Uppsala University

Department of Information Technology

Database Design II - 1DL400

Assignment 2:1 - Stock Portfolio Database Project

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Submitted Files

group9_assign2.amosql | database_schema.jpg

Description

The goal of this assignment is to give practical experience in database application development, using an object-relational database management system (AMOS II) that includes an object-relational query language (AMOSQL). The AMOS II object-relational DBMS is a research prototype system being developed at Uppsala Database Laboratory, Uppsala University. The AMOSQL query language has similarities with the object-oriented extensions of the current SQL standard.

The assignment consists of developing a small stock portfolio database application to handle personal stock portfolios. In oder to populate our database, we used the test data available in the course material, covering two(2) weeks and including five(5) different stocks and *Affärsvärldens Generalindex (AFGX)* index.

Stock data includes stock prices (buy, sell, latest, highest, and lowest), price change (+/-), dividend, dividend in percent, and date. Index data includes name and daily values. Each purchase contains data related to stock id, number of stock shares bought, date, and price. Each portfolio has id, name of person and ids of multiple purchases. Finally, each person has id, name and ids of multiple portfolios.

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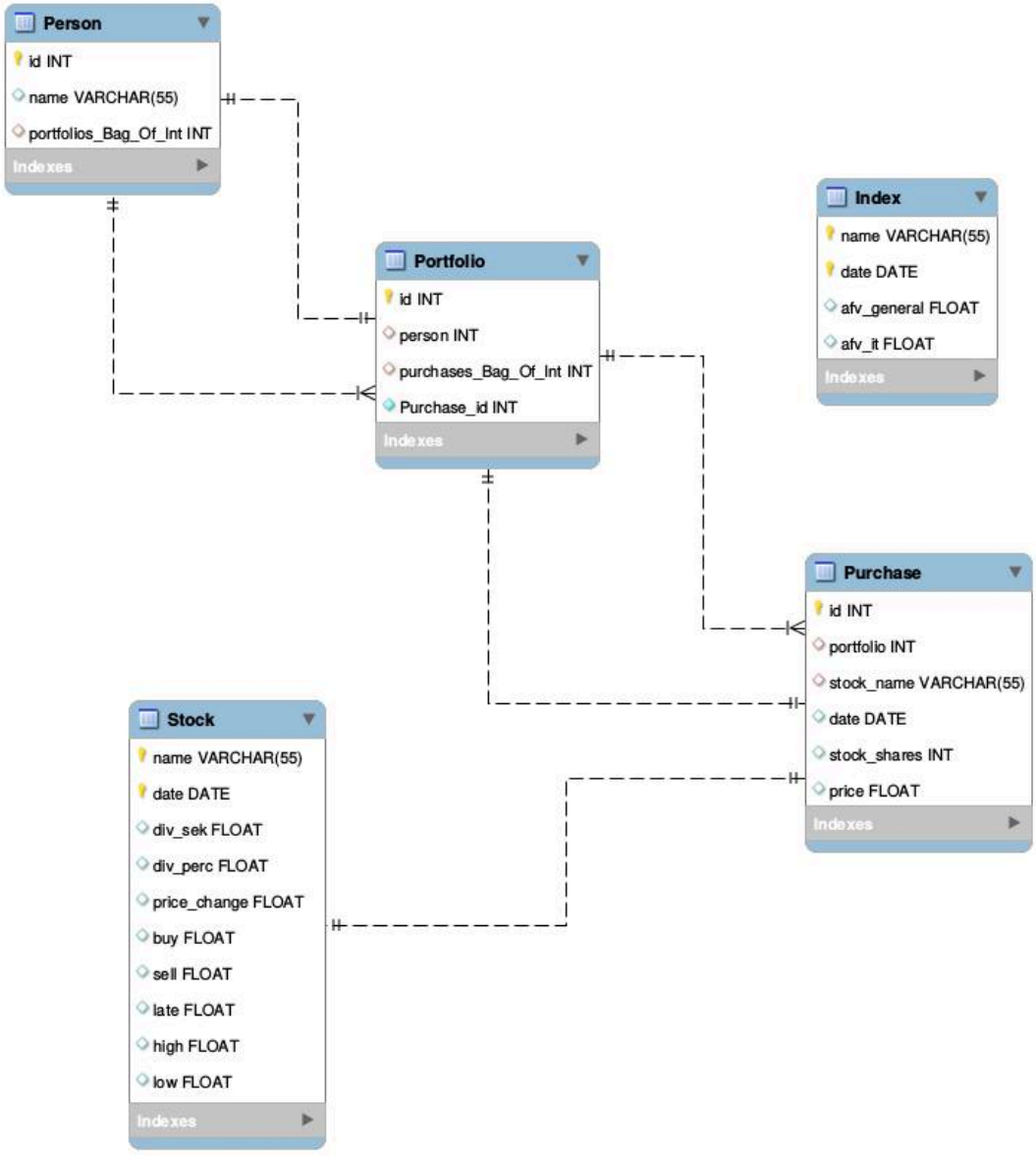
Schema Definition



