

Umeå University
Institution för Datavetenskap

Datavetenskapens byggstenar 7.5 p
DV160HT15

OU4 Data Representation

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1 Introduction

In this assignment the aim was to specify three different possible data representations for a spreadsheet application. The representations were to be described such that they could be implemented from the descriptions.

Several criteria to judge the suitability of the chosen representations were discussed in the mandatory seminar *OU2*. Three of those criteria were then to be used to judge the chosen data representations.

1.1 Problem Description

Below is a translation of the the problem description given in Swedish on the course homepage:

Imagine that you work with the development of a spreadsheet software (Excel). The spreadsheet is basically a single large table with rows and columns. Each cell has a unique address in the form of a row and a column coordinate. For simplicity, let's represent both of them as an integer (normally columns are represented by character combinations, but the transformation to and from is trivial). The table is basically of infinite size and the user fills in just some cells here and there. Obviously, it's not possible to represent all cells as they are of infinite count. Neither is it very economic to to represent the finit number of cells that fit in the thought minimum rectangle that includes all non-empty cells as still many included cells can be empty. The aim is to find a more economic representation of the spreadsheet. There are potentially many different viable representations. The assignment is to come up with three different representations for a spreadsheet and discuss pros and cons for each of them. However the first step is to determine suitable such criteria for evaluating the representantion.

I chose to structure the report according a scientific article with *Introduction, Material and Methods, Results, Discussion and References*.

1.2 The Anatomy of a Spreadsheet

A spreadsheet can be described as a matrix, two-dimensional array or a table with polytypic elements: Each element allowa storage of various simple data types.

1.3 Typical Usecases of a Spreadsheet

During a typical user session, text, numbers, formulas and links to other elements are stored in the table/array elements. In many usecases the array

1.4 Fast and Large or Slow and Small

The most general criteria applicable for in most cases of data structures are *Time* and *Space*. Most design choices come down to a trade-off between how execution speed and amount of needed memory.

2 Material and Methods

DAG, directed acyclic graph.

3 Results

And our results looked like this...

4 Discussion

bla bla bla...