Seminar demonstration files

Overlays (II)

Denis Girou

June 2002

With Acroread, CTRL-L switch between full screen and window mode

Demonstration of overlays (ii)

1 – Introduction

☞ If the talk is related to computing science, we must often show the contents of some programs. The 'listings' package is very useful and powerful for such tasks, used alone or both with the 'fancyvrb' one as we do here.

☞ This is also useful to be able to use overlays to emphasize some lines of the codes. This is possible both with 'fancyvrb' and 'listings'[a], using their escape mechanisms to execute some commands put inside verbatim material.

☞ We also add a macro to be able to put annotations on a text previously shown. This is specially useful to comment interactively things like equations and codes, putting them also in overlays. We give examples for this two cases.

[a] Thanks to Carsten HEINZ to have added in his package a special mechanism to interact with the overlay feature of Seminar.

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

$$\Pi$$

End of slide

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

$$\Pi = \sqrt{6}$$

= 2.44949

End of slide

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

= 2.44949

$$\Pi = \sqrt{6} \times \sqrt{}$$

End of slide

Demonstration of overlays (ii)

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

$$\Pi = \sqrt{6} \times \sqrt{1}$$

= 2.44949

1 $\Longrightarrow$ 2.44949

End of slide

Demonstration of overlays (ii)

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

$$\Pi = \sqrt{6} \times \sqrt{1 + \frac{1}{4}}$$

= 2.44949

1 $\Longrightarrow$ 2.44949

1.25 $\Longrightarrow$ 2.73861

End of slide

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

= 2.44949

$$\Pi = \sqrt{6} \times \sqrt{1 + \frac{1}{4} + \frac{1}{9}}$$

1 $\Longrightarrow$ 2.44949

1.25 $\Longrightarrow$ 2.73861

1.36111 $\Longrightarrow$ 2.85774

End of slide

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

= 2.44949

$$\Pi = \sqrt{6} \times \sqrt{1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16}}$$

1 $\Longrightarrow$ 2.44949

1.25 $\Longrightarrow$ 2.73861

1.36111 $\Longrightarrow$ 2.85774

1.42361 $\Longrightarrow$ 2.92261

End of slide

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

= 2.44949

$$\Pi = \sqrt{6} \times \sqrt{1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \cdots}$$

1 $\Longrightarrow$ 2.44949

1.25 $\Longrightarrow$ 2.73861

1.36111 $\Longrightarrow$ 2.85774

1.42361 $\Longrightarrow$ 2.92261

End of slide

Demonstration of overlays (ii)

2 – Equations with (cumulative) annotations

A formula for Π from Leonhard Euler

$$\Pi = \sqrt{6} \times \sqrt{1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \cdots}$$

= 2.44949

1 $\Longrightarrow$ 2.44949

1.25 $\Longrightarrow$ 2.73861

1.36111 $\Longrightarrow$ 2.85774

1.42361 $\Longrightarrow$ 2.92261

$$= \left(6 \sum_{n=1}^{\infty} \frac{1}{n^2}\right)^{\frac{1}{2}}$$

End of slide

3 – Listing with (progressive) annotations

☞ From a manual to introduce to parallel programming with the MPI library

☞ First with overlays but without annotations, just using the features of the ‘fancyvrb’ package

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code






  print *,'I am process ',rank,' among ',nb_procs


end program WhoAmI
```

End of slide

3 – Listing with (progressive) annotations

- From a manual to introduce to parallel programming with the MPI library
- First with overlays but without annotations, just using the features of the ‘fancyvrb’ package

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',rank,' among ',nb_procs


end program WhoAmI
```

End of slide

3 – Listing with (progressive) annotations

- ☞ From a manual to introduce to parallel programming with the MPI library
- ☞ First with overlays but without annotations, just using the features of the ‘fancyvrb’ package

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

3 – Listing with (progressive) annotations

- ☞ From a manual to introduce to parallel programming with the MPI library
- ☞ First with overlays but without annotations, just using the features of the ‘fancyvrb’ package

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)


