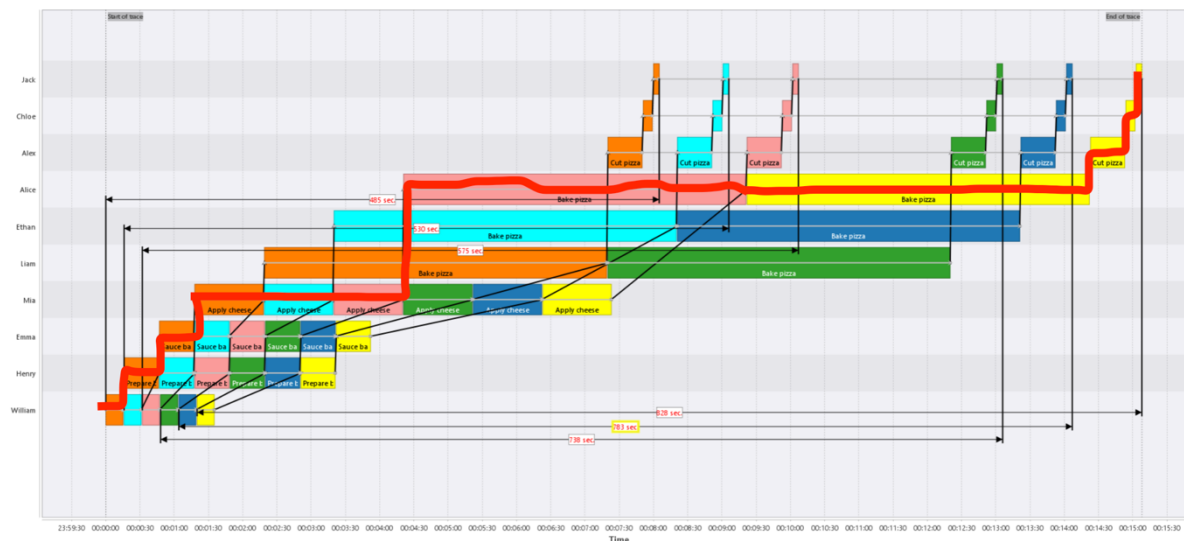


Assignment 3b – Jorrit Kroes (CPS)

a) Critical path prep of 6th pizza to delivery:

It's baking start is influenced by the third order and the start of apply cheese for the third order is influenced by orders 2 and 1



b) After the saucing there is an almost 2.5 min wait before cheese is applied and then after the cheese there is another almost 2 min wait before there is a free oven.

However, even if we would improve the wait due to cheese application we would still have to wait (even longer) for an oven to be free. So by far the biggest problem is the amount of ovens or the time they take to be ready for the next pizza. This makes sense, because the baking process takes far longer than any of the other steps so it quickly becomes a bottleneck.

c)

Below is the excel calculation I did. The cost was calculated by combining the amount of workers*50 with the cost of the ovens in a particular scenario.

Throughput is calculated using formula:

$$T = 1 + \{(\text{workday hours} = 8) * \{\text{seconds in an hour} = 3600\} - \{\text{warmup}\}\} / \{\text{time between pizza output}\}$$

			hours workday		
			8		
warmup	time (pizza to pizza)		Pizza throughput	Cost	
	305	45	634,2222222	650	alt1
	245	15	1904,666667	740	alt2
	365	45	632,8888889	770	alt3

The first and second options are in the Pareto-set, because there is no alternative that improves its throughput or cost without affecting the other. The first option saves the most money, while still being a little bit more efficient than the third option.

The second option is by far the most efficient in terms of throughput, but this comes at a bit of a higher price (although it costs less than the third option).

This gives the scatter plot below with points as the scenarios, with the Pareto-front colored in orange through both good alternatives (1 and 2). The area in green is the Pareto Dominated-subregion.

Any solution **in green** (such as scenario 3, although you almost can't see it just falls into it) is dominated because there is a solution (1 or 2) that is both better in terms of cost and throughput (or equal in one of the two metrics)

