

1. Task (SW ARENA)

Production line with a belt conveyor

The production line comprises 10 stations. Transportation between stations relies on a belt conveyor moving at the speed of 20 m/min. The distance between stations is 15 metres. A product must pass sequentially through all 10 stations. No more than 8 machines may be allocated to a single station. An unlimited number of products may be stored at each station.

Hourly production cost for one machine:

	Machine works	Machine waits
Working place 1	300	200
Working place 2	500	250
Working place 3	700	500
Working place 4	100	80
Working place 5	300	250
Working place 6	750	560
Working place 7	1500	1000
Working place 8	200	100
Working place 9	320	200
Working place 10	500	300

Hourly cost of a product's presence in the production shop equals CZK 20/hour.

Processing times at individual stations:

	Distance [min]
Working place 1	NORM(20,3)
Working place 2	TRIA(15,20,23)
Working place 3	TRIA(8,10,14)
Working place 4	TRIA(17,19,22)
Working place 5	TRIA(20,22,24)
Working place 6	TRIA(15,2)
Working place 7	TRIA(8,10,11)
Working place 8	TRIA(13,15,16)
Working place 9	TRIA(15,17,18)
Working place 10	NORM(20,2)

Simulation Objectives

Determine the interval between arrivals of jobs at production site and the numbers of machines for individual stations for:

- one-shift operation (8 hours per day) for 7 days/week
- two-shift operation (16 hours per day) for 7 days/week
- three-shift operation (24 hours per day) for 7 days/week

The objective of the simulation is to manufacture as many products as possible during the specified time at lowest possible cost.

2. Task of the lecture

Create a search simulation tools for discrete simulation. Describe and explain the principles of discrete simulation.