

Project Description

Part 1 Description:

Write a C++ program that implements the Minimum-area Floorplan (shape function) algorithm. The output is the minimum floorplan area, its aspect ratio, and percentage of wasted area (core utilization). As well, state each block dimension. The possible dimensions for each gate is given in table 1 where each gate can be flipped 90° (i.e: lengths and widths are interchangeable.)

Part 2 Description:

Write a C++ program that implements the Minimum-cut Placement algorithm using the implemented KL algorithm in the mini project. Given a small netlist, which consists of 8 logic gates, apply the minimum-cut placement such that the gates are placed in a 2×4 layout grid (2 rows and 4 columns). The initial cut should be found using initial partitioning with the KL algorithm and to be considered as a vertical cut. The cutline directions are to be alternating. The output should specify the final placement of the gates in the layout grid. The area of each gate is given in table 1.

Table 1. Gates dimensions with n as the number of inputs

Component	NOT Gate	AND Gate	OR Gate	XOR Gate	Flipflop	NAND Gate	NOR Gate	XNOR Gate
Dimensions	$2 * 1$	$(n + 1) * (n + 1)$	$(n + 1) * (n + 1)$	$2n * (n + 2)$	$8 * 1$	$n * n$	$n * n$	$2n * n$