UML Class Diagrams

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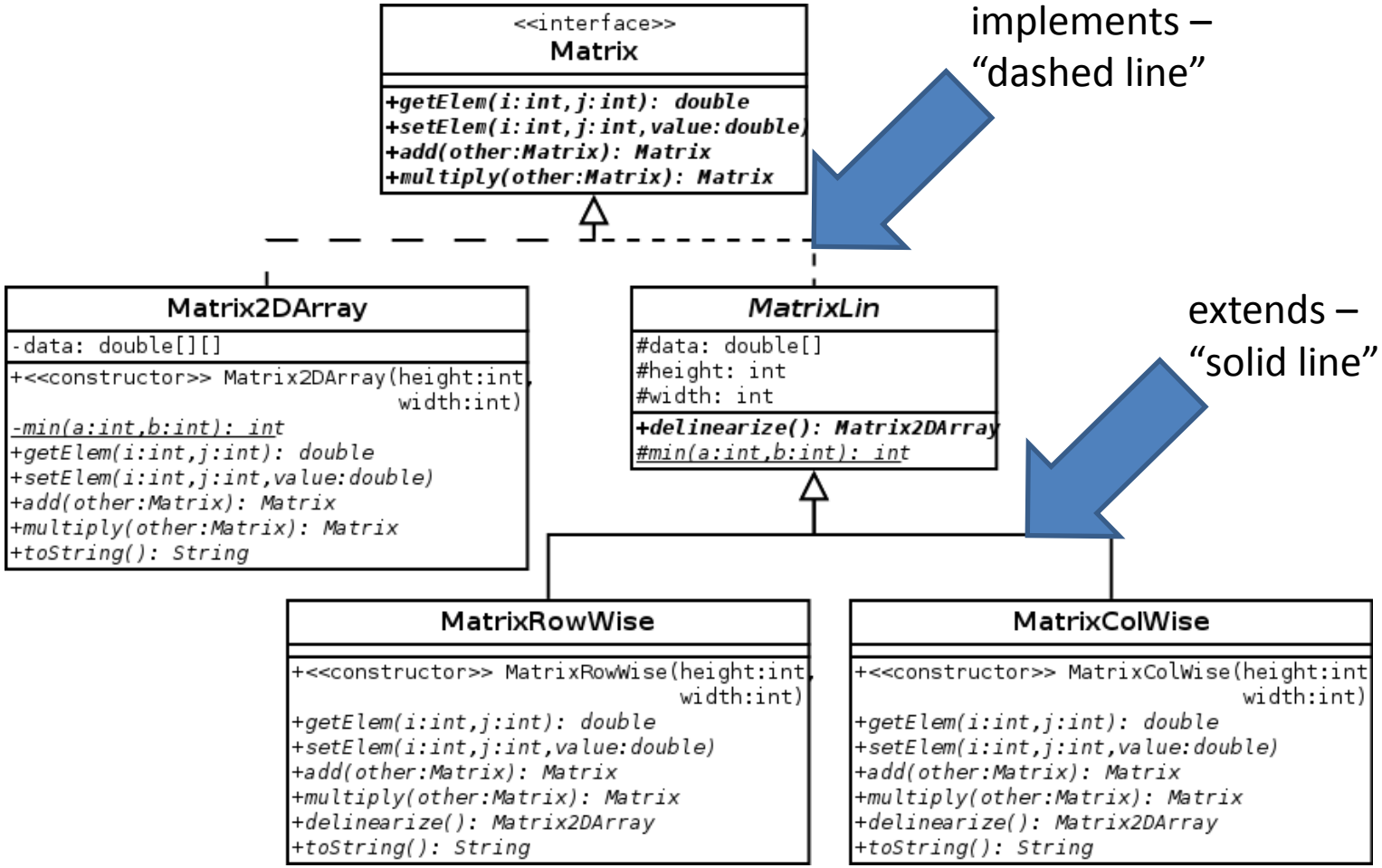
Unified Modeling Language