MYSQL Workbench[4] application has been used in order to create the schema of our database. On the other hand, there are some differences between MYSQL and AMOSQL, related to this schema:

- Tables (MYSQL) → Types (AMOSQL)
- Int (MYSQL) → Integer (AMOSQL)
- Float (MYSQL) → Real (AMOSQL)
- Varchar (MYSQL) → Charstring (AMOSQL)
- Bags, which are unordered sets of objects with duplicates allowed, can be used in AMOSQL

[4] `http://www.mysql.com/products/workbench/`

Stored Data

date	div_sek	div_perc	price_change	buy	sell	late	high	low
|2003-11-26|	6.12	1.1	-3	347	347.5	347.5	352	345
|2003-11-27|	6.12	1.1	1	348	348.5	348.5	349.5	346.5
|2003-11-28|	6.12	1.1	-1	347	347.5	347.5	348.5	343
|2003-12-01|	6.12	1.1	0	347.5	348	347.5	349	343.5
|2003-12-02|	6.12	1.1	-5	342.5	343	342.5	351	342
|2003-12-03|	6.12	1.1	2.5	345	345.5	345	349	343
|2003-12-04|	6.12	1.6	0	345	345.5	345	349.5	344
|2003-12-05|	6.12	1.1	-2.5	342.5	343	342.5	347	341
|2003-12-08|	6.12	1.6	-5	337.5	338	337.5	342	337
|2003-12-09|	6.12	1.1	-1	336	336.5	336.5	341.5	335.5

Stock: “Astra Zeneca”

date	div_sek	div_perc	price_change	buy	sell	late	high	low
|2003-11-26|	0	0	-0.1	12.2	12.3	12.2	12.5	12.2
|2003-11-27|	0	0	0.2	12.3	12.4	12.4	12.4	12.2
|2003-11-28|	0	0	-0.2	12.2	12.3	12.2	12.5	12.2
|2003-12-01|	0	0	0.2	12.3	12.4	12.4	12.5	12.2
|2003-12-02|	0	0	0.1	12.5	12.6	12.5	12.7	12.4
|2003-12-03|	0	0	0	12.5	12.6	12.5	12.7	12.4
|2003-12-04|	0	0	0.3	12.8	12.9	12.8	13	12.4
|2003-12-05|	0	0	-0.4	12.4	12.5	12.4	12.8	12.4
|2003-12-08|	0	0	-0.3	12.1	12.2	12.1	12.3	12
|2003-12-09|	0	0	-0.3	11.8	11.9	11.8	12.4	11.8

