Dynamic Ledger: a tutorial

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1 Introduction

Dynamic Ledger is a program for managing personal finances. Unlike most other accounting programs, it gives you control over your finances even when you have several delayed transactions. With it, you can be exactly as frugal as you need to be, and you can easily avoid spending more than you actually have. In addition, you can use the program to clean and condense your ledgers to save space.

Some ledger ledger programs allow you to input delayed transactions, but few distinguish between "pending" transactions and charges that haven't even shown up online yet. In addition, no other ledger program I've seen takes into account the inherent layering of credit accounts on top of bank accounts. Dynamic Ledger, on the other hand, calculates the true balances of your bank accounts (i.e., how much hard money you will have after everything on your credit cards is paid and all transactions clear) even before you make any credit card payments.

2 Installation

See `INSTALL` for the standard installation instructions for any Linux/Unix package that uses GNU `autotools`. Although standard, these instructions are cryptic and verbose, so I attempt to provide a simplified version below.

2.1 Requirements

1. Make sure you have a C compiler on your system. Linux users can download and install gcc, the GNU Compiler Collection, at `http://gcc.gnu.org/`. Mac users can install gcc or clang through Xcode. Just open Xcode, go to Preferences > Downloads, and look under the "Compnents" tab. There you should be able to install the "command line tools". Windows users should install Cygwin (cygwin.com) or MinGW (mingw.com) and get gcc during the installation.

2. A command line interface tool. Linux users should already be familiar with this. Mac users should go open Applications > Utilities > Terminal. Windows users should open Cygwin (cygwin.com) or MinGW (mingw.com). You should have a basic familiarity with the Linux/Unix command line interface before you begin. If not, you can watch an online video tutorial. At minimum, you should know the commands, `cd`, `ls`, and `pwd`.

2.2 Installation

1. Download and unzip the tarball, `dl-0.0.tar.gz`, if you have not done so already. To unzip, "cd" into the directory containing the tarball and enter into the command line,

```
$ tar -zxvf dl-0.0.tar.gz
```

   A directory called `dl-0.0` should have been created.

2. "cd" into `dl-0.0` and enter the following into the command line.

```
$ ./configure
$ make
$ sudo make install
```

   You may have to type in your computer's password.

2.3 Check your installation

At this point, your program should be ready to use. To test, type

```
$ dl
```

`dl` is the command you will type into the command line to use Dynamic Ledger.

For quick usage information, just type

```
$ man dl
```

Use the up and down arrow keys to browse the documentation, and type "q" to quit.

2.4 View source code documentation

Optionally, to view the documentation of the source code, use `doxygen` (http://www.stack.nl/~dimitri/doxygen/). First, download and install `doxygen`. Then open your command line interface program, "cd" into the main directory of this package, and run

```
$ doxygen Doxyfile
```

Standard `doxygen` documentation is output to the `html/`, `latex/`, and `rtf/` folders.

3 Program usage

Let's use the ledger file, `ledger.txt`, in the `tutorial/` folder:

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking	gas	gas
−15.36		card	checking	food	food
−5		card	checking		paper
400			checking		
300			checking	food	
300			checking	food	
350			checking	food	
100			checking	gas	
800			checking	gas	
200			checking	gas	
400			checking		
440			checking		