  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

3 – Listing with (progressive) annotations

- From a manual to introduce to parallel programming with the MPI library

- First with overlays but without annotations, just using the features of the ‘fancyvrb’ package

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

- Then the same code, but using both the features of the ‘fancyvrb’ and ‘listings’ packages, with an automatic *pretty printing* of the code, after definition of a new language to emphasize the MPI-1 constants and subroutines (see the file `lstlang0.sty`)
- We could also use the ‘listings’ package alone

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code






  print *,'I am process ',rank,' among ',nb_procs


end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

- Then the same code, but using both the features of the ‘fancyvrb’ and ‘listings’ packages, with an automatic *pretty printing* of the code, after definition of a new language to emphasize the MPI-1 constants and subroutines (see the file `lstlang0.sty`)
- We could also use the ‘listings’ package alone

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',rank,' among ',nb_procs


end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

- Then the same code, but using both the features of the ‘fancyvrb’ and ‘listings’ packages, with an automatic *pretty printing* of the code, after definition of a new language to emphasize the MPI-1 constants and subroutines (see the file `lstlang0.sty`)

- We could also use the ‘listings’ package alone

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

☞ Then the same code, but using both the features of the ‘fancyvrb’ and ‘listings’ packages, with an automatic *pretty printing* of the code, after definition of a new language to emphasize the MPI-1 constants and subroutines (see the file `lstlang0.sty`)

☞ We could also use the ‘listings’ package alone

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)


  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

- Then the same code, but using both the features of the ‘fancyvrb’ and ‘listings’ packages, with an automatic *pretty printing* of the code, after definition of a new language to emphasize the MPI-1 constants and subroutines (see the file `lstlang0.sty`)
- We could also use the ‘listings’ package alone

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

☞ And now always the same code, but adding external annotations, using PSTricks nodes. This time, all annotations are shown together, without using overlays.

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment (→ `call MPI_INIT(code)`)

Number of processes for the current execution (→ `nb_procs`)

Rank of the process among all of them (→ `rank`)

Exit of MPI environment (→ `call MPI_FINALIZE(code)`)

End of slide

Demonstration of overlays (ii)

☞ Then finally the same code again, with the same annotations, but shown in a progressive way, using overlays

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

☞ Then finally the same code again, with the same annotations, but shown in a progressive way, using overlays

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

End of slide

Demonstration of overlays (ii)

☞ Then finally the same code again, with the same annotations, but shown in a progressive way, using overlays

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Number of processes for the current execution

End of slide

Demonstration of overlays (ii)

☞ Then finally the same code again, with the same annotations, but shown in a progressive way, using overlays

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Rank of the process among all of them

End of slide

Demonstration of overlays (ii)

☞ Then finally the same code again, with the same annotations, but shown in a progressive way, using overlays

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Exit of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code






  print *,'I am process ',     ,' among ',


end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',    ,' among ',


end program WhoAmI
```

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',    ,' among ',


end program WhoAmI
```

Initialization of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',    ,' among ',

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)




  print *,'I am process ',    ,' among ',

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment (→ `MPI_INIT`)

Exit of MPI environment (→ `MPI_FINALIZE`)

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)


  print *,'I am process ',    ,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

Exit of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)


  print *,'I am process ',    ,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

Number of processes for the current execution

Exit of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

Number of processes for the current execution

Exit of MPI environment

End of slide

Demonstration of overlays (ii)

4 – (Cumulative) listing with (cumulative) annotations (I)

```
program WhoAmI
  implicit none
  include 'mpif.h'
  integer :: nb_procs,rank,code

  call MPI_INIT(code)

  call MPI_COMM_SIZE(MPI_COMM_WORLD,nb_procs,code)
  call MPI_COMM_RANK(MPI_COMM_WORLD,rank,code)

  print *,'I am process ',rank,' among ',nb_procs

  call MPI_FINALIZE(code)
end program WhoAmI
```

Initialization of MPI environment

Number of processes for the current execution

Rank of the process among all of them

Exit of MPI environment

End of slide

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

End of slide

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

File of CORBA required headers

End of slide

Demonstration of overlays (ii)

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

File of CORBA required headers

File of headers relative to the skeleton generated from the IDL interface by the IDL compiler