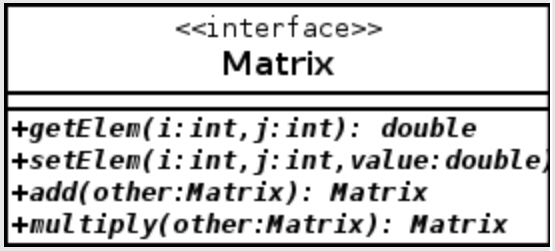
- standard way of drawing diagrams representing programs' structure and behaviour
- includes a way to draw diagrams of classes and class hierarchies
- code (e.g. Java code) is translated into diagram

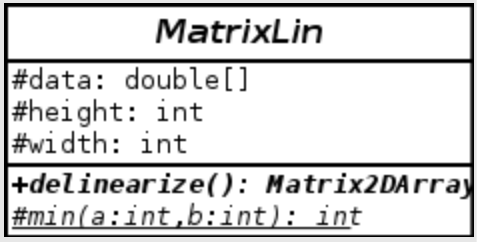
Implements and Extends

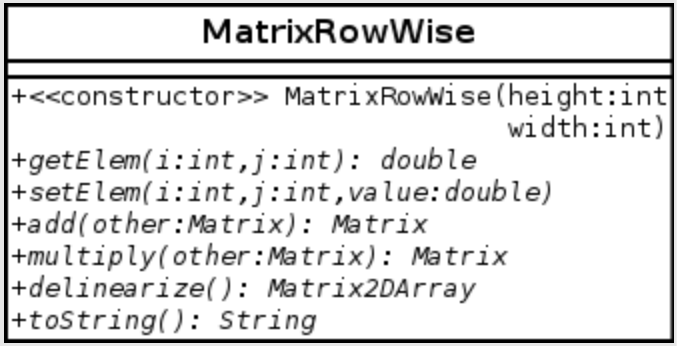


Interface, Abstract Class, Class

Interface	Abstract Class	Class
write <<interface>>	written in *italics*	written upright (normally)