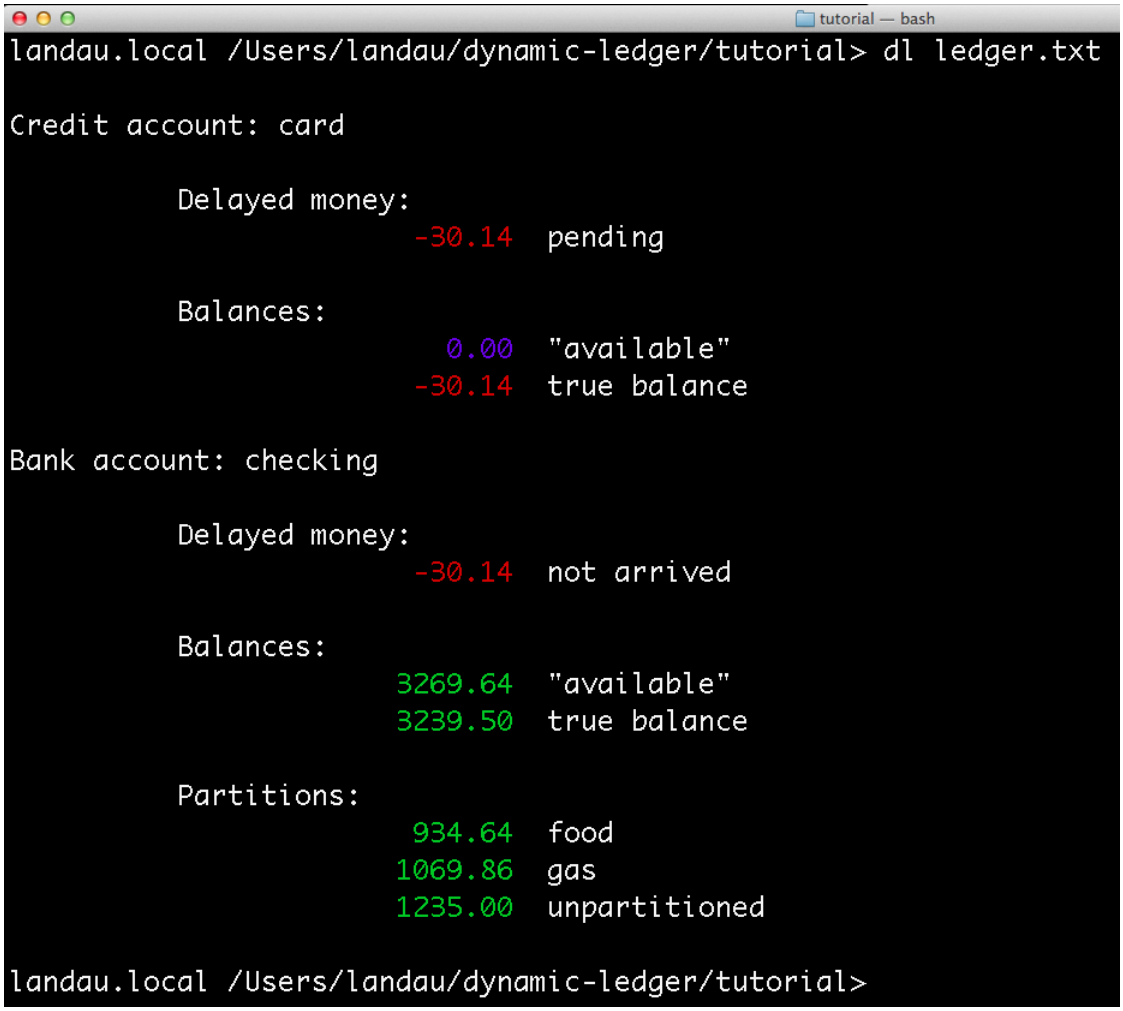
You can type `man dl` into the command line to learn what everything in this ledger file means, and you can read Section 4 to see an extended example. For now, let's just say that `ledger.txt` is a tab-delimited spreadsheet where you record your financial transactions.

3.1 Summarizing ledgers

To summarize `ledger.txt`, open your command line interface program, "cd" (change directories) into the directory containing `ledger.txt`, and type

```
$ dl ledger.txt
```

The following summary should print to your screen.



As Section 4 explains, this summary shows the balances of all the accounts in the ledger. Specifically, it predicts the balances that you should see when access your credit and bank accounts online (the "available" balances), along with what your account balances *will be* once all your delayed transactions have cleared (the true balances).

This feature is the real power of Dynamic Ledger. Just by looking at the summary, you can

1. Check that your ledger file is correct: i.e., verify that the "available" and pending balances in the summary agree with the balances you see online.
2. Look at the true balances to see exactly how much *real money* you have left to spend. That way, you can be sure to only spend money that you actually have.

3.2 Cleaning ledger files

Sometimes, ledger files get long and messy. With Dynamic Ledger, you can condense and clean them up. Let's say `ledger.txt` looks like this:

ledger.txt

amount	status	credit	bank	partition	description
−15.36	cp	card	checking	food	food
−5		card	checking		paper
400			checking		
−30.14	cn	card	checking	gas	gas
300	l		checking	food	
300			checking	food	
350			checking	food	
100			checking	gas	
800			checking	gas	
200			checking	gas	
400			checking		
440			checking		

To output a condensed, clean version of this ledger to `out.txt`, just type

```
$ dl ledger.txt out.txt
```

The condensed ledger looks like

out.txt

amount	status	credit	bank	partition	description
−30.14	cn	card	checking	gas	gas
−15.36	cp	card	checking	food	food
1235.00		card	checking		condensed
300	l		checking	food	
650.00			checking	food	condensed
1100.00			checking	gas	condensed

If you have read Section 4, you will see that this operation summed up all the transaction amounts of the cleared transactions within each bank account partition and stored these sums as individual rows. The upshot is that you have a new, condensed ledger with your delayed and locked transactions still visible. You can verify that the summary of `ledger.txt` is the same as the summary of `out.txt` by typing

```
$ dl ledger.txt
$ dl ledger.txt out.txt
$ dl out.txt
```

Type `man dl` into the command line and read Section 4 to understand delayed transactions. You can specify the kind of delay of each transaction by entering "cn", "cp", "c", "p", or "n" in the "status" column of the ledger file. The condense/clean operation will leave these transactions alone.

