

EXPLAINED

# Solving the World's Most Complex Manufacturing Problems

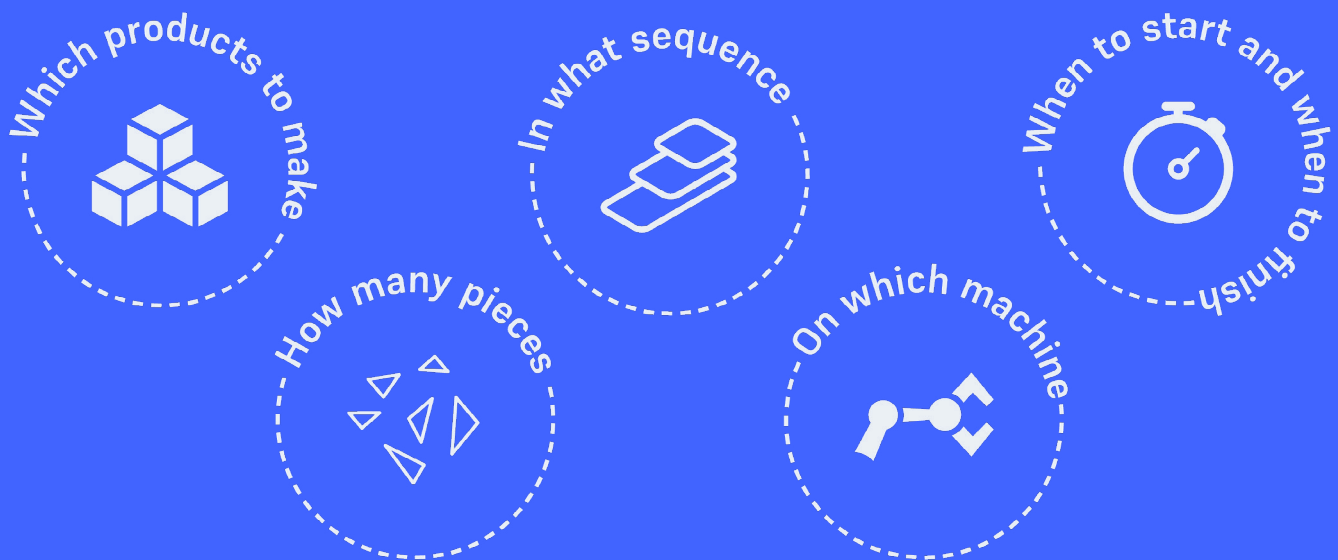
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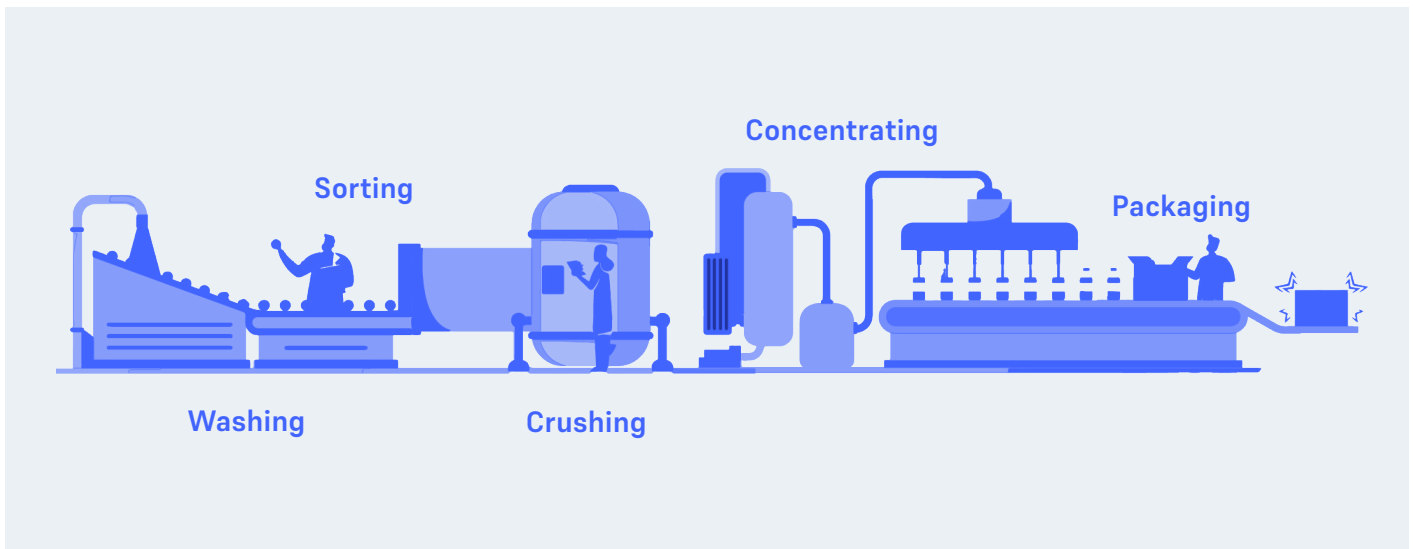
# What is production scheduling?

