BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

January 2021 CSE 308 Offline Assignment on
Behavioural Design Patterns

Q1: You have to use the Observer Design Pattern to build a stock trading platform where each user can subscribe to the different kinds of stocks in the market.

Consider an input file containing the stock names followed by their counts and price (Table 1).

P1 3 40.00
P2 4 30.00
P3 5 80.00
P4 6 25.00
P5 7 15.00
P6 9 50.00

Table 1: Contents of the input file

After a user logs into the system, he will be shown the number of stocks and their respective prices. A user can subscribe to a particular stock by using the `S` command (e.g., `S P3`). Analogously, he can also unsubscribe to a subscribed stock using the `U` command.

Use the following trigger commands (fed into the system) to change the state of the stocks:

1. `I`: Increase a stock price. Example: `I P1 10.00`

2. `D`: Decrease a stock price. Example: `D P4 5.00`

3. `C`: Change in stock count (always positive). Example: `C P2 2`

Subscribers will be notified if the state of their subscribed stocks has changed.

Q2: The city of Johannesburg has the following four major public service organizations.

- Johannesburg Water Supply Authority (JWSA) provides *WATER* related services.

- Johannesburg Power Development Board (JPDC) provides *ENERGY* related services.

- Johannesburg Road and Transport Authority (JRTA) provides *TRANSPORT* services.

- Johannesburg Telecommunication Regulatory Commission (JTRC) provides *TELECOM* services.

The organizations depend on each other for cross services (e.g. JRTA depends on JPDC for *ENERGY* related services). Due to the recent allegations of poor service and lack of cooperation among the organizations, Johannesburg City Corporation (JCC) has decided to act as the mediator among these four entities. Any cross service will have to be performed through JCC.

Each organization can either provide service or request for service that others provide. The requests for services are sent to JCC who puts the requests on the specific organization's service queue. The organizations have no idea whom they are serving. Implement the above scenario using Mediator design pattern.

Sample Input	Expected Outcome
Init	All four services are initiated through mediator
JWSA POWER	JWSA requests for *POWER* service
JRTA POWER	JRTA requests for *POWER* service
JPDC TELECOM	JPDC requests for *TELECOM* service
JPDC SERVE	JPDC serves the request of JWSA
JPDC SERVE	JPDC serves the request of JRTA

Table 2: Sample Input and Expected Outcome

You can use built-in Queue data structure of Java for this problem.

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Submission Deadline: 10 PM, June 21, 2021