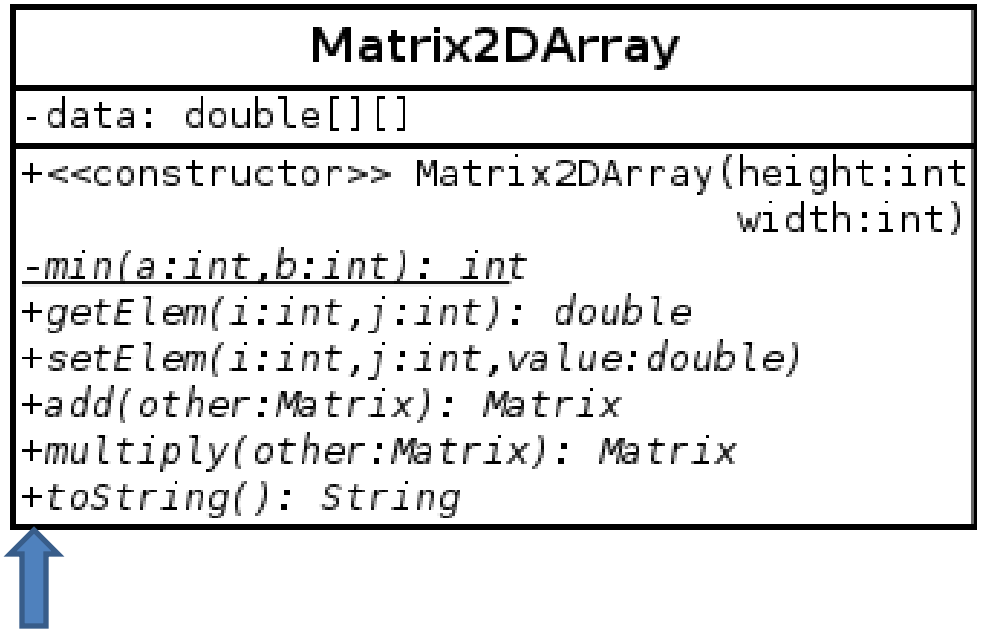


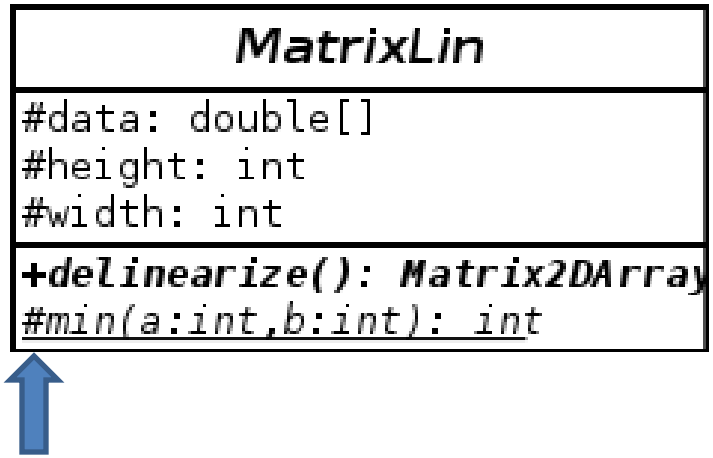




Access Modifiers

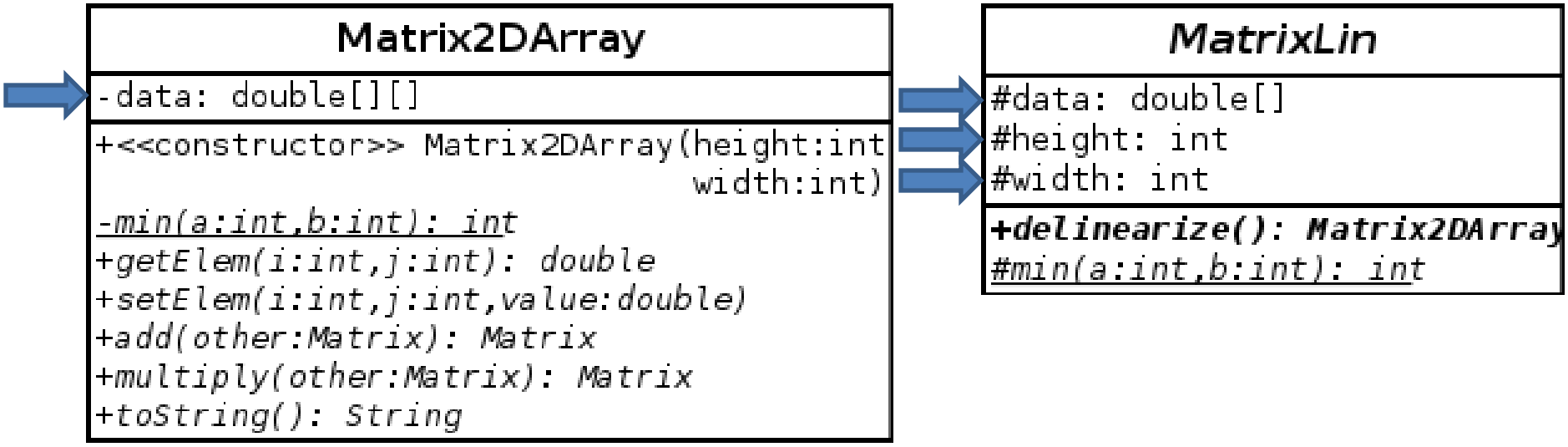
- + means public
- - means private
- # means protected





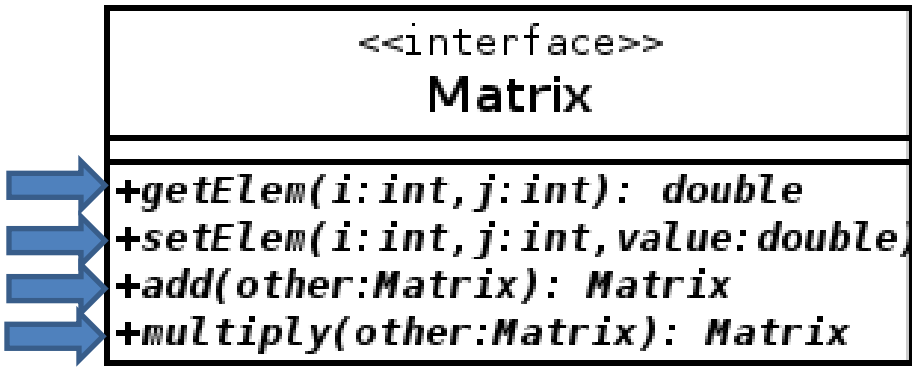
Fields

- written in regular font
- syntax is `name: type`
  - e.g. "`private double[][] data;`" becomes "`-data: double[][]`"