End of slide

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

File of CORBA required headers (→ `#include <OB/CORBA.h>`)

File of headers relative to the skeleton generated from the IDL interface by the IDL compiler (→ `#include <export_skel.h>`)

The class `ClassMatrix` must now be known inside the CORBA POA (→ `class ClassMatrix : virtual public POA_Exporte {`)

End of slide

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

File of CORBA required headers (→ `#include <OB/CORBA.h>`)

File of headers relative to the skeleton generated from the IDL interface by the IDL compiler (→ `#include <export_skel.h>`)

The class `ClassMatrix` must now be known inside the CORBA POA (→ `class ClassMatrix : virtual public POA_Exporte {`)

Constructor (→ `ClassMatrix(double init);`)

End of slide

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

- *File of CORBA required headers*
- *File of headers relative to the skeleton generated from the IDL interface by the IDL compiler*
- *The class `ClassMatrix` must now be known inside the CORBA POA*
- *Constructor*
- *Destructor*

End of slide

Demonstration of overlays (ii)

5 – Listing with (cumulative) annotations (II)

☞ From a manual to introduce to distributed programming with CORBA

```
#include <iostream.h>
#include <fstream.h>

#include <OB/CORBA.h>
#include <export_skel.h>

class ClassMatrix : virtual public POA_Exporte {

 private :
  TypeMatrix A;

 public :
  ClassMatrix(double init);
  ~ClassMatrix();

  virtual void MultiplyVector(CORBA::Double    alpha,
                              TypeVector_slice *vector)
    throw(CORBA::SystemException);
};
```

File of CORBA required headers (→ `#include <OB/CORBA.h>`)

File of headers relative to the skeleton generated from the IDL interface by the IDL compiler (→ `#include <export_skel.h>`)

The class `ClassMatrix` must now be known inside the CORBA POA (→ `class ClassMatrix : virtual public POA_Exporte {`)

Constructor (→ `ClassMatrix(double init);`)

Destructor (→ `~ClassMatrix();`)

Definition of a service to multiply a matrix by a scalar and a vector, with a management of the exceptions done by CORBA (→ `virtual void MultiplyVector(...) throw(CORBA::SystemException);`)

End of slide

Demonstration of overlays (ii)

```
// Implementation of the methods

ClassMatrix::ClassMatrix(double cste) {
  long long i, j;

  for (i = 0; i < N; i++) {
    for (j = 0; j < N; j++) {
      A[i][j] = 0.0;}}
  for (i = 0; i < N; i++) {
      A[i][i] = cste;}
}

ClassMatrix::~ClassMatrix() {
  cout << "Destruction of the object" << endl;
}

void ClassMatrix::MultiplyVector(CORBA::Double    alpha,
                                 TypeVector_slice *vector)
  throw(CORBA::SystemException) {

  long long i, j;
  TypeVector tmp;

  for (i = 0; i < N; i++) {
    tmp[i] = 0.0;
    for (j = 0; j < N; j++) {
      tmp[i] = tmp[i] + alpha * A[i][j] * vector[j];
    }
  }
  for (i = 0; i < N; i++) vector[i] = tmp[i];
}
```

End of slide

Demonstration of overlays (ii)


```
// Implementation of the methods

ClassMatrix::ClassMatrix(double cste) {
  long long i, j;

  for (i = 0; i < N; i++) {
    for (j = 0; j < N; j++) {
      A[i][j] = 0.0;}}
  for (i = 0; i < N; i++) {
      A[i][i] = cste;}
}

ClassMatrix::~ClassMatrix() {
  cout << "Destruction of the object" << endl;
}

void ClassMatrix::MultiplyVector(CORBA::Double    alpha,
                                 TypeVector_slice *vector)
  throw(CORBA::SystemException) {

  long long i, j;
  TypeVector tmp;

  for (i = 0; i < N; i++) {
    tmp[i] = 0.0;
    for (j = 0; j < N; j++) {
      tmp[i] = tmp[i] + alpha * A[i][j] * vector[j];
    }
  }
  for (i = 0; i < N; i++) vector[i] = tmp[i];
}
```

