

# A Codd inspired amendment to my critical reading of the Third Manifesto

Maurice Gittens <maurice at gittens dot nl>

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## Abstract

According to the authors, Hugh Darwen and C.J. Date, of the book entitled “Foundation for Future Database Systems; The Third Manifesto” the maxim: *All logical difference are big differences* and its corollary *All logical mistakes are big mistakes* has been central to their work on this book. The paper “A critical reading of the Third Manifesto” by my hand, identified a number of issues with the logical consistency of the dissertation presented in The Third Manifesto. Based on the article “Extending the Database Relational Model to Capture more Meaning” by E.F. Codd, this paper presents new argumentation in support of the position that the alleged blunders identified by The Third Manifesto have been falsely identified as such.

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**Status: draft**

## Revision history

- Nov 15 2005; Fix an unfortunate misspelling of Hugh Darwen’s name. For this I sincerely apologize.
- Aug 10 2004; Fix up my usage of the English language a bit more
- May 24 2004; Correct more grammatical and typographical errors
- April 20 2004; A second pass at fixing up the text; first more or less complete version
- April 17 2004; A first draft of this document

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## 1 Introduction

### Acknowledgment

After I wrote the article “A critical reading of the Third Manifesto”, René Vincent Jansen pertinently gave me access to a copy of an article entitled “Extending the Database Relational Model to Capture more Meaning” by E.F. Codd. This article provided additional foundation for questioning the prudence of founding future database systems on the logical framework presented in The Third Manifesto.

### The primary purpose of this paper

Date and Darwen present the maxim: *All logical difference are big differences* and its corollary *All logical mistakes are big mistakes* as a guiding principle in their work on the Third Manifesto. The Third Manifesto proceeded to identify what it refers to as the Two Great Blunders :

- Equating relvars and classes
- Mixing pointers and relations (or more specifically allowing database relvars to contain object IDs)

The primary purpose of this paper is the presentation a number of points made by E.F. Codd in the context of extending the relational database model as these points relate to the alleged Two Great Blunders identified by the Third manifesto.

### The secondary purpose of this paper

A secondary purpose of this paper is to point out what properties of domains, according to Codd, are essential in the establishment of what is fundamentally a relational database. Codd’s position will be shown to be in contrast to The Third Manifesto’s position that the properties of domains are orthogonal to support of the relational model.

## 2 Codd and The Third Manifesto’s great blunders

### 2.1 The first great blunder

The first alleged *great blunder* identified in The Third Manifesto follows:

### *Equating relvars and classes*

The Third Manifesto proceeds with much rhetoric to claim that Object Classes should not be modeled as relations but that Object Classes should be modeled as domains instead. Codd devotes chapter 11 of “Extending the Database Relational Model to Capture more Meaning” to this specific topic. The chapter starts out with: “Another important dimension for forming larger meaningful units is that of generalization...” Codd then proceeds to describe (in terminology some may find unusual) what is essentially “Equating relvars and classes”. Codd introduces concepts like specialization, subtypes instantiation etc. His explanation includes an example of what today would be called a class hierarchy. After reading this chapter one can but acknowledge that Codd did not think that equating relvars and classes is a blunder. In fact as will be detailed later in this paper, Codd claims that “simple” domains are a prerequisite for the relational model. This position contradicts The Third Manifesto’s claim that Object Classes should be modeled as relational domains.

## **2.2 The second great blunder**

The Third Manifesto identifies the second great blunder as:

*Mixing pointers and relations (or more specifically allowing database relvars to contain object IDs).*

Chapter 4 of Codd’s “Extending the Database Relational Model to Capture more Meaning” entitled “Designation of Entities” starts out with the following sentence: “The need for unique and permanent identifiers for database entities is clear”. Codd proceeds to describe what he refers to as surrogates which are system defined, unique within the entire database and in principle not subject to change. These surrogates and their associated domains, called the E domains by Codd, clearly have the properties of Object Identifiers. Based on this evidence one can but conclude that Codd did not agree that support for object identifiers is to be rejected. There is evidence which suggests that The Third Manifesto erred by confusing Object Identifiers with Pointers. Codd made no such mistake.

## **3 Codd’s view of a relational database differs from that of Date and Darwen**

According to E.F. Codd a relational database is defined as:

A relational database is a time-varying collection of data, all of which can be accessed and updated as if they were organized as a collection of tabular time-varying tabular (nonhierarchic) relations of assorted degrees defined on a given set of simple domains.

According to the Third manifesto:

The question as to what data types are supported is orthogonal to the question of support of the relational model.

Let us take time to notice the fundamental difference between the two positions presented here. As a result of the position that support for the relational model is orthogonal to the supported data types, The Third Manifesto proceeded to allow domains to have an arbitrarily complex structure and also to support arbitrarily complex user defined operators. Codd on the other hand specifically states that relational databases must be based on “simple” domains. Codd also says that domain values should not be decomposable further by the DBMS. Which is to say: According to Codd, the question as to what data types are supported is *not* orthogonal to the question of support of the relational model. Based on this evidence one can but conclude that Codd’s view of relational database is logically different from The Third Manifesto’s view of a relational database. Such logical differences are *big* differences.

## 4 Conclusions

Based on “Extending the Database Relational Model to Capture more Meaning” and with regard to the subject matter of this article the following conclusions are drawn:

- E.F. Codd is not in agreement with The Third Manifesto’s claim that the alleged *first great blunder* is indeed a blunder; Codd’s position and the Third Manifesto’s position on this question are in opposition.
- E.F. Codd is not in agreement with The Third Manifesto’s claim that the alleged *second great blunder* is indeed a blunder; Codd’s position and the Third Manifesto’s position on this question are in opposition.
- E.F. Codd definition of relational databases is in opposition to The Third Manifesto’s definition of a relational database
- E.F. Codd allows the use of surrogates (which might be called object identifiers) in his extended relational databases

## References

- [1] C.J. Date, Hugh Darwen [2000] Foundation for Future Database Systems, Addison-Wesley Publishing Company.
- [2] E.F. Codd, [1979] “Extending the Database Relational Model to Capture more Meaning”
- [3] Maurice Gittens, [2003] “A critical reading of The Third Manifesto”, <http://www.gittens.nl>