Abstract Methods

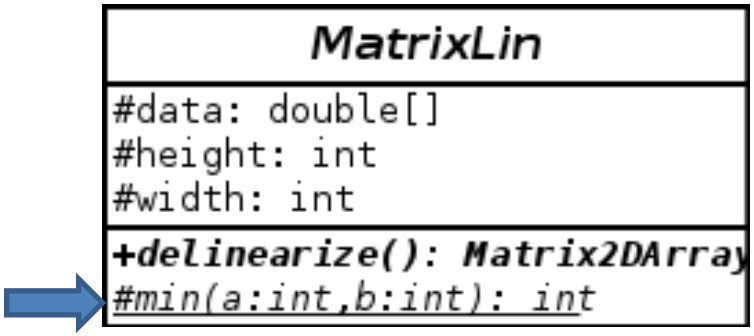
- written in ***bold italic***
- return types come after (nothing for `void`)




```
interface Matrix {
    public double getElem(int i, int j);
    public void setElem(int i, int j, double value);
    public Matrix add(Matrix other);
    public Matrix multiply(Matrix other);
}
```

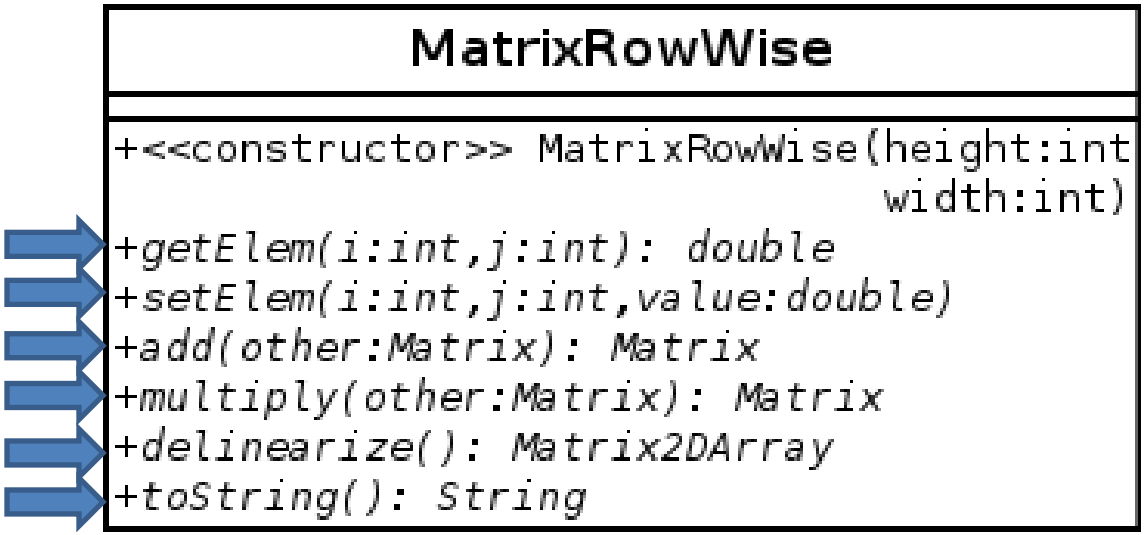
Implemented Methods

- written in *italic*
- implementations not shown in class diagrams
- static fields/methods are underlined




```
abstract class MatrixLin implements Matrix {
    protected double[] data;
    protected int height, width;
    public abstract Matrix2DArray delinearize();
    protected static int min(int a, int b) { ... }
}
```