Implementation of the constructor: initialization of the matrix to the identity matrix

End of slide

```
// Implementation of the methods

ClassMatrix::ClassMatrix(double cste) {
  long long i, j;

  for (i = 0; i < N; i++) {
    for (j = 0; j < N; j++) {
      A[i][j] = 0.0;}}
  for (i = 0; i < N; i++) {
      A[i][i] = cste;}
}

ClassMatrix::~ClassMatrix() {
  cout << "Destruction of the object" << endl;
}

void ClassMatrix::MultiplyVector(CORBA::Double    alpha,
                                 TypeVector_slice *vector)
  throw(CORBA::SystemException) {

  long long i, j;
  TypeVector tmp;

  for (i = 0; i < N; i++) {
    tmp[i] = 0.0;
    for (j = 0; j < N; j++) {
      tmp[i] = tmp[i] + alpha * A[i][j] * vector[j];
    }
  }
  for (i = 0; i < N; i++) vector[i] = tmp[i];
}
```

Implementation of the constructor: initialization of the matrix to the identity matrix

Implementation of the destructor: generally memory deallocation

End of slide

Demonstration of overlays (ii)


```
// Implementation of the methods

ClassMatrix::ClassMatrix(double cste) {
  long long i, j;

  for (i = 0; i < N; i++) {
    for (j = 0; j < N; j++) {
      A[i][j] = 0.0;}}
  for (i = 0; i < N; i++) {
      A[i][i] = cste;}
}

ClassMatrix::~ClassMatrix() {
  cout << "Destruction of the object" << endl;
}

void ClassMatrix::MultiplyVector(CORBA::Double    alpha,
                                 TypeVector_slice *vector)
  throw(CORBA::SystemException) {

  long long i, j;
  TypeVector tmp;

  for (i = 0; i < N; i++) {
    tmp[i] = 0.0;
    for (j = 0; j < N; j++) {
      tmp[i] = tmp[i] + alpha * A[i][j] * vector[j];
    }
  }
  for (i = 0; i < N; i++) vector[i] = tmp[i];
}
```

Implementation of the constructor: initialization of the matrix to the identity matrix

Implementation of the destructor: generally memory deallocation

Service to compute the product of a matrix (multiplied by a constant) with a vector, with a management of the exceptions done by CORBA

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB (callout pointing to the `CORBA::ORB_init` line)

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB

Declaration and initialization of the POA

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB

Declaration and initialization of the POA

Creation of an object `Matrix`

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB

Declaration and initialization of the POA

Creation of an object `Matrix`

Local characters string, used to store the generated reference

End of slide

Demonstration of overlays (ii)

```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB

Declaration and initialization of the POA

Creation of an object `Matrix`

Local characters string, used to store the generated reference

Writing of this server reference in the file `reference`

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

- Declaration and initialization of the ORB
- Declaration and initialization of the POA
- Creation of an object `Matrix`
- Local characters string, used to store the generated reference
- Writing of this server reference in the file `reference`
- Activation of the ORB (which will "listen")

End of slide

Demonstration of overlays (ii)


```
// Main program

int main(int argc, char* argv[])
{
  // Initialization of the CORBA ORB and POA
  CORBA::ORB_var orb = CORBA::ORB_init(argc, argv);
  CORBA::Object_var poaObj = orb -> resolve_initial_references("RootPOA");
  PortableServer::POA_var RootPOA = PortableServer::POA::_narrow(poaObj);

  ClassMatrix Matrix((double) (1.0));

  // Writing of the "universal pointer" IOR in the file "reference"
  CORBA::String_var str = orb -> object_to_string( Matrix._this() );
  ofstream out("reference");
  out << str << endl;
  out.close();

  RootPOA -> the_POAManager() -> activate();
  orb -> run();

  orb -> destroy();
}
```

Declaration and initialization of the ORB

Declaration and initialization of the POA

Creation of an object `Matrix`

Local characters string, used to store the generated reference

Writing of this server reference in the file `reference`

Activation of the ORB (which will "listen")

Destruction of the ORB (it will never occur here)

End of slide