**Group Assignment #2: Inventory Management**

**Logistics Management, Fall 2023**

**Due: 23:30, October 31, 2023 (Tuesday)**

CBW is a distributor of home appliance. The SKU (Stock Keeping Unit) under this study is a popular vacuum cleaner with the cost of $7,200. The inventory level at the end of the day for the past year has been collected, based on which it has been found the daily demand roughly follow a normal distribution with the mean of 20 and the standard deviation of 8. The total business days per year is assumed to be 245 days, as no operation takes place during weekends and holidays.

Based on the EOQ model, with the fixed ordering cost of $3,600 (mainly about the transportation cost from the manufacturer) and the annual holding rate around 25%, CBW currently reviews its inventory level by taking periodic review policy with the frequency of 7 days (*i.e.*, about 3 times per month). In the past year, CBW invests one day of demand (*i.e.*, 20 units) as the safety inventory. Given the replenishment lead-time is 2 days, which is quite stable throughout the year, an order is placed to replenish the inventory to the target level of 200 units.

To understand the logistic cost and customer service level, CBW initiates a project to review its inventory control policy (including the associated parameters). Your team is asked to prepare an executive summary for this project.

1. The report must include the operational indicators (the average inventory level, the annual inventory cost, and the annual ordering costs) based on the given past year data as well as some service level indicators, such as the cycle service level and the product fill rate. Also, suppose the back-order cost due to shortage is assumed to be $1,200/unit. Please also calculate the annual shortage cost of CBW.
2. Since it’s the first year to apply this policy, CBW would like to see if this policy is likely to reliably lead to good results. Thus, a data set of 20 replications of the simulated annual demand patterns is generated. Please evaluate the indicators mentioned above by calculating the averages of the simulated dataset. It would be great if you provided some thoughts about the results of the associated indicators.

Notes:

1. All data items needed for the assignment are provided on E3 course platform.
2. For both historical and simulated demand in the report, please use the data set given to calculate the “Actual Value” of each indicator, and use the parameters given above to calculate the “Theorical Value” of each indicator, if possible. Then, some comparisons can be made between them.