

# **Tiling Problems**

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# Tiling Problems: Set 1

Consider the set of identical  $1 \times 2$  and  $2 \times 1$  dominoes.

1. How many ways are there to tile a  $2 \times 2$  grid with this tileset?
2. How many ways are there to tile a  $2 \times 1000$  grid with this tileset? Give your answer mod  $10^9 + 7$ .
3. How many ways are there to tile a  $2 \times 10^{18}$  grid with this tileset? Give your answer mod  $10^9 + 7$ .

# Tiling Problems: Set 2

Consider the set of identical  $1 \times 2$  and  $2 \times 1$  dominoes.

1. How many ways are there to tile a  $3 \times 2$  grid with this tileset?
2. How many ways are there to tile a  $3 \times 1000$  grid with this tileset? Give your answer mod  $10^9 + 7$ .
3. How many ways are there to tile a  $3 \times 10^{18}$  grid with this tileset? Give your answer mod  $10^9 + 7$ .

# Tiling Problems: Set 3

You have four types of tiles: one green  $1 \times 1$  tile, one blue  $1 \times 1$  tile, a yellow  $2 \times 1$  tile, and a red  $1 \times 2$  tile. All tiles of the same type are indistinguishable from one another

1. How many ways are there to tile a  $3 \times 2$  grid with this tileset?
2. How many ways are there to tile a  $3 \times 1000$  grid with this tileset? Give your answer mod  $10^9 + 7$ .
3. How many ways are there to tile a  $3 \times 10^{18}$  grid with this tileset? Give your answer mod  $10^9 + 7$ .