Computing and Data Science

Simulations

Assignment no. 2 code

3rd Year

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Screen of code:

```python
[1]  import numpy as np
     import pandas as pd


[2]  def newspaper(rn_t ,rn_d,no_of_news):
     # Lists to store various data
         type_news=[]
         demand=[]
         revenue=[]
         cost=[]
         lost_profit=[]
         scrap=[]
         daily_profit=[]
         no=[]
     # Classifying news type based on random numbers
         for i in range(0,len(rn_t)):
             if rn_t[i]>= 1 and rn_t[i]<=35:
                 type_news.append('good')
             elif rn_t[i]>= 36 and rn_t[i]<=80:
                 type_news.append('fair')
             elif rn_t[i]>= 81 and rn_t[i]<=99 or rn_t[i]==0:
                 type_news.append('poor')
     # Determining demand based on news type and random numbers
         for i in range(0,len(rn_t)):
             if type_news[i]=='good':      # Determine demand for 'good' news type
                 if rn_d[i]>=1 and rn_d[i]<=3:
                     demand.append(40)
                 elif rn_d[i]>=4 and rn_d[i]<=8:
                     demand.append(50)
                 elif rn_d[i]>=9 and rn_d[i]<=23:
                     demand.append(60)
                 elif rn_d[i]>=24 and rn_d[i]<=43:
                     demand.append(70)
                 elif rn_d[i]>=44 and rn_d[i]<=78:
                     demand.append(80)
                 elif rn_d[i]>=79 and rn_d[i]<=93:
                     demand.append(90)
                 elif rn_d[i]>=94 and rn_d[i]<=99 or rn_d[i]==0:
                     demand.append(100)
             elif type_news[i]=='fair':   # Determine demand for 'fair' news type
                 if rn_d[i]>=1 and rn_d[i]<=10:
                     demand.append(40)
                 elif rn_d[i]>=11 and rn_d[i]<=28:
                     demand.append(50)
                 elif rn_d[i]>=29 and rn_d[i]<=68:
                     demand.append(60)
                 elif rn_d[i]>=69 and rn_d[i]<=88:
                     demand.append(70)
                 elif rn_d[i]>=89 and rn_d[i]<=96:
                     demand.append(80)
                 elif rn_d[i]>=97 and rn_d[i]<=99 or rn_d[i]==0:
                     demand.append(90)
             elif type_news[i]=='poor':    # Determine demand for 'poor' news type
                 if rn_d[i]>=1 and rn_d[i]<=44:
                     demand.append(40)
```

```python
                elif rn_d[i]>=45 and rn_d[i]<=66:
                    demand.append(50)
                elif rn_d[i]>=67 and rn_d[i]<=82:
                    demand.append(60)
                elif rn_d[i]>=83 and rn_d[i]<=94:
                    demand.append(70)
                elif rn_d[i]>=95 and rn_d[i]<=99 or rn_d[i]==0:
                    demand.append(80)
    # Calculating costs, revenues, and daily profit
        for i in range(0,len(rn_t)):
            no.append(no_of_news)
            cost.append(no_of_news*0.33)
            if demand[i]>no_of_news:    # Check if demand exceeds production
                rev=no_of_news*0.5
                revenue.append(rev)
                lost=(demand[i]-no_of_news)*0.17
                lost_profit.append(lost)
                scrap.append("-")
                profit1=(revenue[i]-lost_profit[i])-cost[i]
                daily_profit.append(profit1)
                continue
            elif demand[i]<no_of_news:    # Check if demand is less than production
                rev=demand[i]*0.5
                revenue.append(rev)
                scraps=(no_of_news-demand[i])*0.05
                scrap.append(scraps)
                profit2=(revenue[i]+scrap[i])-cost[i]
                daily_profit.append(profit2)
                lost_profit.append('-')
                continue
            elif demand[i]==no_of_news:    # Check if demand equals production
                rev=no_of_news*0.5
                revenue.append(rev)
                profit3=revenue[i]-cost[i]
                daily_profit.append(profit3)
                lost_profit.append('-')
                scrap.append("-")
                continue
    # Creating DataFrame to store all data
        dataframe=pd.DataFrame({
            "RN type":rn_t,
            "type of newspaper":type_news,
            'RN demand':rn_d,
            "demand":demand,
            'revenue of sales':revenue,
            'cost':cost,
            'number of newspaper':no,
            'lost profit':lost_profit,
            'sales of scrap':scrap,
            "daily profit":daily_profit
        })
        dataframe.index=dataframe.index+1        # Setting index starting from 1
        return dataframe
```

for 90 newspapers

```
[13] df1=newspaper([86,32,73,24,76,38,45,18,44,12],[4,39,66,89,97,24,9,55,15,17],90)
     df1
```

	RN type	type of newspaper	RN demand	demand	revenue of sales	cost	number of newspaper	lost profit	sales of scrap	daily profit
1	86	poor	4	40	20.0	29.7	90	-	2.5	-7.2
2	32	good	39	70	35.0	29.7	90	-	1.0	6.3
3	73	fair	66	60	30.0	29.7	90	-	1.5	1.8
4	24	good	89	90	45.0	29.7	90	-	-	15.3
5	76	fair	97	90	45.0	29.7	90	-	-	15.3
6	38	fair	24	50	25.0	29.7	90	-	2.0	-2.7
7	45	fair	9	40	20.0	29.7	90	-	2.5	-7.2
8	18	good	55	80	40.0	29.7	90	-	0.5	10.8
9	44	fair	15	50	25.0	29.7	90	-	2.0	-2.7
10	12	good	17	60	30.0	29.7	90	-	1.5	1.8

```
[24] Total_profit_90=df1['daily profit'].sum().round(2)
     Total_profit_90
```

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31.5
```

for 80 newspapers

```
[15] df2=newspaper([54,60,40,80,14,3,26,57,36,11],[78,49,50,75,53,46,11,65,66,30],80)
     df2
```

	RN type	type of newspaper	RN demand	demand	revenue of sales	cost	number of newspaper	lost profit	sales of scrap	daily profit
1	54	fair	78	70	35.0	26.4	80	-	0.5	9.1
2	60	fair	49	60	30.0	26.4	80	-	1.0	4.6
3	40	fair	50	60	30.0	26.4	80	-	1.0	4.6
4	80	fair	75	70	35.0	26.4	80	-	0.5	9.1
5	14	good	53	80	40.0	26.4	80	-	-	13.6
6	3	good	46	80	40.0	26.4	80	-	-	13.6
7	26	good	11	60	30.0	26.4	80	-	1.0	4.6
8	57	fair	65	60	30.0	26.4	80	-	1.0	4.6
9	36	fair	66	60	30.0	26.4	80	-	1.0	4.6
10	11	good	30	70	35.0	26.4	80	-	0.5	9.1

```
[22] Total_profit_80=df2['daily profit'].sum().round(2)
     Total_profit_80
```

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77.5
```