In addition, you can lock any cleared transaction that you want preserved. Just enter "l" into the status column. Then, the condense/clean operation will ignore it even though it is cleared.

4 How to write and maintain a ledger file

Dynamic Ledger requires you to keep your ledger in a tab-delimited spreadsheet file. This section shows you how to keep track of your transactions in this ledger file when you're using the program to balance your checkbook.

4.1 Managing delayed transactions over time

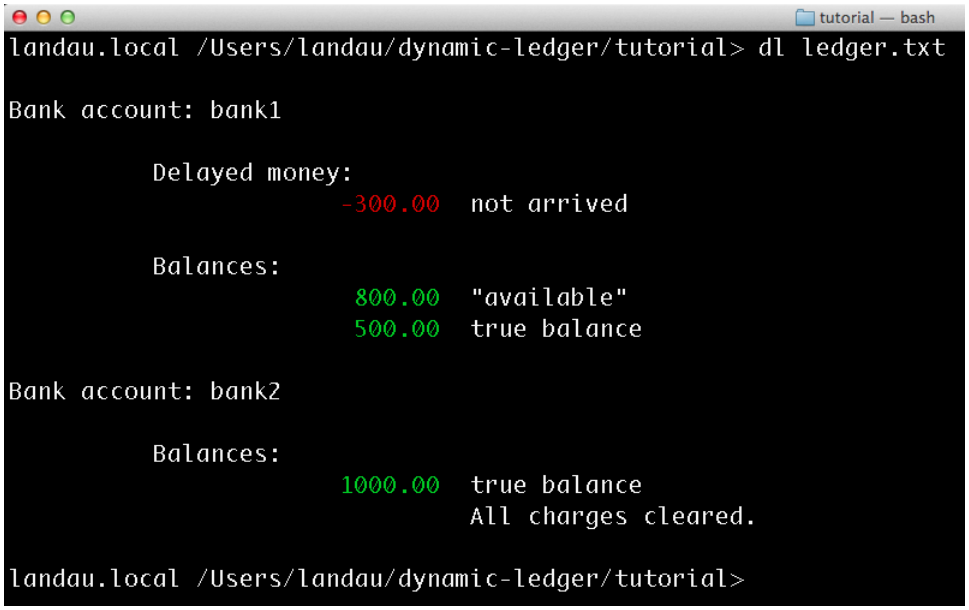
Suppose I have two bank accounts. I began with $800 in my first bank account, and then I make a withdrawal of $300. Suppose it's still too early for the $300 withdrawal to show up on my bank account's website. In addition, I have a second bank account of $1000. I make the following tab-delimited ledger file to record this information.

Let's start with the following tab-delimited ledger file, `ledger.txt`.

ledger.txt

amount	status	credit	bank	partition	description
−300	n		bank1		
800			bank1		
1000			bank2		

The "n" in the status column indicates that the $300 charge has not arrived at bank1 yet. I can use Dynamic Ledger to compute the following summary of `ledger.txt`.



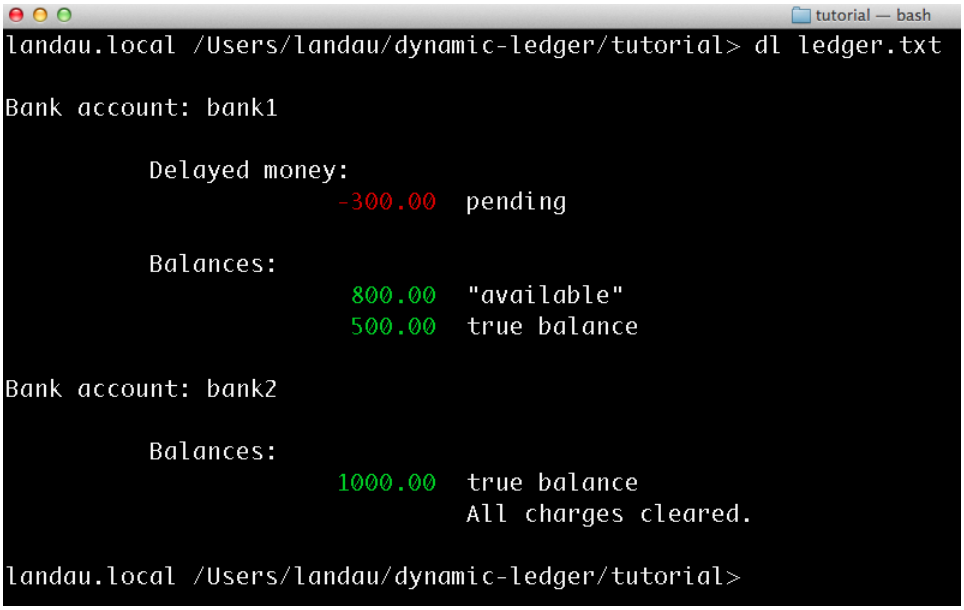
The program shows me an "available" balance of $800.00 because that is the balance I should see when I log on to my bank account's website to check. However, my true balance is $500 because of the delayed $300 withdrawal.

