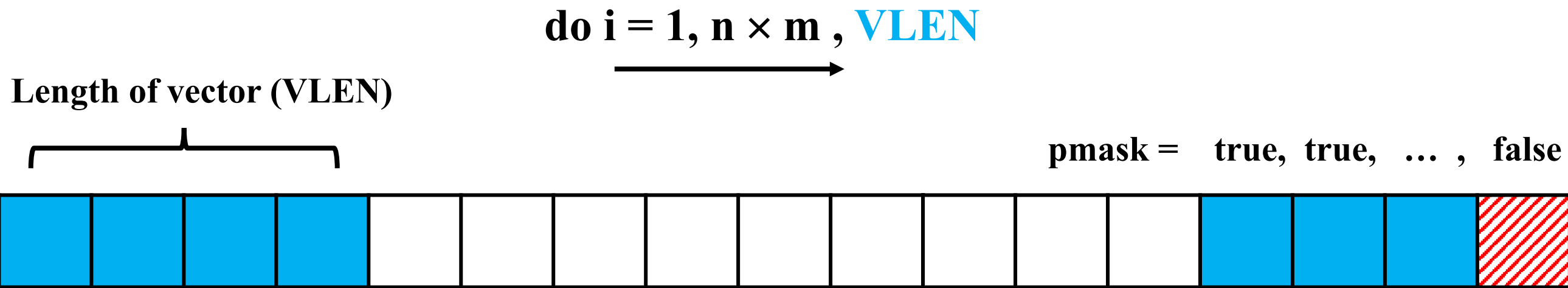
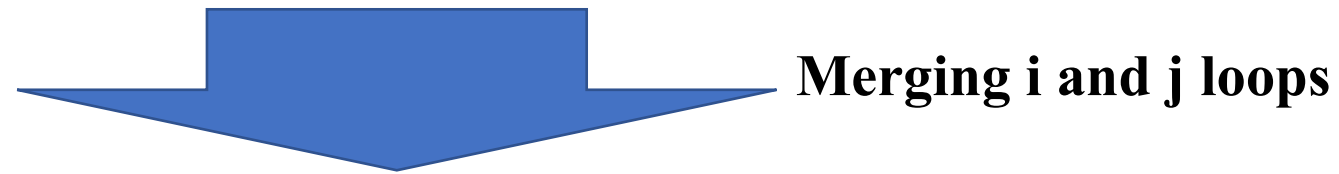
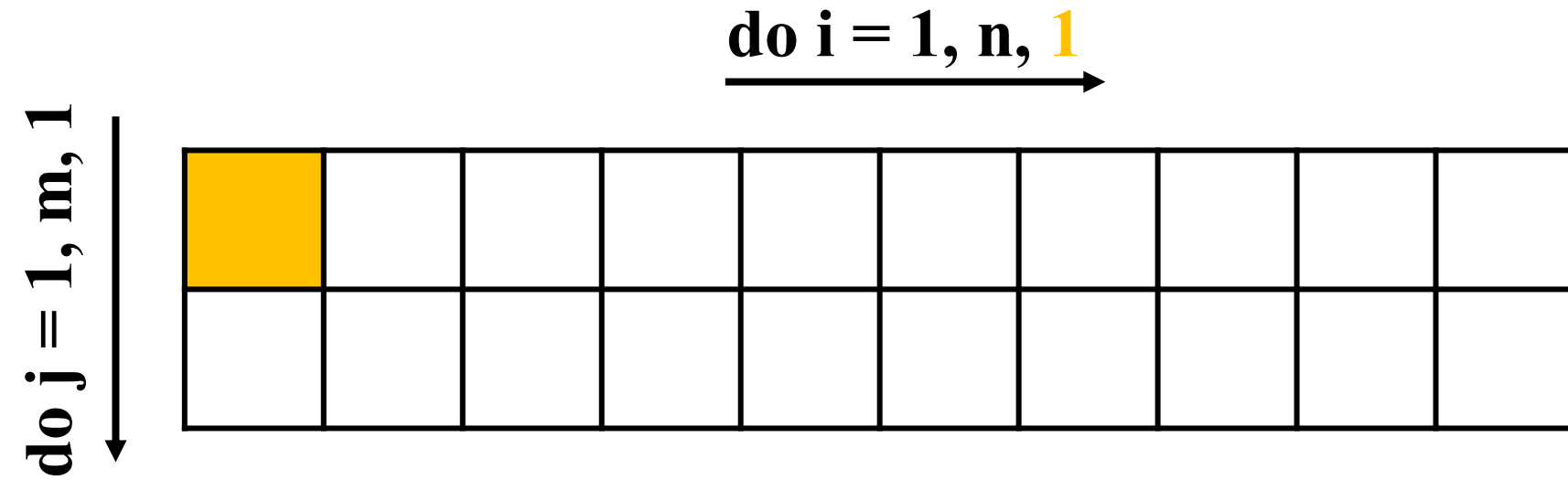


(a)



(b)

```

Real, dimension(76) :: cppb !Concentrations of species
do k=1,nzz ! Vertical layer loop
do j=1,m ! Longitude loop
do i=1,n ! Latitude loop
***
call cbmz ( cppb(:),***)
***
end do
end do
end do

```

(c)

```

Integer, parameter :: VLEN=16 ! The length of vector for AVX512
Logic, dimension(VLEN) :: pmask !Mask Array
Integer :: ilen ! Index for valid grids
Real, dimension(VLEN,76) :: cppb !Two dimensions array for concentrations of species
***
do k=1,nzz ! vertical layer loop
ngrid = n*m ! Total number of grids
do i=1, ngrid, VLEN ! Merged loops of longitude and latitude grids
    ilen = min(ngrid-i, VLEN) ! Decide the length of this vector
    pmask = False
    ***
    !exclude the invalid grids
    do j=1, ilen
    ***
    pmask(j) = True
    ***
end do
***
call cbmz ( cppb(:,i) ,***)
***
end do
end do

```