Tiling Problems

Veteran Track

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Tiling Problems: Set 1

Consider the set of identical 1×2 and 2×1 dominoes.

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

Tiling Problems: Set 2

Consider the set of identical 1×2 and 2×1 dominoes.

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

Tiling Problems: Set 3

You have four types of tiles: green 1×1 tiles, blue 1×1 tiles, vertical 2×1 tiles, and horizontal 1×2 tiles. All tiles of the same type are indistinguishable from one another. Also, the tiles cannot be rotated.

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

Answers

Answers: Set 1

1.1. **2**

1.2. **107579939**

1.3. **680057396**

Answers: Set 2

2.1. **3**

2.2. **146530309**

2.3. **558008386**

Answers: Set 3

2.1. **34**

2.2. **647780007**

2.3. **912631521**