Suppose that next time I log on to my bank account's website, the $300 withdrawal is shown as "pending". To make `ledger.txt` agree with what I see online, I change the "n" status to "p":

ledger.txt

amount	status	credit	bank	partition	description
−300	p		bank1		
800			bank1		
1000			bank2		

The summary from Dynamic Ledger is now

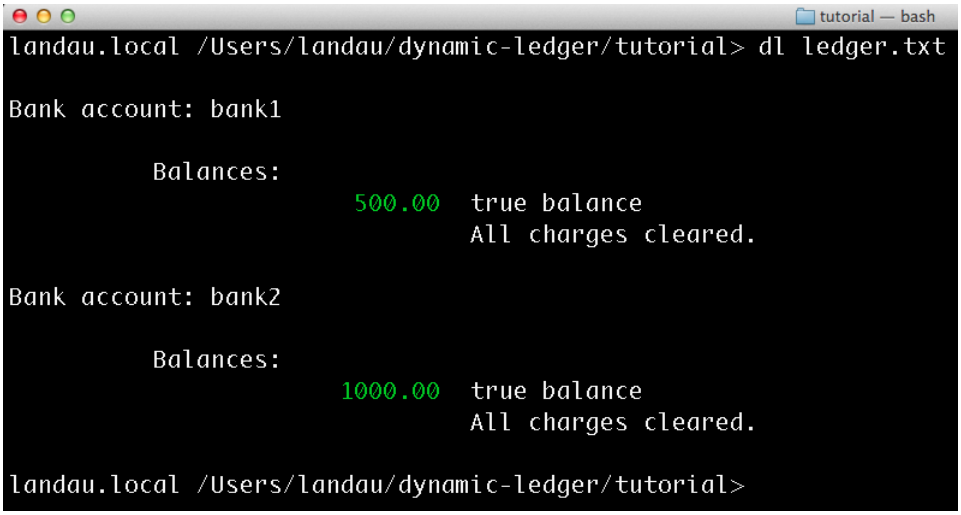


When the withdrawal finally clears online, I can delete the "p":

ledger.txt

amount	status	credit	bank	partition	description
−300			bank1		
800			bank1		
1000			bank2		