Stock: “Ericsson B”

date	div_sek	div_perc	price_change	buy	sell	late	high	low
|2003-11-26|	2.57	1.9	0	136	136.5	136	138	135.5
|2003-11-27|	2.57	1.8	0.5	136.5	137	136.5	137.5	136
|2003-11-28|	2.57	1.9	-0.5	136	136.5	136	137.5	135
|2003-12-01|	2.57	1.9	0	135.5	136	136	137.5	134.5
|2003-12-02|	2.57	1.9	-0.5	135.5	136	135.5	137.5	135
|2003-12-03|	2.57	1.9	-1	134.5	135	134.5	136.5	134
|2003-12-04|	2.57	1.8	2.5	137	137.5	137	138	134.5
|2003-12-05|	2.57	1.9	-3	133.5	134	134	136.5	133
|2003-12-08|	2.57	1.9	-3.5	130.5	131	130.5	133	130.5
|2003-12-09|	2.57	1.9	-1.5	129	129.5	129	132	129

Stock: “Nokia SDB”

date	div_sek	div_perc	price_change	buy	sell	late	high	low
|2003-11-26|	0.3	1.3	-0.7	23.7	23.8	23.7	24.6	23.6
|2003-11-27|	0.3	1.2	1.9	25.5	25.6	25.6	25.6	23.4
|2003-11-28|	0.3	1.2	-0.1	25.5	25.6	25.5	25.9	24.8
|2003-12-01|	0.3	1.1	0.7	26.2	26.3	26.2	26.9	25.8
|2003-12-02|	0.3	1.1	0.9	27	27.1	27.1	27.4	26.8
|2003-12-03|	0.3	1.1	-0.5	26.6	26.7	26.6	27.4	26.6
|2003-12-04|	0.3	1.1	-0.2	26.3	26.4	26.4	26.9	25.7
|2003-12-05|	0.3	1.1	0.3	26.7	26.8	26.7	26.7	26.1
|2003-12-08|	0.3	1.1	-0.5	26.1	26.2	26.2	26.6	26.1
|2003-12-09|	0.3	1.2	-0.3	25.8	25.9	25.9	26.5	25.5

Stock: “Skandia”

date	div_sek	div_perc	price_change	buy	sell	late	high	low
|2003-11-26|	8	4.7	-2	214.5	215	214.5	218	214.5
|2003-11-27|	8	4.6	4.5	218.5	219	219	219	215
|2003-11-28|	8	4.6	-0.5	218	218.5	218.5	220	217.5
|2003-12-01|	8	4.6	-1.5	216.5	217	217	219	216
|2003-12-02|	8	4.6	-1.5	215	215.5	215.5	218.5	214.5
|2003-12-03|	8	4.6	2	217.5	218	217.5	218	216
|2003-12-04|	8	3.6	5	222	222.5	222.5	223.5	217
|2003-12-05|	8	4.6	-1.5	220	221	221	224	219.5
|2003-12-08|	8	3.7	-3	218	218.5	218	219.5	217
|2003-12-09|	8	3.6	2.5	220	220.5	220.5	221	219

Stock: “Volvo B”

date	afv_general	afv_it
|2003-11-26|	181.24	65.40
|2003-11-27|	183.4	65.57
|2003-11-28|	182.73	66.55
|2003-12-01|	184.40	67.75
|2003-12-02|	184.69	67.73
|2003-12-03|	185.24	68.40
|2003-12-04|	186.12	68.39
|2003-12-05|	185.47	67.80
|2003-12-08|	183.62	67.31
|2003-12-09|	184.7	68.34

Index: “Affarsvarldens”

id	name	portfolios
1	“Efthymia Chantzi”	(1)
2	“Huijie Shen”	(2)
3	“Eleftherios Anagnostopoulos”	(3)

Person

id	person	purchases
1	1	(1, 2, 3)
2	2	(4, 5)
3	3	(6)

Portfolio

id	portfolio	stock_name	date	stock_shares	price
1	1	“Astra Zeneca”	|2003-11-26|	500	347.25
2	1	“Ericsson B”	|2003-12-02|	100	12.55
3	1	“Astra Zeneca”	|2003-12-05|	1000	342.75
4	2	“Skandia”	|2003-11-27|	500	137.25
5	2	“Nokia SDB”	|2003-12-04|	2500	137.25
6	3	“Volvo B”	|2003-12-01|	5000	216.75

Purchase

Query 1

Description: What days did a stock have a positive price change?