Let's break down the problem we are trying to solve by starting with the basics. Manufacturing is a process of turning raw materials into a final product and at the heart of this process is something called production scheduling.

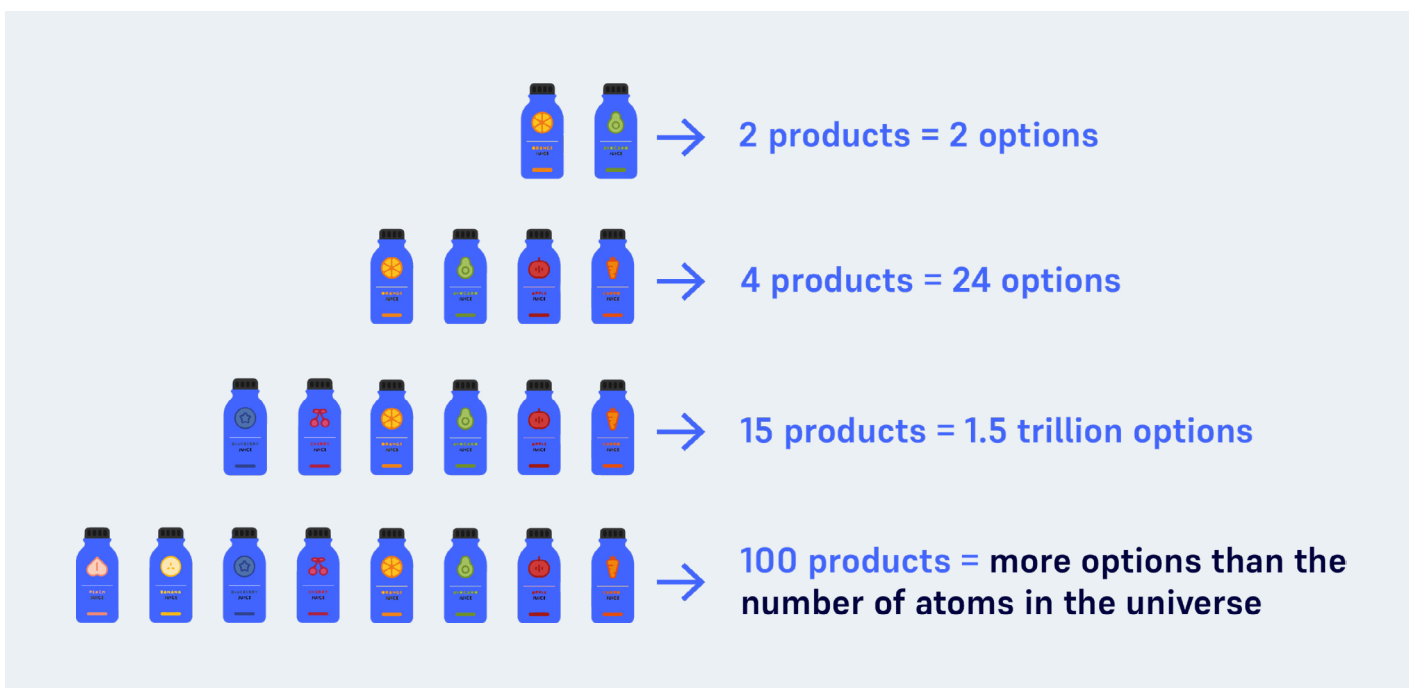
Production scheduling takes place at every factory in the world. Each day, someone has to decide what is the best way to execute production:



Even a simple production process, such as making fruit juice, generates a huge number of scheduling scenarios.



By adding just one product to a product line, the number of scheduling scenarios increases exponentially.



If factories were simple and only had a couple of products, then the solution would be obvious. In reality, however, factories have hundreds if not thousands of products and a human has to try and find the best schedule using simple conventional software.

This is impossible for a human mind to do well. Yet nearly every factory relies on this method, resulting in them failing to meet customer orders and costing each factory millions of dollars a year.

**Now imagine how complex this problem gets when you try to schedule a semiconductor wafer fab instead of a fruit juice factory.** Thanks to dynamic bottlenecks and re-entrant flows, the frontend production of semiconductors – known as wafer fabrication – is the most complex manufacturing process on earth.

The solution to scheduling these facilities lies with the latest advancements in artificial intelligence, cloud computing and advanced mathematical optimization.

## That's where we come in.

Utilising over 10 years of academic research, we have developed a solution with smart decomposition, artificial intelligence powered mathematical models and mixed integer linear programming.

Our technology is able to break down the problem into smaller ones and generate an optimized schedule in a matter of minutes. Crucially, it allows for the user to select specific objectives – such as throughput – and will automatically optimize to meet that goal.

We have already proven efficiency gains that can save a wafer fab millions of dollars annually and we continue to research and develop to help more and more companies move towards industry 4.0.