EOQ

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Simple questions -qualifications

- Type of material
  - Raw material
  - Semi-products (WIP)
  - Final products
- Questions :
  - How much do we have to order (order quantity=Q)
  - When do we have to order (question related to Reorder Level=Reorder Point)

Demands

- Type of demands
  - Deterministic – known demand
  - Probabilistic
    - Under risk (distribution of demand is known)
    - Under uncertainty (distribution of demand is not known)

- Lead time (time between placing order and getting items)

Costs

- Order Costs = C_o
  - Transport
  - People work
  - Inspection cost
  - Reject costs
  - Follow up costs
- Cost of item = C
  - Purchase cost

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Costs

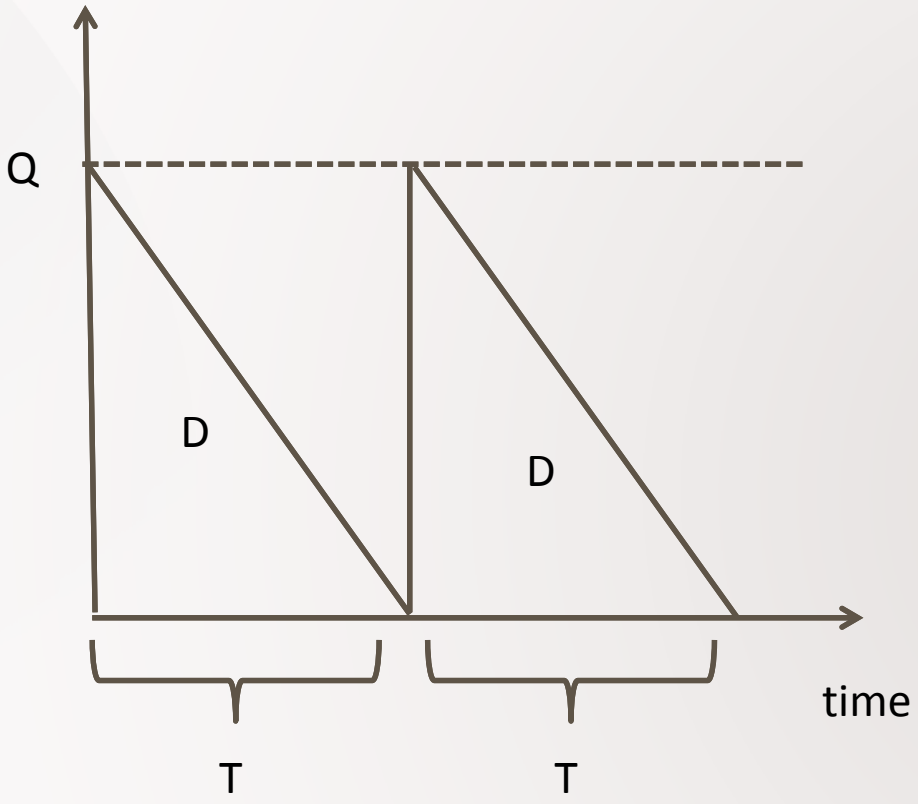
- Inventory Holding Cost= Carrying Costs = C_C
  - Cost of space
  - Cost of guarding
  - Cost of obsolete items
  - Special equipment
  - Pilferage (act of item stealing)
  - Cost of capital (most important)
- Backorder Cost = C_{bo}
  - Lost of goodwill

Costs

- Backorder Cost = C_{bo}
  - Lost of goodwill
  - Lost of opportunity
  - Cost of additional capacity
  - Cost of rescheduling and rework
  - Lost of sales

EOQ model 1

- **Prerequisites**
  - Single item only
  - Continuous demand =D
  - No stock shortage
  - Instantaneous shipment
- Lead time= constant



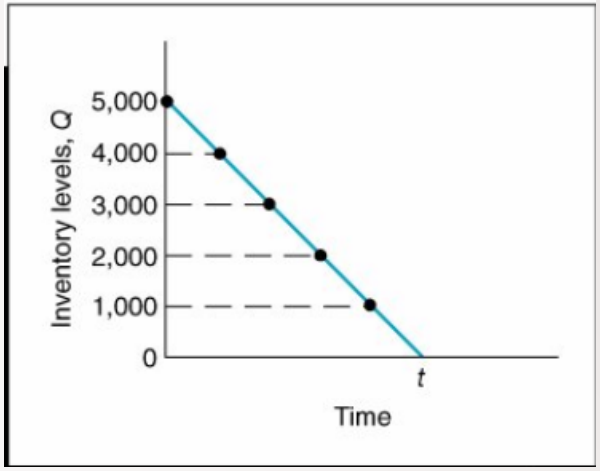
Notice, that inventory never goes below zero; shortages do not exist !!

