the action.

**decision rule**

The set of condition alternatives and series of actions to be performed.

**decision table**

Tabular expression of procedural decision situations which is characterized by one or more conditions and a set of actions that are executed based upon the state of the conditions.

**decision table horizontal format**

A transposed image of a vertical decision table where the decision rules are listed vertically and extend horizontally.

**decision table vertical format**

The more commonly used decision table format where decision rules are listed horizontally and extend vertically.

**direct mode**

A method for constructing decision tables from a written, a priori, problem statement in which the condition alternatives are exhaustively enumerated.

**elaboration**

The process of refining conditions/actions to more specific levels of detail by expanding them into more detailed decision tables.

else rule

A rule that is executed when none of the other rules in a decision table are satisfied by a given transaction.

entry

A condition or action alternative; the contents of a cell in the rule portion of the table.

equivalence class

See rule classes.

expansion of condition entries

The process of replacing a rule containing an irrelevant "-" entry with rules containing each of the possible entry values for the condition that had the irrelevant entry. The opposite of consolidation.

expansion of decision table

The process of eliminating linkages between a table and its invoked tables by replacing each invoking reference by the invoked table.

explicit subtables

A subtable defined by a declarative action "subtable" and which is a separate structure from the original table.

extended entry decision table

Refers to the content of the condition/action entry portion of a decision table. The condition/action stub is a condition statement which assumes the values supplied in the entry portion of the table.

factoring

Extracting a subset of conditions, condition alternatives and actions from a decision table to form a subtable which is to be invoked by the original table.

ignore

See irrelevant entry.

**implied limited entries**

In case of logical relations among a table's conditions, one entry in a rule may be derivable from other entries in the rule. Three limited entries cover such situations:

- Y! meaning true by implication,
- N! meaning false by implication,
- # meaning undefined and cannot be evaluated.

**impossible rules**

If conditions in a decision table are logically dependent, one condition's entry may imply that another condition's entry cannot be satisfied. Rules that contain these entries are logically impossible. These rules can be removed but in their syntactic dimension must be considered when testing completeness.

**inconsistency**

On the structure (syntactic) level single hit decision tables are inconsistent if they provide more than one rule for a condition configuration. On the semantic level single hit decision tables are inconsistent if they provide more than one rule for a transaction processed against the table. Semantic analysis of inconsistency requires knowledge of the environment in which a decision table is used.

**indifference entry**

See irrelevant entry.

**inputs for decision tables**

When viewing a decision table as a mechanism which transforms a set of inputs into a set of outputs, the inputs to a decision table comprise variables directly tested by the table's conditions or utilized by its actions, and indirectly, those as input to procedures invoked by the table.

**intermixing conditions and actions**

An alternative to the linkage of decision tables via invocation is to replace each reference to the invoked table by the table invoked. This process, called "expansion", may result in the interleaving of actions and conditions.

## interpretation of decision tables

The purpose of interpreting a decision table is to find the rule(s) that satisfy an actual transaction. The interpretation process consists of testing the condition entries with a specific transaction state to identify the rule (within single hit table) or the rules (within multiple hit table) that satisfy it.

## interpretive masking

Interpretive masking is a method to convert decision tables into a computer program. The resulting program processes each transaction, mapped into a bit mask of one's and zero's, against a set of table masks to find the rule(s) satisfied by the transactions.

## intersection of rules

Within consistent single hit decision tables the intersection of any two of the decision rules is empty. This means that two rules do not describe the same part of the decision situation, which is exactly what is intended by single hit decision tables. If the intersection of two rules of a single hit decision table is not empty, the table is inconsistent. Both rules describe one part of the decision situation which violates the logic behind single hit decision tables. If both rules include the same action set, the table is said to contain redundancy, if the action sets differ, the table is contradictory. Within multiple hit tables, non-empty intersections of rule-pairs are not only allowed but the normal case.

## invocation of decision tables

One decision table invokes another table by DOing it, CALLing it, PERFORMing it, using it as a FUNCTION reference, etc. The invocation of the second table is done in the stub portion of the invoking table.

## irrelevant entry

A "-" (dash) within a condition row of the decision rule represents all semantically possible alternatives of the condition. Hence within the dash-containing rule, this condition cannot affect the action set selection, therefore it is irrelevant. A "-" or a blank within an action row of a decision table shows that the action must not be executed, it is to be ignored within the dash-containing rule.

