Divide and Conquer Implementation Pattern

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Introduction

This project is an example of the **Divide and Conquer Pattern** applied to business rules. The pattern helps reduce complexity of rule logic.

# Divide and Conquer Pattern

## Pattern Definition

The Divide and Conquer Pattern splits one big decision table into smaller decisions which combine the overall result. See below.



Figure : Divide and Conquer

## Pattern Advantages

This pattern helps split one long decision table with many columns into smaller constituent tables. It helps reduce duplicate conditions, encourages condition reuse, and simplifies business logic.

## Pattern Disadvantages

Excessive use of this pattern creates a proliferation of intermediate tables and may affect performance.

## Pattern Example

Consider a rule application that categorises planets for habitability. The rule inputs are:

* **Oxygen** - As a percentage of total atmosphere
* **Surface Pressure** – In millibars
* **Temperature** - Average daily temperature in degrees centigrade

The output from the rules is an indication of the habitability of the planet.

Our initial design might be developed as a decision table shown below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Oxygen** | **Surface Pressure** | **Temperature** | **Habitability** |
| At least 15% | More than 1000mb | More than 10 | **Good** |
| 5 to 15% | 100-999 | More than 0 | **Bearable** |
| otherwise |  |  | Deadly |

Figure : Planet Habitability

The decision table in Figure 2 is not complete and once all attributes are added it will be difficult to score all combinations. To simplify we could decompose the table into smaller tables which combined create the overall result. The design using DMN (decision modelling notation) is as follows:

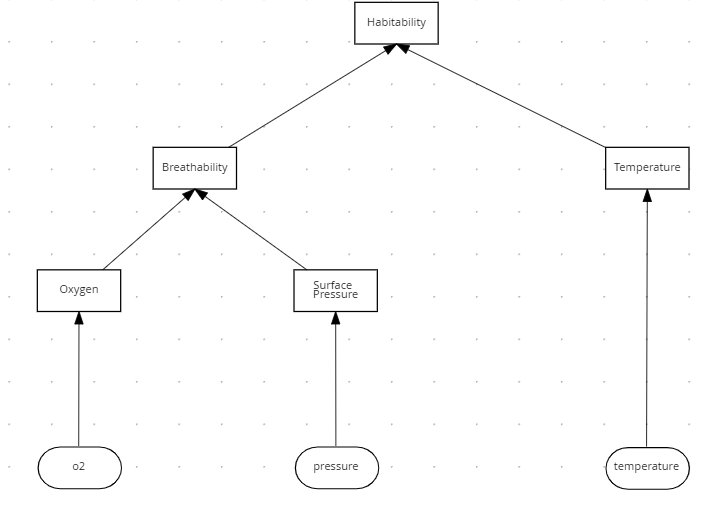


Figure : Habitability Tables

We decompose each column in Figure 2 into separate tables:

### Surface Pressure Table

|  |  |
| --- | --- |
| **Mb** | **Pressure** |
| >=1000 | Optimal |
| 100-999 | Bearable |
| < 100 | Deadly |

Figure : Surface Pressure Table

### Oxygen Table

|  |  |
| --- | --- |
| **Mb** | **Pressure** |
| >=15 % | Optimal |
| 5 - 15% | Bearable |
| < 5% | Deadly |

Figure : Oxygen Table

### Breathability Table

|  |  |  |
| --- | --- | --- |
| **Oxygen** | **Pressure** | **Breathability** |
| Optimal | Optimal | Optimal |
| Bearable | Bearable | Bearable |
| Deadly | Deadly | Deadly |

Figure : Breathability Table

### Temperature Table

|  |  |
| --- | --- |
| **Temperature** | **Classification** |
| > 50 | Deadly |
| > 0 | Bearable |
| >10 | Temperate |

Figure : Temperature Table

### Habitability

We now join the tables to form **habitability** which produces an overall decision:

|  |  |  |
| --- | --- | --- |
| **Breathability** | **Climate** | **Habitability** |
| Good | Temperate | Good |
| Poor | Cold | Poor |
| Poor | Hot | Poor |
| Otherwise |  | Fair |

Figure : Habitability

The **habitability** table has the same behaviour as Figure 2 except that it is easier to understand and maintain. An additional advantage is that the smaller tables can be reused in other decisions.