Carrying cost (will be presented -see next slide)

$$\text{Average inventory (carrying) cost} = \frac{Q}{2}$$

To verify this relationship, we can specify any number of points values of Q over the entire time period, t , and divide by the number of points. For example, if Q = 5,000, the six points designated from 5,000 to 0, as shown in shown figure, are summed and divided by 6:

$$\text{average inventory} = \frac{5{,}000 + 4{,}000 + 3{,}000 + 2{,}000 + 1{,}000 + 0}{6}$$
$$= 2{,}500$$



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EOQ model 1

- Annual demand /year = D
- Number of orders/year = $\frac{D}{Q}$
- Total order cost = $\frac{D}{Q} * C_o$,where C_o=order cost
- Average inventory (carrying) cost = $\frac{Q}{2}$
- Total holding (carrying) cost = $\frac{Q}{2} * C_C$, Where C_C=carrying cost
- Cost of the item = $D*C$
- Total cost = TC= $\frac{D}{Q} * C_o + \frac{Q}{2} * C_C + D*C$ *(non-linear function with one variable)*
- $\frac{dTC}{dQ} = -\frac{D}{Q^2} * C_o + \frac{Cc}{2} = 0$
- $Q=EOQ=\sqrt{\frac{2DC_o}{C_C}}$

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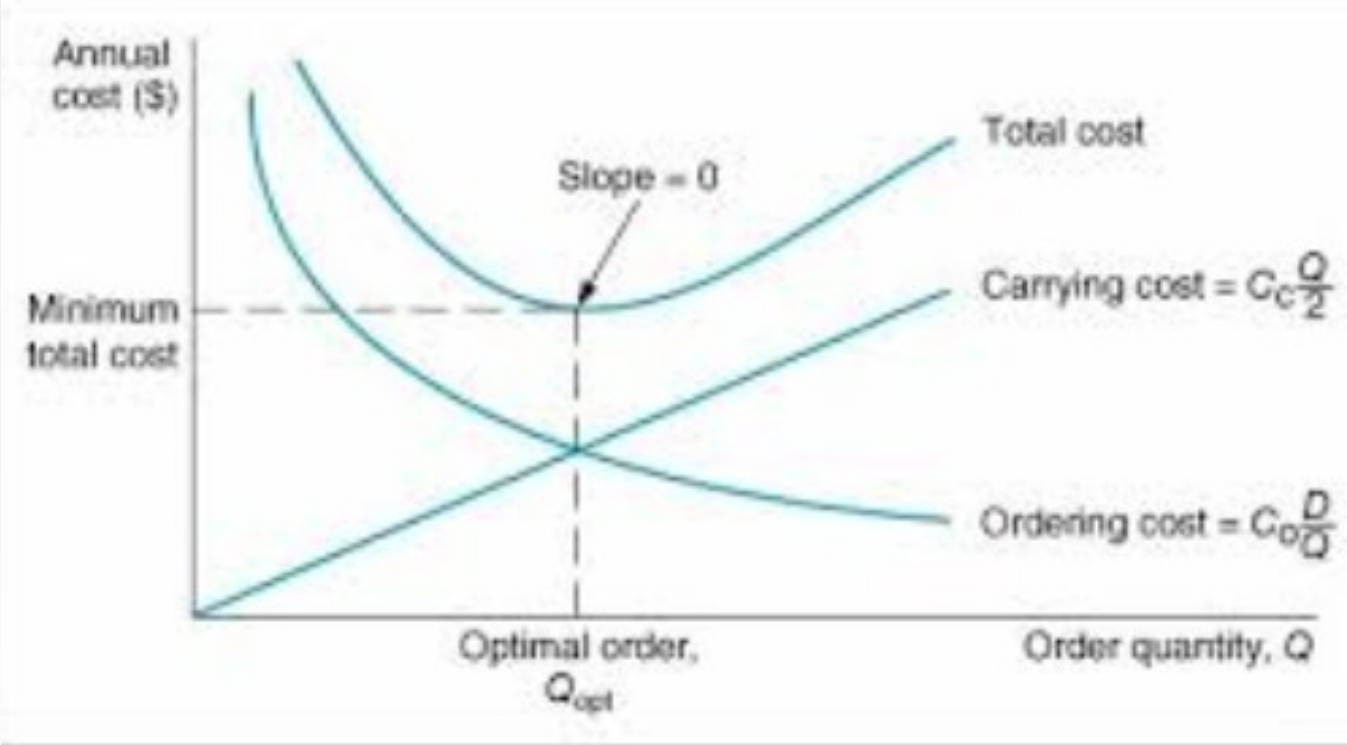

Děkujeme za Vaši pozornost a čas