Assignment #1: the (simplified) beer game

The beer game is an educational game invented by J. W. Forrester at the MIT Sloan School of Management.

In the original game, four participants are involved in a role-play simulation of a beer supply chain.

The four participants play the role of the retail/wholesale/warehouse/factory managers. Each of them has to **decide** <u>how much to order in each turn</u> (e.g., every week) in order to **minimize their "cost" over a given planning horizon**.

In the simplified beer game, there is a single player, acting as a retail manager.

In this assignment, you have to:
- implement in Python the simplified beer game; demand is generated pseudo-randomly in beer_demand.py. You are not allowed to have a look at this procedure while playing. You may plot past demands, inventories, … by writing suitable Python code to help you make the best decision; implementation due by Monday; will be discussed in class;
- play this game for 20 weeks and compare your performance with your peers;
- discuss the kind of decision support you (as IT manager) may provide to the logistics manager.

Hypotheses:
- Order cost: 100€
- Out of stock costs 1€/(pallet*week)

- Inventory costs 1 €/(pallet*week)
- Initial inventory: 540 pallets
- Lead time = 2 weeks

Here is a sample game.

It becomes known that
- demand has been 120 pallets of beer
(demand is random and generated by function get_demand() in beer_demand.py)
Amount supplied to customers this week: 120 pallets
Backlog: 0 pallets
Inventory level: 420
How much do you want to order this week? (make a purchasing decision!)

0

Inventory cost: 420 * 1 €
Out of stock costs: 0 €
Order cost: 0 €
Goods arriving in 1 week: 0
Goods arriving in 2 weeks: 0
Total cost this week: 420+0+0=420€
Cumulative total cost: 420 €

Demand = 90
Amount supplied to customers this week: 90 pallets
Backlog: 0 pallets
Inventory level: 330
How much do you want to order this week? (make a purchasing decision!)

0

Inventory cost: 330 * 1 €
Out of stock costs: 0 €
Order cost: 0 €
Goods arriving in 1 week: 0
Goods arriving in 2 weeks: 0
Total cost this week: 330+0+0=330€
Cumulative total cost: 420+330=750 €

Demand = 100 pallets
Amount supplied to customers this week: 100 pallets
Backlog: 0 pallets
Inventory level: 230
How much do you want to order this week? (make a purchasing decision!)

300

Inventory cost: 230 * 1€
Out of stock costs: 0 €

Order cost: 100 €
Goods arriving in 1 week: 0
Goods arriving in 2 weeks: 300
Total cost this week: 230+0+100 = 330€
Cumulative total cost: 750 + 330 = 1080 € (+ cost for purchasing beer)

<mark>END OF WEEK 4</mark>
Demand = 50
Amount supplied to customers this week: 50 pallets
Backlog: 0 pallets
Inventory level: 180

…

<mark>END OF WEEK 5</mark>
Demand = 100
Amount supplied to customers this week: 100 pallets
Backlog: 0 pallets
Inventory level: 180 – 100 + 300 = 380 # merchandise ordered at the end of week 3 arrives

…