

**INTENTIONAL MODEL**  
**A NEW APPROACH TO DATABASE DESIGN**

by

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Dedicated to  
**MY PARENTS**

## CERTIFICATE

Certified that the thesis **"Intentional model : A new approach to Database design"** , which is being submitted by **Mrs. Hemalatha** for the award of the degree of Doctor of Philosophy to the Indian Institute of Technology, Delhi, is a record of student's own work carried out by her under my supervision and guidance. The matter embodied in this thesis has not been submitted for the award of any other degree or diploma.

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## ABSTRACT

Database management system, evolved from conventional file processing systems to eliminate the problems of redundancy, data duplication, lack of integrity and consistency. Three major data models were developed viz. Hierarchical, Network and Relational Models, which attempted to meet these objectives but still suffer from certain drawbacks like user dependent navigation, referential integrity and so on.

With the aim of eliminating these problems, a new model named as Intentional Model is developed in this thesis. In this model, the intentions, namely the constraints are kept separate from the database, which is stored in a single INF base table defined on a set of attributes. The intentions are classified into the following four types :

- (i) Linear equality constraints
- (ii) Linear inequality constraints
- (iii) Functional dependencies (FDs)
- (iv) General Intentions

In the (ii) and (iii) types of intentions, attributes are allowed to take a specific 'value' or "Don't know value", a unique symbol to represent the fact that the value is at present not known but exists. The dependency preservation/consistency checking procedures are developed for each of these intentions, for checking of the consistency, before any new insertion or

modification of a tuple into the database. The consistency checking procedure also updates the knowledge of the database for any new consistent insertion or modification. A query language based on intentional algebra is developed for the model.

In the general intentions, a new type of intentions called as Value Based Intentions (VBI) is introduced. The definition of "Don't know value" is further generalized and the concept of null or value inapplicable to attributes is introduced. The consistency checking procedure is developed in the presence of FDs and VBIs.

The model is implemented for type (i), (ii) & (iii) intentions with sample databases on ICL 2960 in FORTRAN.

## CONTENTS

### Acknowledgements

### Abstract

### Chapter 1 Introduction

|     |                                                      |   |
|-----|------------------------------------------------------|---|
| 1.1 | Evolution of database systems                        | 1 |
| 1.2 | Modern databases                                     | 2 |
| 1.3 | Introducing data models : Need for Intentional Model | 4 |
| 1.4 | Thesis outline                                       | 7 |

### Chapter 2 Data models

|       |                                                |    |
|-------|------------------------------------------------|----|
| 2.1   | Introduction                                   | 11 |
| 2.2   | Entities, attributes, and relationships        | 11 |
| 2.3   | Network data model                             | 12 |
| 2.3.1 | Logical organization                           | 12 |
| 2.3.2 | Rules governing the model                      | 14 |
| 2.3.3 | Mechanism for data storage and retrieval       | 16 |
| 2.4   | Hierarchical Model                             | 19 |
| 2.4.1 | Logical organization                           | 19 |
| 2.4.2 | Rules governing the data model                 | 20 |
| 2.4.3 | Data storage and retrieval mechanisms          | 21 |
| 2.5   | Relational model                               | 23 |
| 2.5.1 | Relation and the relation scheme               | 23 |
| 2.5.2 | Some definitions and concepts of normalization | 24 |
| 2.5.3 | Extentions to relational model                 | 28 |
| 2.6   | Other Data Models                              | 30 |

|                  |                                                                                 |    |
|------------------|---------------------------------------------------------------------------------|----|
| 2.7              | Conclusion                                                                      | 31 |
| <b>Chapter 3</b> | <b>Intentional Model</b>                                                        |    |
| 3.1              | Introduction                                                                    | 34 |
| 3.2              | Components of the intentional model                                             | 35 |
| 3.3              | Constraint checking mechanism                                                   | 40 |
| 3.4              | Intentional algebra and the query language                                      | 42 |
| 3.5              | Evaluation of predicate                                                         | 44 |
| 3.5.1            | Primitive evaluation                                                            | 44 |
| 3.5.2            | Predicate evaluation                                                            | 45 |
| 3.5.3            | Not operator                                                                    | 47 |
| 3.6              | An alternate method for projection                                              | 48 |
| 3.7              | Conclusion                                                                      | 49 |
| <b>Chapter 4</b> | <b>Linear equality and inequality constraints</b>                               |    |
| 4.1              | Introduction                                                                    | 50 |
| 4.2              | Linear equality constraints                                                     | 50 |
| 4.3              | Linear inequality constraints                                                   | 51 |
| 4.4              | Capital budgeting problem                                                       | 53 |
| 4.4.1            | Introduction                                                                    | 53 |
| 4.4.2            | Statement of the capital budgeting problem                                      | 54 |
| 4.4.3            | Problem formulation                                                             | 55 |
| 4.5              | Conclusion                                                                      | 59 |
| <b>Chapter 5</b> | <b>Dependency checking algorithms for functional dependencies as intentions</b> |    |
| 5.1              | Introduction                                                                    | 60 |
| 5.2              | Functional dependencies and their cover                                         | 61 |

|                   |                                                          |     |
|-------------------|----------------------------------------------------------|-----|
| 5.3               | Dependency checking algorithm I                          | 67  |
| 5.4               | Data manipulation operations on the database             | 70  |
| 5.5               | Dependency checking algorithm II with "Don't know value" | 75  |
| 5.5.1             | Algorithm for dependency checking II                     | 76  |
| 5.5.2             | Analysis of the dependency checking algorithm II         | 78  |
| 5.5.3             | Implementation of the algorithm                          | 80  |
| 5.6               | Data manipulation operators                              | 81  |
| 5.7               | Transactions in the material order and receipt system    | 83  |
| 5.8               | Conclusion                                               | 89  |
| <b>Chapter 6</b>  | <b>General Intentions</b>                                |     |
| 6.1               | Introduction                                             | 91  |
| 6.2               | Introduction of "Null" value                             | 92  |
| 6.3               | Value based intentions (VBI)                             | 93  |
| 6.4               | Algorithm for general intentions                         | 96  |
| 6.5               | Data manipulation operations                             | 101 |
| 6.6               | Conclusion                                               | 102 |
| <b>Chapter 7</b>  | <b>Conclusion</b>                                        | 103 |
| <b>Appendices</b> | <b>Appendix I</b>                                        | 110 |
|                   | <b>Appendix II</b>                                       | 116 |
|                   | <b>Appendix III</b>                                      | 123 |
|                   | <b>Appendix IV</b>                                       | 129 |
| <b>References</b> |                                                          | 132 |