Final Project - Credit card numbers and the case of Mobius Duck

In this project, you are assisting an investigation. The investigator asked you to help him determine the validity of credit card numbers located in a case of Mobius Duck, case number 20150510-001.

Your task is to:

- Read the data listed below "Data to Evaluate" from a file.
- Evaluate each number to see if they are representing a possible credit card number.
- Validate each credit card number to see if they are a valid number.
- Store the valid numbers and invalid numbers in a separate array.
- Write the contents of validated credit card number array into a file called "valid_cards.txt".
- Write the invalid credit card number array to a file called "invalid_numbers.txt".
- Make sure to include the issuer for each group of credit card numbers identified.
- Your application should work with any number of credit card entries.

Turn in:

- Source code (.java) files of all classes and driver class.
- Completed UML for application classes.
- Flow chart for every method that contains beyond sequential logic flow.
- Generated javadocs structure.
- Input and output files

Grading:

- Naming standard followed for project files – 2%
- Input and output files – 2%
- Javadoc structure – 5%
- Project compiled without error – 91%
  - Proper use of internal comments, docstrings, and tags – 5%
  - Self documenting field, identifier, method, static, final, and class identifiers - 5%
  - Properly validated input and output files - 5%
  - Properly used arrays to store data - 5%
  - Correct output calculated by the Luhn algorithm and card number issuer identified – 71%

Extra Credit:

- Implement the full Issuer IIN Range instead of the simplified list.

How to validate Credit Card Numbers?

Most credit card number can be validated using the Luhn algorithm, which is more or a less a glorified Modulo 10 formula!

The Luhn Formula:

- Drop the last digit from the number. The last digit is what we want to check against
- Reverse the numbers
- Multiply the digits in odd positions (1, 3, 5, etc.) by 2 and subtract 9 to all any result higher than 9
- Add all the numbers together
- The check digit (the last number of the card) is the amount that you would need to add to get a multiple of 10 (Modulo 10)

Luhn Example:

	Steps															Total
Original Number:	4	5	5	6	7	3	7	5	8	6	8	9	9	8	5	**5**
Drop the last digit:	4	5	5	6	7	3	7	5	8	6	8	9	9	8	5	
Reverse the digits:	5	8	9	9	8	6	8	5	7	3	7	6	5	5	4	
Multiple odd digits by 2:	10	8	18	9	16	6	16	5	14	3	14	6	10	5	8	
Add digits from line above	1	8	9	9	7	6	7	5	5	3	5	6	1	5	8	
Add all numbers:	1	8	9	9	7	6	7	5	5	3	5	6	1	5	8	**85**
Mod 10:	(85 + X) modulo 10 = **0 ,** thus X=5 (last digit of card)															

List of credit card number formats

Credit Card Issuer	Starts With (IIN Range)	Length (Number of digits)
American Express	34, 37	15
Diners Club - Carte Blanche	300, 301, 302, 303, 304, 305	14
Diners Club - International	36	14
Diners Club - USA & Canada	54	16
Discover	6011, 622126 to 622925, 644, 645, 646, 647, 648, 649, 65	16
InstaPayment	637, 638, 639	16
JCB	3528 to 3589	16
Laser	6304, 6706, 6771, 6709	16-19
Maestro	5018, 5020, 5038, 5893, 6304, 6759, 6761, 6762, 6763	16-19
MasterCard	51, 52, 53, 54, 55	16-19
Visa	4	13-16
Visa Electron	4026, 417500, 4508, 4844, 4913, 4917	16

Data to Evaluate
3158539628375348
3337465828248404
3112804683572030
3112804683572033
5435528978467581
6706465468107999
6304362971054667
6706169762827894
6706169762827892
4844104341377697
4913405490886727
4844885754351829
4844885754351822
6371473570875275
6381475006869978
6389057917814806
347100734345549
347100734345543
6011162533805000
6011621663574413
6011824617460743
6011824617460745
6389057917814802
4539318768050385
36880982786892
36845793345501
36661154562232
36661154562234
5893329089846994
6761680165952016
6763100400984029
6763100400984022
5127043299122389
5330838017737340
5429168755154025
5429168755154023
375354034606481
379570632133224
4485521241443135
4532916206508075
4532916206508076
5590976687287124
5540641137519895
5540641137519892
30522070708059
30066552673241
30365487186802
30365487186801

Simplified Issuer Codes for Final Project:

VISA:
45
44
MasterCard:
51
53
American Express (AMEX):
37
34
Discover:
60
JCB:
31
33
Diners Club - North America:
54
55
Diners Club - Carte Blanche:
30
Diners Club - International:
36
Maestro:
58
LASER:
67
Visa Electron:
48
49
InstaPayment:
63