• An assembly line consists of a series of **work stations** along which a product moves.

• The product remains at each work station an amount of time called **cycle time**. While it is at a work station, one or more **tasks** are performed, each with a known **performance time**.

• **Precedence restrictions** may be imposed. That is, "task i precedes task j" (i→j) means that task i must be performed at the same or earlier station than j.
If the cycle time is \( c \) and the number of work stations is \( k \), then

\[
k c \geq \sum_{i=1}^{n} P_i = \text{work content}
\]

Idle time:

\[
I = kc - \sum_{i=1}^{n} P_i
\]

Balance delay:

\[
d = \frac{kc - \sum_{i=1}^{n} P_i}{kc} = \frac{I}{kc}
\]
Idle time = 5 \times 15 - 48 = 27

An example line, with k=5 stations, and c = cycle time = 15

Balance delay = \frac{27}{75} = 36\%

Since the work content is 48 = 3 \times 16, is it possible to find a "perfect" (i.e. zero delay) balance with cycle time 16 and 3 stations?
Heuristic Algorithms for Assembly Line Balancing

- The Kilbridge & Wester Algorithm
- The Ranked Positional Weight Method (RPWM)
- The Reversed RPWM
- COMSOAL
- Genetic Algorithm