# The layout problem

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**Abstract**

In this paper, I describe the layout problem.
The paper ends with "The End"

## Introduction

**The layout problem** is found in a variety of fields including economics, finance, masonry, publishing, journalism, electronics and the design of user interfaces.

In this paper, I describe the layout problem.

## The one-dimensional layout problem

The one-dimensional layout problem is:

Find $L$, $p$ and $l_i$ such that

$$L = \sum_{i=1}^{p} l_i$$

where
$L > 0$ is the length of the outer layout
$p > 1$ is the number of partitions of $L$
For $1 \leq i \leq p$, $l_i$ are the partitions of $L$

## The two-dimensional layout problem

The two-dimensional layout problem is:

Find $L$, $B$, $p$, $q$, $l_i$ and $b_i$ such that

$$L = \sum_{i=1}^{p} l_i$$

$$B = \sum_{j=1}^{q} b_j$$

$$LB = \sum_{i=1}^{p} \sum_{j=1}^{q} l_i b_j$$

where
$L > 0$ is the length of the outer layout
$B > 0$ is the breadth of the outer layout
$p > 1$ is the number of partitions of $L$
$q > 1$ is the number of partitions of $B$
For $1 \leq i \leq p$, $l_i$ are the partitions of $L$
For $1 \leq j \leq q$, $b_j$ are the partitions of $B$

## The three-dimensional layout problem

The three-dimensional layout problem is:

Find $L$, $B$, $H$, $p$, $q$, $r$, $l_i$, $b_i$ and $h_i$ such that

$$L = \sum_{i=1}^{p} l_i$$

$$B = \sum_{j=1}^{q} b_j$$

$$H = \sum_{k=1}^{r} h_k$$

$$LBH = \sum_{i=1}^{p} \sum_{j=1}^{q} \sum_{k=1}^{r} l_i b_j h_k$$

where
$L > 0$ is the length of the outer layout
$B > 0$ is the breadth of the outer layout
$H > 0$ is the height of the outer layout
$p > 1$ is the number of partitions of $L$
$q > 1$ is the number of partitions of $B$
$r > 1$ is the number of partitions of $H$
For $1 \leq i \leq p$, $l_i$ are the partitions of $L$
For $1 \leq j \leq q$, $b_j$ are the partitions of $B$
For $1 \leq k \leq r$, $h_k$ are the partitions of $H$

## The $n$-dimensional layout problem

For $n > 3$, the $n$-dimensional layout problem can be described with suitable notation and is left as an exercise for the reader.

## The End