## LEDT

See limited entry decision table.

**limited entry decision table**

a decision table which limits the condition and action alternatives in the entry portion of the table to Y (yes), N (no), - (irrelevant or ignore), Y! (true by implication), N! (false by implication), and # (do not test) in the condition entry area, and X (perform) or - or blank (do not perform) in the action entry area.

**linkage of decision tables**

By linkage of decision tables, a system of decision tables is formed. Table linkage is performed by invocation.

**mergeable entries**

The elimination of a duplicate condition check in two or more branches of the decision tree based upon like action sets.

**mixed entry decision table**

A decision table that has limited and extended entry forms intermixed for the conditions/actions in the table.

**multiple hit tables**

Presents an alternative to the standard exclusive "or", single hit table. The table uses an inclusive "or" relationship to relate the rules of the table, thus allowing a transaction to satisfy more than one decision rule.

**occurrence**

A state of a condition.

**order (rule, condition)**

Relative to testing sequence; condition order is testing the conditions in the sequence listed. Rule order is testing in such a way as to determine the satisfaction of rules in the sequence listed.

**outpath....**

A term used to describe a rule path from and including the entry at condition c of rule r and those entries which follow it in rule r -- OP(r,c).

output

Semantically, the results of a transformation.

output generating clause

A clause (action or condition) which sets or alters the value of a variable.

outspan

Output generating clause.

parsing

Mapping a decision table into a control structure compatible with the test-and-branch logic of a computer.

producer

The system's developer. The person or people responsible for analyzing the user's requirements and then developing a system (either manual or for a computer) to perform the desired task.

quadrant

A quadrant is used to refer to one of the four sections which normally divides a decision table, viz condition subjects, condition alternatives, action subjects, and action alternatives.

redundancy

Unnecessary (overlapping, repeated) specification (coding). A condition is redundant in a table when none of its entries indicate it is to be tested (evaluated). Rule redundancy is the special case of rule overlap where two rules are also in the same rule class (have the same actions).

relevancy

a condition is relevant to a rule when it must be tested to determine satisfaction of the rule. An action is relevant when it is to be executed upon satisfaction of the rule.

rule class (equivalence class)

All simple rules within a table that have the same (identical or equivalent) actions.



**rule masking**

At execution (processing) time all conditions are evaluated and compared rule by rule to select the rule or rules satisfied by the transaction.

**rule overlap**

Two rules overlap when one or more transactions satisfy both rules. The extent of the overlap is the complete set of transactions that satisfy both rules.

**rule satisfaction**

At execution (processing) time a rule is satisfied when a transaction meets the alternatives specified in that rule.

**search cost**

The product of condition testing cost and the summation of rule probabilities for which that condition is irrelevant (i.e. where the condition entry is "-").

**search free conditions**

Conditions which do not contain irrelevant entries for any given rule thereby yielding a search cost of zero.

**search free tables**

Those tables which can be mapped into program trees that test only search free conditions and thereby yielding a search cost of zero for the table.

**search mode**

A technique for defining a problem structure through systematic inquiries and then expressing it in a decision table.

**selector input**

Any input to a decision table which is tested in one of the table's conditions.

**semantic completeness**

A decision table is semantically complete if it provides a rule for all possible transactions.

**semantic consistency**

A decision table is semantically consistent if no transaction satisfies more than one rule.

**semantic function**

A decision table is a semantic function if it is semantically complete and consistent.

**single hit decision tables**

Those tables that allow not more than one rule to support a given transaction.

**space, action**

The cartesian product formed by selecting one alternative each of a table's actions.

**space, condition**

The cartesian product formed by selecting one alternative from each of a table's conditions.

**subject**

See condition subject or action subject.

**subspace**

A collection of points within a space.

**subtables**

A selection of rows and columns that partition the decision table.

**supported transaction**

See transaction, supported.

**transaction**

Input to a decision table, contain a value for each variable tested by the table's conditions or used by its actions.

transaction-set

A rule transaction set comprises all transactions which satisfy the rule. A T-set.

transaction, supported

A transaction is supported by a table if it satisfies at least one of the tables rules.

T-set

See transaction-set.

verification cost

The product condition test cost and the summation of rule probabilities with relevant condition entries.