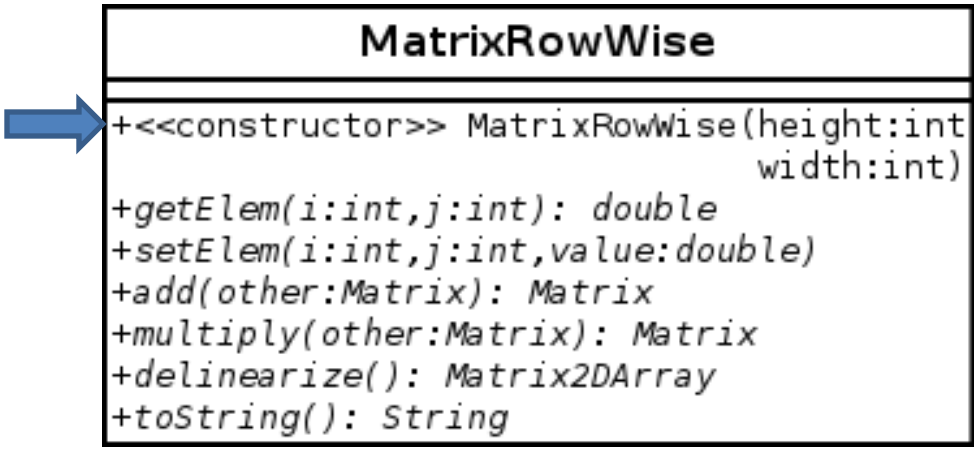
More Implemented Methods




```
class MatrixRowWise extends MatrixLin {
    public MatrixRowWise(int height, int width) { ... }
    public double getElem(int i, int j) { ... }
    public void setElem(int i, int j, double value) { ... }
    public Matrix add(Matrix other) { ... }
    public Matrix multiply(Matrix other) { ... }
    public Matrix2DArray delinearize() { ... }
    public String toString() { ... }
}
```

