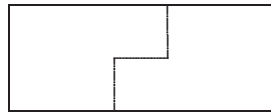


MATHEMATICS CHALLENGE FOR YOUNG AUSTRALIANS
JUNIOR: YEARS 7 and 8
WARM UP PROBLEM 04

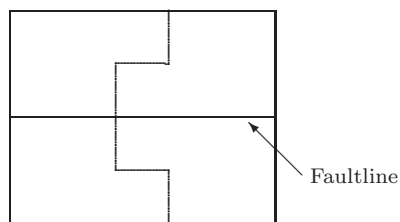
P-Tiles

A P-tile is made from 5 unit squares joined edge to edge as shown. It can be used to tile some rectangles made up of unit squares.

For example a 5 by 2 rectangle can be tiled by two P-tiles.



This tiling is said to be *fault-free* because there is no straight line going from one side of the rectangle to the other (beside its edges). However the following tiling of a 5 by 4 rectangle has a *faultline* and is not fault-free.



Note that the tiles can be placed with either face up.

1. Draw a fault-free tiling of a 5 by 4 rectangle using P-tiles.
2. Draw a fault-free tiling of a 5 by 6 rectangle using P-tiles.
3. Show that a fault-free tiling is possible for any 4 by m rectangle using P-tiles where m is a multiple of 5.
4. Show that a 5 by 3 rectangle cannot be tiled by P-tiles.

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