MPI_CART_GET(comm, maxdims, dims, periods, coords)

IN	comm	communicator with Cartesian structure (handle)
IN	maxdims	length of vectors `dims`, `periods`, and `coords` in the calling program (integer)
OUT	dims	number of processes for each Cartesian dimension (array of integer)
OUT	periods	periodicity (true/false) for each Cartesian dimension (array of logical)
OUT	coords	coordinates of calling process in Cartesian structure (array of integer)

```
int MPI_Cart_get(MPI_Comm comm, int maxdims, int *dims, int *periods,
             int *coords)

MPI_CART_GET(COMM, MAXDIMS, DIMS, PERIODS, COORDS, IERROR)
    INTEGER COMM, MAXDIMS, DIMS(*), COORDS(*), IERROR
    LOGICAL PERIODS(*)

void MPI::Cartcomm::Get_topo(int maxdims, int dims[], bool periods[],
             int coords[]) const
```

MPI_CART_RANK(comm, coords, rank)

IN	comm	communicator with Cartesian structure (handle)
IN	coords	integer array (of size `ndims`) specifying the Cartesian coordinates of a process
OUT	rank	rank of specified process (integer)

```
int MPI_Cart_rank(MPI_Comm comm, int *coords, int *rank)

MPI_CART_RANK(COMM, COORDS, RANK, IERROR)
    INTEGER COMM, COORDS(*), RANK, IERROR

int MPI::Cartcomm::Get_cart_rank(const int coords[]) const
```

For a process group with Cartesian structure, the function MPI_CART_RANK translates the logical process coordinates to process ranks as they are used by the point-to-point routines.

For dimension `i` with `periods(i) = true`, if the coordinate, `coords(i)`, is out of range, that is, `coords(i)` $<$ `0` or `coords(i)` $\geq$ `dims(i)`, it is shifted back to the interval `0` $\leq$ `coords(i)` $<$ `dims(i)` automatically. Out-of-range coordinates are erroneous for non-periodic dimensions.

If comm is associated with a zero-dimensional Cartesian topology, coords is not significant and 0 is returned in rank.