Contructors

- prepend `<<constructor>>`




```
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    public MatrixRowWise(int height, int width) { ... }
    public double getElem(int i, int j) { ... }
    public void setElem(int i, int j, double value) { ... }
    public Matrix add(Matrix other) { ... }
    public Matrix multiply(Matrix other) { ... }
    public Matrix2DArray delinearize() { ... }
    public String toString() { ... }
}
```
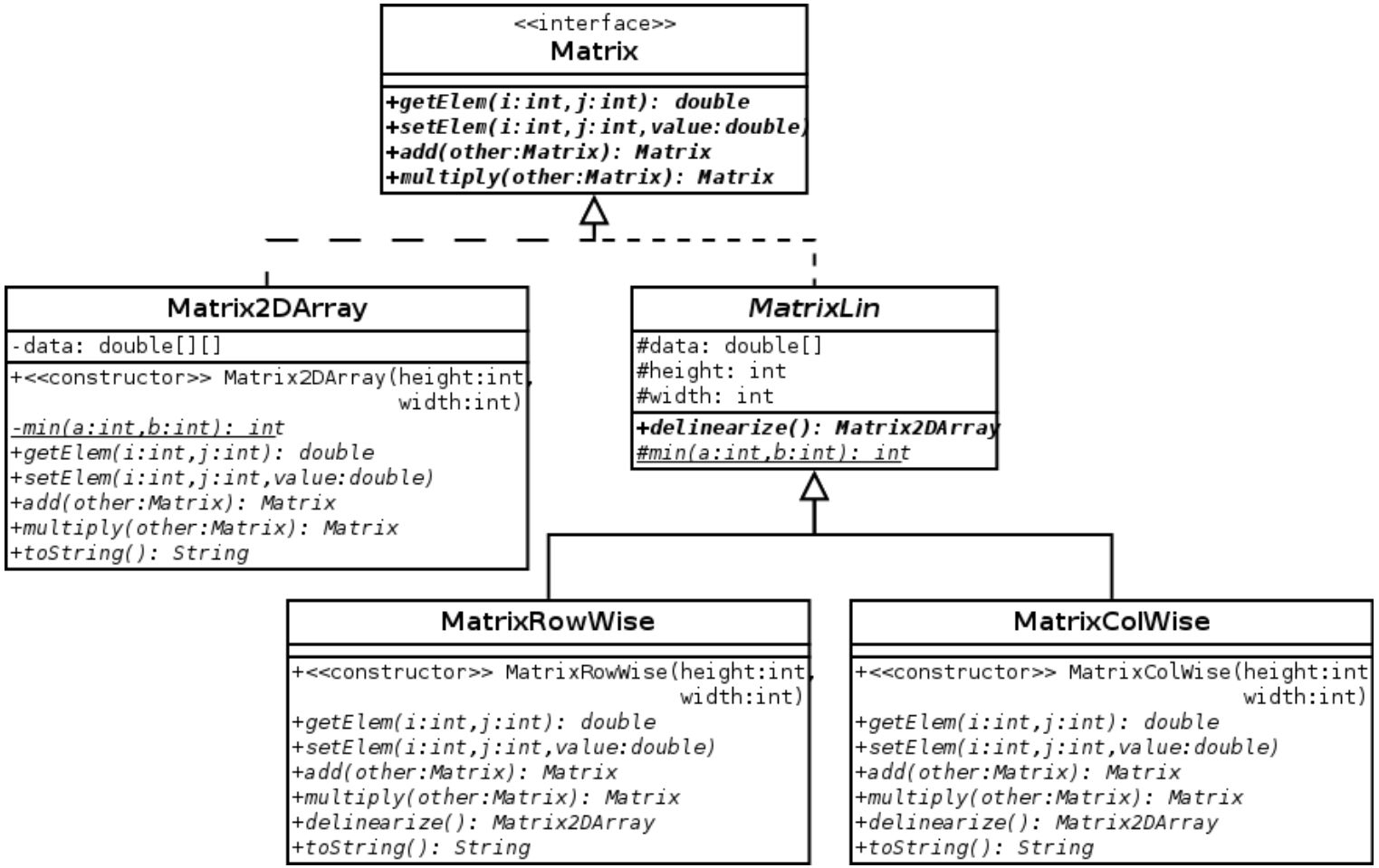
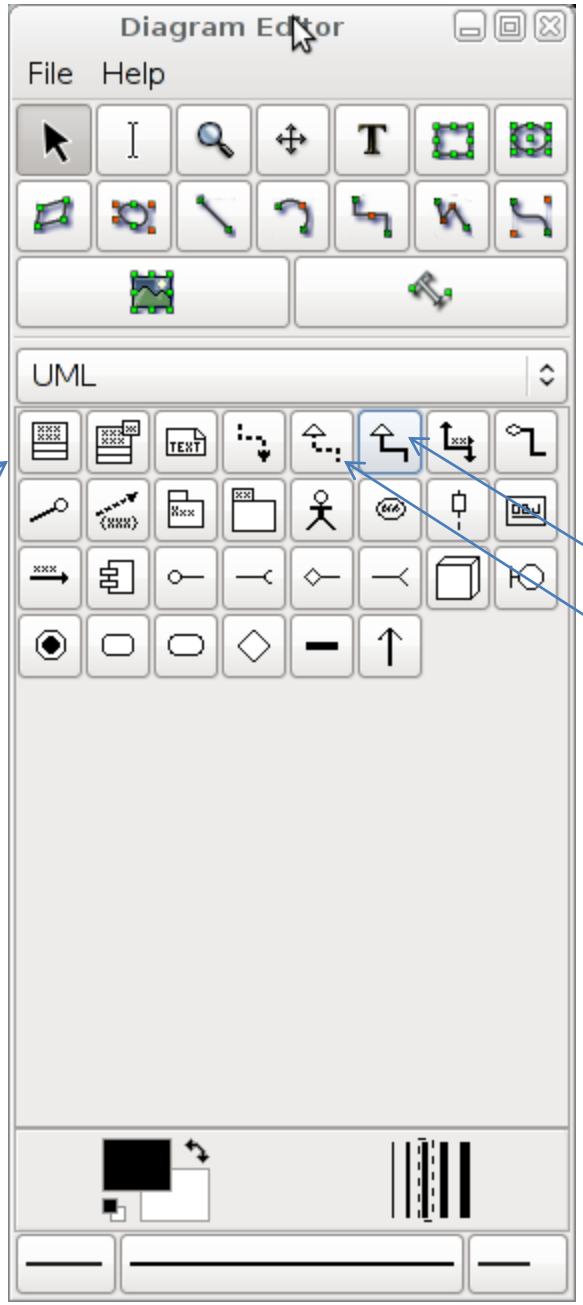

Class Hierarchy (again)



dia (Diagram Editor)

- easy way of creating class diagrams
- create classes and relationships
- double-click on class to get a self-explanatory dialog that lets you modify it
- Google for anything that's unclear
- can export to PNG or PDF (PNG is a bit more straightforward)
- you can use any software you wish



create class or interface
HINT: modify "stereotype" for interfaces

extends

implements