```
A[m_, n_] := If[m == 0, n + 1, If[m > 0 && n == 0, A[m - 1, 1], A[m - 1, A[m, n - 1]]]]

(* compute first four values of the sum directly *)
fstvls = Table[A[i, i], {i, 0, 3}]
```

```
{1, 3, 7, 61}
```

```
msq1[n_] := Module[{vl}, If[n < EulerPhi[7^8],
    vl = 2^n, vl = PowerMod[2, Mod[(n - 8), EulerPhi[7^8]] + 8, 14^8]];
  vl
 ]
a44 = Take[Mod[NestList[msq1, 2, 250], 3 × 14^8] - 3, {7}][[1]]
(* Use hierarchical periods and convergence of the interated
 exponentials to get last two values A(5,5) and A(6,6) *)
vl = 4;
For[i = 1, i ≤ 7, i++,
 vl = PowerMod[2, vl, 6 × 7^i]
]
lstvl = PowerMod[2, vl, 14^8] - 3
Mod[Total[Join[fstvls, {a44}, {lstvl}, {lstvl}]], 14^8]
```

```
915 627 005

829 575 165

1 098 988 351
```