

# Solvers for Mathematical Programming



## Cplex Callable Libraries

- C API towards *LP/QP/MIP/MIQP* algorithms
- Basic objects: **Environment** and **Problem**
- **Environment**: license, optimization parameters ...
- **Problem**: contains problem information: variables, constraints ...)
- (at least one) environment and problem must be created

`CPXENVptr` `CPXopenCPLEX` / `CPXcloseCPLEX`

`CPXLPptr` `CPXcreateprob` / `CPXfreeprob`

2.18

## Cplex API functions

- The two objects can be accessed (e.g. to add variables or constraints, or to solve a problem) via the functions provided by the API
- (Almost) all the API functions can be called as

```
int CPXfuncName (environment[,problem],...);
```

Error code (0=ok)  
CPXgeterrorstring returns a  
description of the error

Basic objects

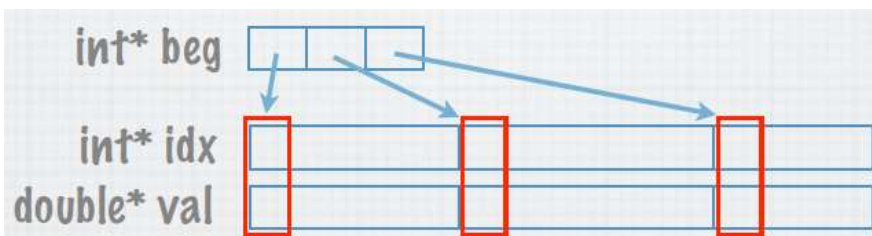
Parameters

`cpxmacro.h`

2.19

## Sparse matrix representation

- Sparse matrix: many zero entries
- Compact representation:
  - Explicit representation of “nonzeroes”
  - Linearization into indexes (**idx**) and values (**val**) vectors
  - A third vector to indicate where rows begins (**beg**)



`addrow.xls`

2.20