

1. THE FILE `grains.pl`

“There once was a wise servant who saved the life of a prince. The king promised to pay whatever the servant could dream up. Knowing that the king loved chess, the servant told the king he would like to have grains of wheat. One grain on the first square of a chess board, with the number of grains doubling on each successive square.”

<code>square(SquareNumber, Value)</code>
--

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The number of grains of wheat on a particular square of the chessboard, where `SquareNumber` $\in [1, 64]$.

```
square(SquareNumber, _) :-  
  ( SquareNumber < 1  
    ; SquareNumber > 64 ),  
  !,  
  fail.
```

The number of grains of wheat on square n is $2^{(n-1)}$.

```
square(SquareNumber, Value) :- Value is 2 ** (SquareNumber - 1).
```

<code>total(Value)</code>

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The total number of grains on the chessboard is one less than twice the number of grains on the 64th square.

```
total(Value) :-  
  square(64, SixtyFourth),  
  Value is 2 * SixtyFourth - 1.
```