CoCoALib - Feature #37

matrix constructors

30 Nov 2011 08:25 - Anna Maria Bigatti

Status:	Closed	**Start date:**	02 Nov 2011
Priority:	High	**Due date:**	
Assignee:	John Abbott	**% Done:**	100%
Category:	Data Structures	**Estimated time:**	5.00 hours
Target version:	CoCoALib-0.99560	**Spent time:**	1.00 hour

Description

Comments about matrix constructors: mainly "ring or not ring?"

IdentityMat(QQ,2), **ZeroMat(QQ,2,4)**, **ConcatHor**, **ConcatVer**,
MatrixByRows, **MatrixByCols**, ...

Related issues:

Related to CoCoA-5 - Feature #309: (Multi)BlockMatrix	**Closed**	**13 Feb 2013**
Related to CoCoA-5 - Design #1116: Port RowMat, ColMat, MatByRows,... to CoCoA-5	**New**	**06 Nov 2017**

History

#1 - 30 Nov 2011 08:31 - Anna Maria Bigatti

- Subject changed from matrix constructor to matrix constructors

JAA: C4 has a function for creating an identity matrix. It also has a means of creating a zero matrix (of specified dimensions, **NewMat**). Presumably similar functions should exist in C5.

AMB: **IdentityMat(QQ,2);** and **ZeroMat(QQ,2,4);** [both in CoCoA-5 and in CoCoALib]
Should we have **ZeroMat(ZZ,3);** as a shortcut for **ZeroMat(ZZ,3,3);**?

JAA: If (when?) C5 has automatic promotion of ring elements then these functions can safely return a matrix over ZZ; otherwise the ring in which the entries reside will have to be specified explicitly as an argument.

JAA: What would a function such as **ConcatHor** or **ConcatVer** or **BlockMatrix** do when given matrices whose elements belong to different rings? Will automatic promotion occur here too?

JAA: Just a quick comment about the alternative matrix constructors **MatrixByRows** and **MatrixByCols**. JAA believes that *both matrix dimensions* should be given explicitly when using these ctors: at least one of the dimensions *must* be given explicitly, and to avoid doubt and confusion about which one, it seems simplest to require both (their product can also be used to check that the supplied list of entry values has the correct length). The presence or absence of an argument specifying the ring should be as for the standard matrix ctor (currently JAA+AMB are tending toward not specifying explicitly the ring).

AMB: **MakeMatByRows(2,3,[1,2,3,4,5,6]);** [in CoCoA-5]

JAA: Consider the example below:

```
R ::= QQ[x,y,z];
M := matrix(R,[[1,x],[1,y]]);
Use S ::= ZZ/(7)[x,y];
M := matrix(R,[[1,x],[1,y]]); // cut-and-pasted
```

The creation of the matrix M will not work as one might reasonably expect (i.e. creating a matrix whose entries are in R): it will produce an error.
If the ring were not supplied as an argument then M would contain a matrix whose entries lie in S; this might be what was wanted, but it is different from the original matrix!

Here's another example which is close to a "nasty surprise":

```
R ::= QQ[x,y];
Use S ::= QQ[a,b];
```

```
x := 2; y := 3;
M := matrix(R,[[1,x],[1,y]]); // cut-and-pasted
```

Here the matrix construction will presumably succeed, but will not produce the original matrix. It is also easy to create examples producing the wrong result, if we change the definition of the ring R...

#2 - 30 Nov 2011 09:07 - Anna Maria Bigatti

- Category set to Philosophy

#3 - 28 Apr 2017 11:11 - Anna Maria Bigatti

- Project changed from CoCoA to CoCoALib

- Category deleted (Philosophy)

- Target version set to CoCoALib-0.99560

This issue was under "CoCoA" instead of "CoCoALib".
I'm recovering these old and forgotten issues, so we reconsider them.

#4 - 06 Nov 2017 14:31 - John Abbott

- Category set to Data Structures

This issue is a bit strange -- it is now quite old, and of questionable relevance now.

Perhaps we should just close it?

#5 - 06 Nov 2017 14:41 - Anna Maria Bigatti

- % Done changed from 50 to 90

MatByRows/**Cols** is now available in CoCoALib.

All other questions have been dealt with, more or less directly.

#6 - 06 Nov 2017 15:29 - Anna Maria Bigatti

- Related to Design #1116: Port RowMat, ColMat, MatByRows,... to CoCoA-5 added

#7 - 15 Dec 2017 15:18 - John Abbott

- Status changed from In Progress to Closed

- % Done changed from 90 to 100