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COS 214 Tutorial 2

- This tutorial takes place on **02 September 2021**.
- This tutorial consists of **4 questions**.
- The tutorial does not contribute towards your final marks.

Question 1 ..... (3 marks)

For each of the following statements, identify the pattern that best matches the statement.

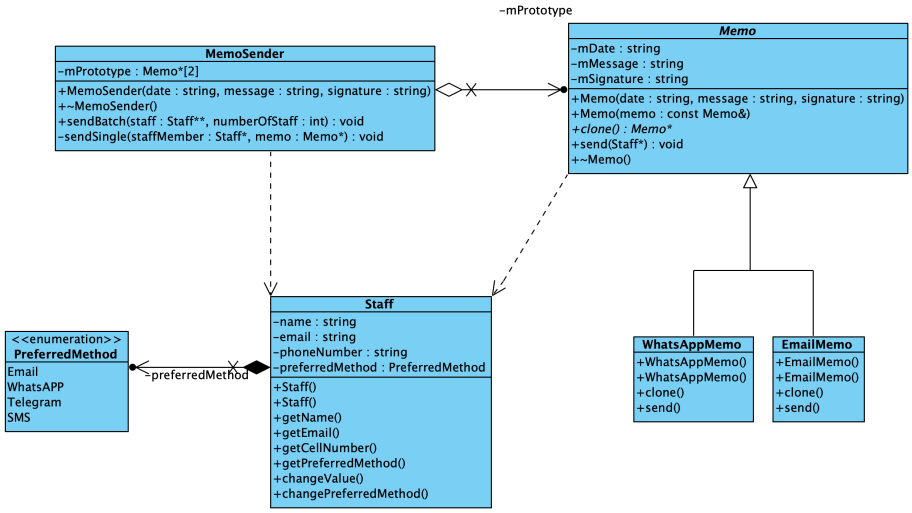
1.1 Provides a hierarchy that encapsulates many possible "platforms", and the construction of a suite of "products". (1)

1.2 Used in situations where it is necessary to dynamically swap out algorithms. (1)

1.3 Creates an object by making a copy of an existing object. (1)

Question 2 ..... (11 marks)

Consider the following design for the memo sender example and answer the questions that follow.



2.1 Identify the participants of the design pattern shown in the class diagram. (4)

2.2 Consider the following implementation of the `sendBatch` function.

```
1   void MemoSender::sendBatch(Staff** staff, int numberOfStaff) {
2   cout << "Starting to send a batch of messages ..." << endl;
3   for(int i = 0; i < numberOfStaff; i++) {
4   switch (staff[i]->getPreferredMethod()) {
5   case Email :
6   sendSingle(staff[i], mPrototype[0]->clone());
7   break;
8   case WhatsAPP :
9   sendSingle(staff[i], mPrototype[1]->clone());
10  break;
```

```
11      default : cout << "Error - preferred method not available" << endl;
12      }
13      }
14      cout << "All messages were sent!" << endl;
15      }
16
```

a) Provide an implementation for the `clone` function of the `EmailMemo` class. (3)

b) The `send` function for sending email is defined by: (1)

```
1       void EmailMemo::send(Staff* staff) {
2       Memo::send(staff);
3       cout << "Email" << endl;
4
5       }
6
```

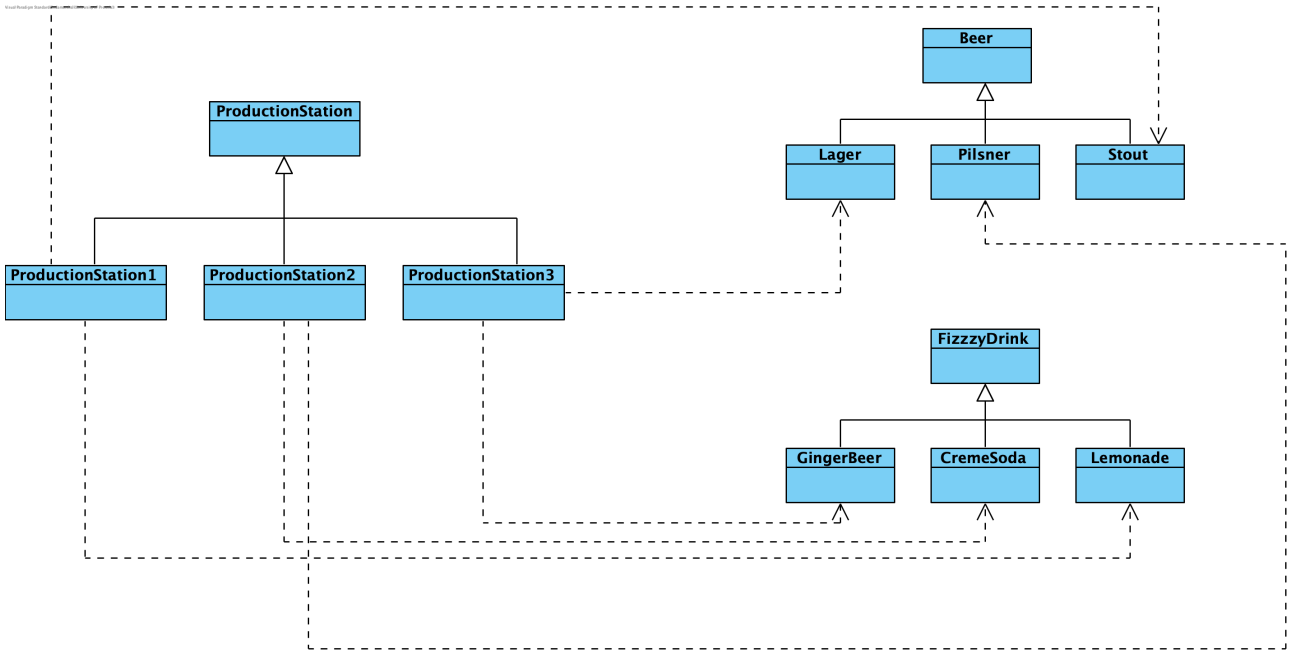
Is this an implementation of the Template Method design pattern?

