# CS167 - Intro Programming

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## Homework 04: Credit Cards (due Feb 16, 2016)

1. Credit Cards. The typical credit card has a 16-digit account embossed on the front. Typing the 16 digits into a box on a computer to complete an on-line purchase can be challenging. To catch simple errors (e.g. transpositions, off-by-one, etc), the far right digit in the account number is actually a *checksum*. In other words, its value is the result of a carefully designed calculation involving the other 15 digits. It is an example of a Luhn Algorithm which is itself part of a much larger class of error detecting codes.

   If the checksum is inconsistent with the other 15 digits, the user is asked to re-enter the card number. The good thing about this approach is the check can be done right at the point of entry and doesn't rely on contacting the card provider to verify the number.

   The Luhn digit check algorithm used in nearly all credit card account numbers consists of the following steps:

   a. Double the value of alternate digits of the primary account number beginning with the second digit from the right (the first right—hand digit is the check digit.)

   b. Add the individual digits comprising the products obtained in Step (a) to each of the unaffected digits in the original number.

   c. The total obtained in Step (b) must be a number ending in zero (30, 40, 50, etc.) for the account number to be validated.

   Write a program that requests an account number (16 digits in length, entered on a single line in the form XXXX XXXX XXXX XXXX, groups of 4 digits, separated by a single space), applies the check algorithm and informs the user whether the number is a valid number. Use string operations to manage the credit card number. A valid Mastercard card number to test your program on is: 5394 1291 0548 2350 (don't get excited, it's a fake card number)

   Furthermore, pretend that you only accept Visa, MasterCard, American Express or Discover cards. In other words, reject cards that don't start with the correct numbers. The following table describes the various account number prefixes used by the various card types.

| Card Type | Prefix |
|---|---|
| AmEx | 34, 37 |
| Discover | 6011, 644, 65 |
| MasterCard | 51—55 |
| Visa | 4 |

   Check the account number to determine whether it is an accepted type and inform the user. Use strings and/or lists in this program.

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**Homework 04 Pairings:**

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['Ashley, George', 'Donner, Eliza']
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