Function: query1(Charstring stock_name) → Bag of Date

AmosQL 1> query1("Ericsson B");

|2003-11-27|

|2003-12-01|

|2003-12-02|

|2003-12-04|

Query 2

Description: What has been the difference between buy and sell price for a stock for each day in a period of time?

Function: function query2(Charstring stock_name, Date dateFrom, Date dateTo) → Bag of (Date, Real)

AmosQL 2> query2("Volvo B", |2003-11-26|, |2003-12-06|);

(|2003-11-26|, -0.5)

(|2003-11-27|, -0.5)

(|2003-11-28|, -0.5)

(|2003-12-01|, -0.5)

(|2003-12-02|, -0.5)

(|2003-12-03|, -0.5)

(|2003-12-04|, -0.5)

(|2003-12-05|, -1)

Query 3

Description: What is the values of the stocks in a portfolio at a given date?

Function: function query3(Portfolio portfolio, Date date) → Bag of (Charstring, Real)

Note: Value of a stock in a portfolio is considered as the late value of the stock multiplied by the number of the shares of this stock.

AmosQL 3> query3(:port1, |2003-12-09|);

("Astra Zeneca", 504750.0)

("Ericsson B", 1180.0)

Query 4

Description: What is the current value of a whole portfolio. Consider the value for the latest day in the database as a current value?

Function: function query4(Portfolio portfolio) → Real

AmosQL 4> query4(:port1);

505930.0

Query 5

Description: Development of every stock from a portfolio and development of a portfolio in Swedish kronor (SEK) or corresponding currency, percentage, and in comparison to some index. The development is taken with respect to some period of time.

Functions:

Development of every stock of a portfolio: query5a(Portfolio portfolio, Date dateFrom, Date dateTo) → (Charstring, Real, Real)

Development of the whole portfolio: query5b(Portfolio portfolio, Date dateFrom, Date dateTo) → (Real, Real)

Comparison to an index: query5c(Portfolio portfolio, Date dateFrom, Date dateTo, Charstring indexName) → (Real, Real)

AmosQL 5> query5a(:port1, |2003-11-26|, |2003-12-09|);

("Astra Zeneca", -11.0, -3.16546762589928)

("Ericsson B", -0.399999999999999, -3.27868852459015)

AmosQL 6> query5b(:port1, |2003-12-08|, |2003-12-09|);

(-1530.0, -0.301501596184921)

AmosQL 7> query5c(:port1, |2003-12-08|, |2003-12-09|, "Affarsvarldens");

(-0.301501596184921, 0.588171223178294)

Query 6

Description: Compare development of one stock to another.

Function: query6(Charstring stock_name1, Charstring stock_name2, Date dateFrom, Date dateTo) → (Real, Real)

AmosQL 8> query6("Astra Zeneca", "Ericsson B", |2003-12-08|, |2003-12-09|);

(-1.0, -0.299999999999999)

Query 7 - Group Selection

Description: Return the name of the person who has spent the maximum amount, in order to buy stock shares, in a specified period.

Function: query7(Date dateFrom, Date dateTo) → Charstring

AmosQL 9> query7(|2003-12-01|, |2003-12-09|);

"Eleftherios Anagnostopoulos"

Query 8 - Group Selection

Description: Given a specific amount, return for each stock the number of shares that can be bought, and a prediction of possible profits/losses during the next two weeks, based on stock's behavior during the last two weeks.

Function: query8(Real amount) → (Charstring, Integer, Real)

AmosQL 10> query8(10000.00);

("Astra Zeneca", 29, -319.0)

("Ericsson B", 847, -338.799999999999)

("Nokia SDB', 77, -539)

("Skandia", 386, 849.2)

("Volvo B", 45, 270.0)