2.3 Complete the following main program (3)

```
1       int main() {
2       ---[i]--- sender("August 18, 2020", "Please remember the online meeting tomorrow
3
4       ---[ii]---** staffList = new ---[ii]---*[4];
5
6       staffList[0] = new Staff("Paul Dool","p.dool@cos214.ac.za",
7       "012 004 9936",Email);
8       staffList[1] = new Staff("Kathy Hope","k.hope@cos214.ac.za",
9       "022 804 9936",WhatsAPP);
10      staffList[2] = new Staff("Roger Reed","r.reed@cos214.ac.za",
11      "084 999 5055",WhatsAPP);
12      staffList[3] = new Staff("Lebo Nkosi","l.nkosi@cos214.ac.za",
13      "081 111 9033",Telegram);
14
15      ---[iii]--- // Send the message to the staff members
16
17      return 0;
18      }
19
```

Question 3 ..... (12 marks)

The brewery has been repurposed even further. It now produces and bottles beer, fizzy drinks and sparkling wine. It never produces combinations of beer, fizzy drinks or sparkling wine at the same time. That is, the process in charge of managing what was originally brewing will only produce product from one grouping at a time. The following is a class diagram showing the classes in the system enabling the production of beer and fizzy drinks.

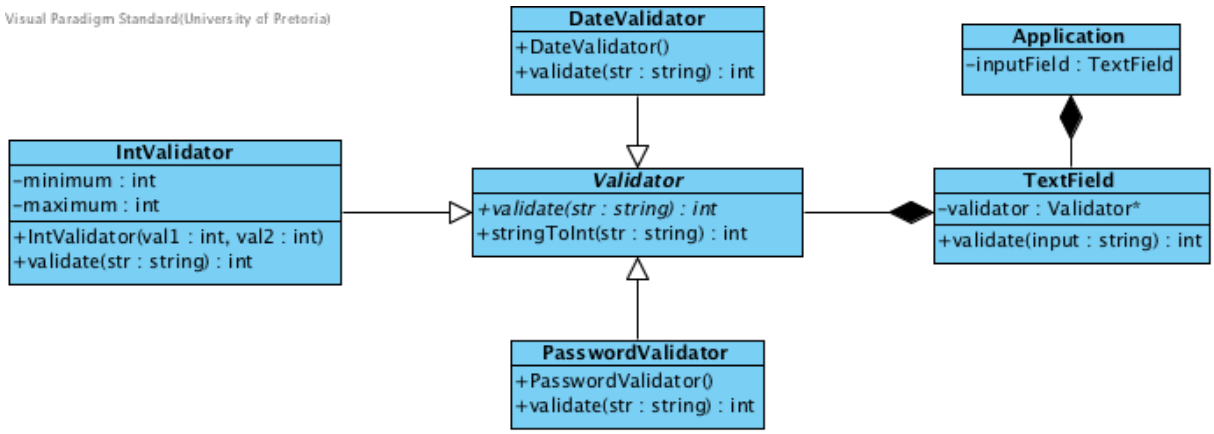


3.1 Identify the participants of the design pattern shown in the class diagram. (8)

3.2 What needs to be added to the given class diagram to enable the production of sparkling wine? (4)

Question 4 ..... (6 marks)

The following diagram is the class diagram of the design of a generic input field used by a client program. It applies the Strategy design pattern.



4.1 Complete the following list of participants and features as applied to the pattern. (4)

i Context

ii Strategy

iii Concrete Strategies

iv algorithm

4.2 Write the implementation of the `validate()` method of the `TextField` class as it should appear in `TextField.cpp`. (2)