Atılım University
Department of Software Engineering

SE461 Software Design Patterns
Fall, 2021-2022
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Assignment 4
Due Date: December 31, 2021 23.59
Duration: 8 Days

WARNINGS
- Students who either cheat, attempt to cheat or provide a help to other(s) in cheating (based on JPlag), get 0 (zero) grade from assignment. Also, based on the regulations, a disciplinary action will be taken.
- For every late hour, 10 points will be cut.
- Assignments sent by e-mail will not be accepted.

Most credit-cards comply with ANSI Standard X4.13-1983. The first digit in your credit-card number means:

- travel/entertainment cards (such as American Express (Amex) and Diners Club) if 3

- Visa if 4

- MasterCard if 5

In Amex cards, 3rd and 4th digits indicates the currency, 5th through 11th are the account number, 12th through 14th are the card number within the account and 15th digit is a check digit. Amex cards have only 15 digits.

In Visa cards, digits two through six are the bank number, digits seven through 12 or seven through 15 are the account number and digit 13 or 16 is a check digit.

In MasterCard, digits two and three, two through four, two through five or two through six are the bank number (depending on the whether digit two is a 1, 2, 3 or other). The digits after the bank number up through digit 15 are the account number, and digit 16 is a check digit.

1. Propose and adapt an existing design pattern to parse a given credit-card number to one of Amex, Visa or MasterCard. Separate the possible candidates of bank numbers, account numbers, and check digits.

2. Prepare a report to justify why you choose the pattern. Your report must not exceed 300 words. Add as a separate **PDF** file to your final ZIP.

3. Draw the UML Class Diagram of your proposed design.

4. Implement your design sticking with your UML Class Diagram. A sample run for an Akbank VISA Test Card might look like this:

   SAMPLE RUN:

   ```
   Enter credit-card number: 4355 0843 5508 4358
   Card type: VISA
   Possible bank numbers: 35508
   Possible account numbers: 435508, 435508435
   Possible check digits: 4, 8
   ```

NOTES:

If you find any non-clear parts in the assignment, you can make reasonable assumptions about them and implement according to your assumptions.

Your programs will be evaluated by both following your UML Class Diagrams and the answer key. Therefore, make sure to follow your UML Class Diagrams while implementing your proposed solution.

Upload your report, your class files, and your UML Class Diagram as SVG or high-res PNG. You can compress your files as a ZIP file.