```
# raline aantal 1-dimensionale rasters voor 0<=p<=m en m>1
def raline(p,m):
    if p == 0 or p == m:
        return 1
    p2 = floor(p/2);m2 = floor(m/2)
    if p%2 == 1 and m%2 == 1:
        return (binomial(m,p) + binomial(m2,p2))/2
    if p%2 == 1 and m%2 == 0:
        return binomial(m,p)/2
    if p%2 == 0 and m%2 != 0:
        return (binomial(m,p) + binomial(m2,p2))/2
    if p%2 == 0 and m%2 == 0:
        return (binomial(m,p) + binomial(m2,p2))/2
    return (m2,p2)
# rasquare aantal vierkante rasters voor 0<=p<=m^2 en m>1
def rasquare(p,m):
    if p == 0 or p == m**2:
        return 1
    p4 = floor(p/4);m2 = floor(m/2)
    if p%4 == 0 and m%2 == 0:
        s = 0; i = 0
        while i<=min(m2,p/2):
            s = s + binomial(m,2*i)*binomial((m**2-m)/2,(p-2*i)/2)
            i = i + 1
        return (binomial(m**2,p)+2*binomial(m**2/4,p4)+3*binomial(m**2/2,p/2)+2*s)/8
    if p%4 == 1 and m%2 == 0:
        s = 0; i = 0
        while i<=min(m2-1,2*p4):
            s = s + binomial(m,2*i+1)*binomial((m**2-m)/2,(p-2*i-1)/2)
            i = i + 1
        return (binomial(m**2,p)+2*s)/8
    if p%4 == 2 and m%2 == 0:
        s = 0; i = 0
        while i<=min(m2,p/2):
            s = s + binomial(m,2*i)*binomial((m**2-m)/2,(p-2*i)/2)
            i = i + 1
        return (binomial(m**2,p)+3*binomial(m**2/2,p/2)+2*s)/8
    if p%4 == 3 and m%2 == 0:
        s = 0; i = 0
        while i<=min(m2-1,2*p4+1):
            s = s + binomial(m,2*i+1)*binomial((m**2-m)/2,(p-2*i-1)/2)
            i = i + 1
        return (binomial(m**2,p)+2*s)/8
    if p%4 == 0 and m%2 != 0:
        s = 0; i = 0
        while i<=min(m2,p/2):
            s = s + binomial(m,2*i)*binomial((m**2-m)/2,(4*p4-2*i)/2)
            i = i + 1
        return (binomial(m**2,p)+2*binomial((m**2-1)/4,p4)+binomial((m**2-1)/2,p/
2)+4*s)/8
```

```
    if p%4 == 1 and m%2 != 0:
        s = 0; i = 0
        while i<=min(m2,2*p4):
            s = s + binomial(m,2*i+1)*binomial((m**2-m)/2,2*p4-i)
            i = i + 1
        return (binomial(m**2,p)+2*binomial((m**2-1)/4,p4)+binomial((m**2-1)/
2,2*p4)+4*s)/8
    if p%4 == 2 and m%2 != 0:
        che = binomial(m**2,p)
        chr = 0
        chd = binomial((m**2-1)/2,p/2)
        cha = 2*0
        s = 0; i = 0
        while i<=min(m2,p/2):
            s = s + binomial(m,2*i)*binomial((m**2-m)/2,2*p4 + 1 - i)
            i = i + 1
        return (binomial(m**2,p)+binomial((m**2-1)/2,p/2)+4*s)/8
    if p%4 == 3 and m%2 != 0:
        che = binomial(m**2,p)
        chr = 0
        chd = binomial((m**2-1)/2,2*p4+1)
        cha = 2*0
        s = 0; i = 0
        while i<=min(m2,2*p4+1):
            s = s + binomial(m,2*i+1)*binomial((m**2-m)/2,2*p4-i+1)
            i = i + 1
        return (binomial(m**2,p)+binomial((m**2-1)/2,2*p4+1)+4*s)/8
# rarechthoek aantal (m,n)-rasters voor 0<=p<=mn en m>n>1
def rarechthoek(p,m,n):
    if p == 0 or p == m*n:
        return 1
    if m == n:
        return rasquare(p,m)
    p2 = floor(p/2); m2 = floor(m/2); n2 = floor(n/2)
    if p%2 == 0 and m%2 == 0 and n%2 == 0:
        return (binomial(m*n,p) + 3 * binomial(m*n/2,p/2))/4
    if p%2 == 0 and m%2 == 0 and n%2 != 0:
        sn = 0; i = 0
        while i <= min(m2,p2):
            sn = sn + binomial(m, 2*i)*binomial((m*n-m)/2,(p-2*i)/2)
            i = i + 1
        return (binomial(m*n,p) + 2 * binomial((m*n)/2,p/2) + sn)/4
    if p%2 == 0 and m%2 != 0 and n%2 == 0:
        sm = 0; i = 0
        while i <= min(n2,p2):
            sm = sm + binomial(n, 2*i)*binomial((m*n-n)/2,(p-2*i)/2)
            i = i + 1
        return (binomial(m*n,p) + 2 * binomial((m*n)/2,p/2) + sm)/4
    if p%2 == 0 and m%2 != 0 and n%2 != 0:
        sm = 0; i = 0
```

```
    while i <= min(n2,p2):
        sm = sm + binomial(n, 2*i)*binomial((m*n-n)/2,(p-2*i)/2)
        i = i + 1
    sn = 0; i = 0
    while i <= min(m2,p2):
        sn = sn + binomial(m, 2*i)*binomial((m*n-m)/2,(p-2*i)/2)
        i = i + 1
    return (binomial(m*n,p) + sm + sn + binomial((m*n-1)/2,p/2))/4
if p%2 != 0 and m%2 == 0 and n%2 == 0:
    return (binomial(m*n,p))/4
if p%2 != 0 and m%2 != 0 and n%2 == 0:
    sm = 0; i = 0
    while i <= min(n2,p2):
        sm = sm + binomial(n, 2*i+1)*binomial((m*n-n)/2,(p-2*i-1)/2)
        i = i + 1
    return (binomial(m*n,p) + sm)/4
if p%2 != 0 and m%2 == 0 and n%2 != 0:
    sn = 0; i = 0
    while i <= min(m2,p2):
        sn = sn + binomial(m, 2*i+1)*binomial((m*n-m)/2,(p-2*i-1)/2)
        i = i + 1
    return (binomial(m*n,p) + sn)/4
if p%2 != 0 and m%2 != 0 and n%2 != 0:
    sm = 0; i = 0
    while i <= min(n2,p2):
        sm = sm + binomial(n, 2*i+1)*binomial((m*n-n)/2,(p-2*i-1)/2)
        i = i + 1
    sn = 0; i = 0
    while i <= min(m2,p2):
        sn = sn + binomial(m, 2*i+1)*binomial((m*n-m)/2,(p-2*i-1)/2)
        i = i + 1
    return (binomial(m*n,p) + sm + sn + binomial((m*n-1)/2,(p-1)/2))/4
return (p2,m2,n2)
```