The summary from Dynamic Ledger is now



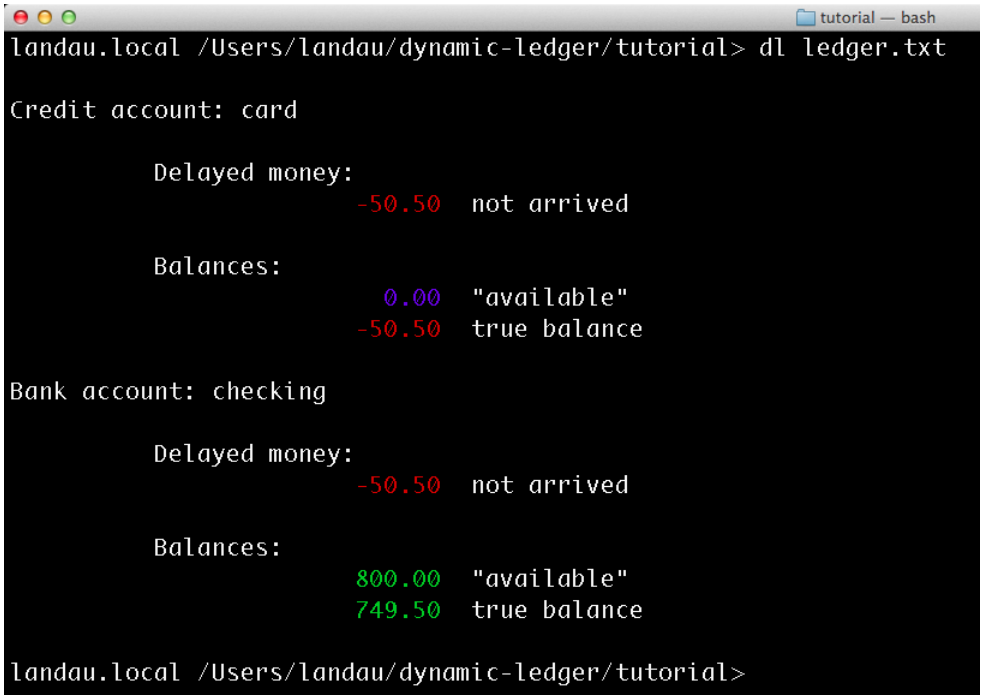
4.2 Managing credit accounts

Under the program's conceptual model, transactions flow through credit accounts into bank accounts. To see how this works, consider the following extended example. Suppose I start with a checking account with $800. I spend $5 on paper, then $15.36 on food, and then $30.14 on gas. I pay all those things with a credit card, but it's too early for any of those transactions to actually show up my credit card's website. I make the following tab-delimited ledger file.

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cn	card	checking		gas
−15.36	cn	card	checking		food
−5	cn	card	checking		paper
800			checking		

Note the "cn" transaction status code for all three charges. That means I made these transactions with a credit card, but it's too early for the charges to actually show up on the credit account's website. The summary of the ledger is



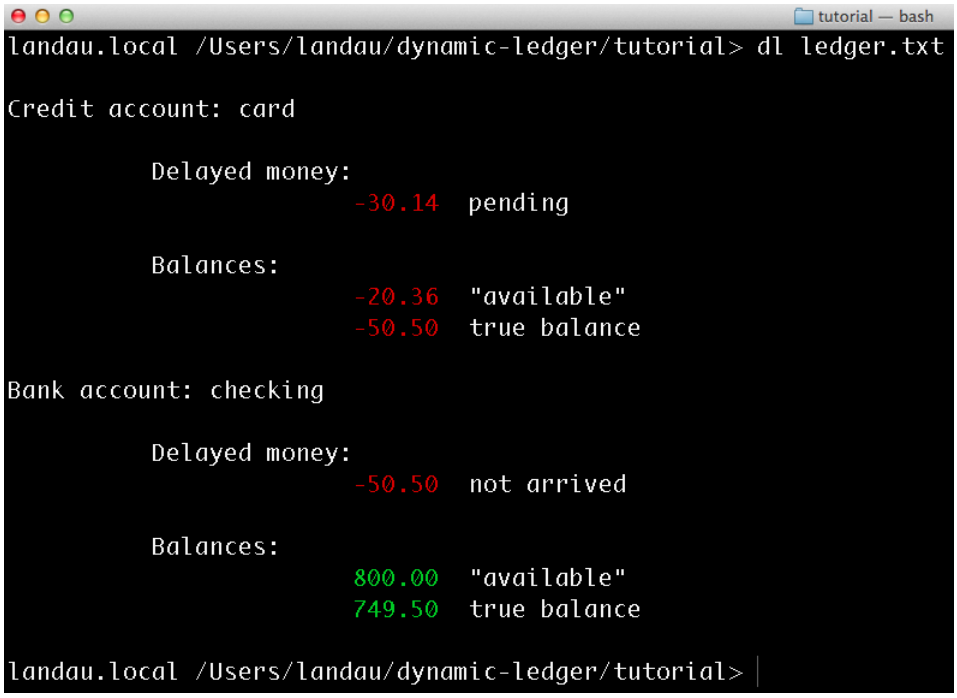
Notice that my credit card has an "available" balance of $0.00, but my true balance is -$50.50. That means that when I go on online, I should see an account balance of $0.00 (if I recorded my transactions correctly). However, because I have delayed transactions, I owe the credit company $50.50 in reality. Similarly, my bank account should show an "available" balance of $800.00 online, but in reality, I only have $749.50 left to spend.

Over time, transactions will begin clear on the credit card company's website. Suppose that after a few days I see that the food and paper transactions have cleared, but the gas transaction is still "pending". I change my transaction status codes to reflect the changes.

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking		gas
−15.36	c	card	checking		food
−5	c	card	checking		paper
800			checking		

"cp" means pending on the credit card, while "c" means charged to the credit card but unpaid. The new summary from the program looks like

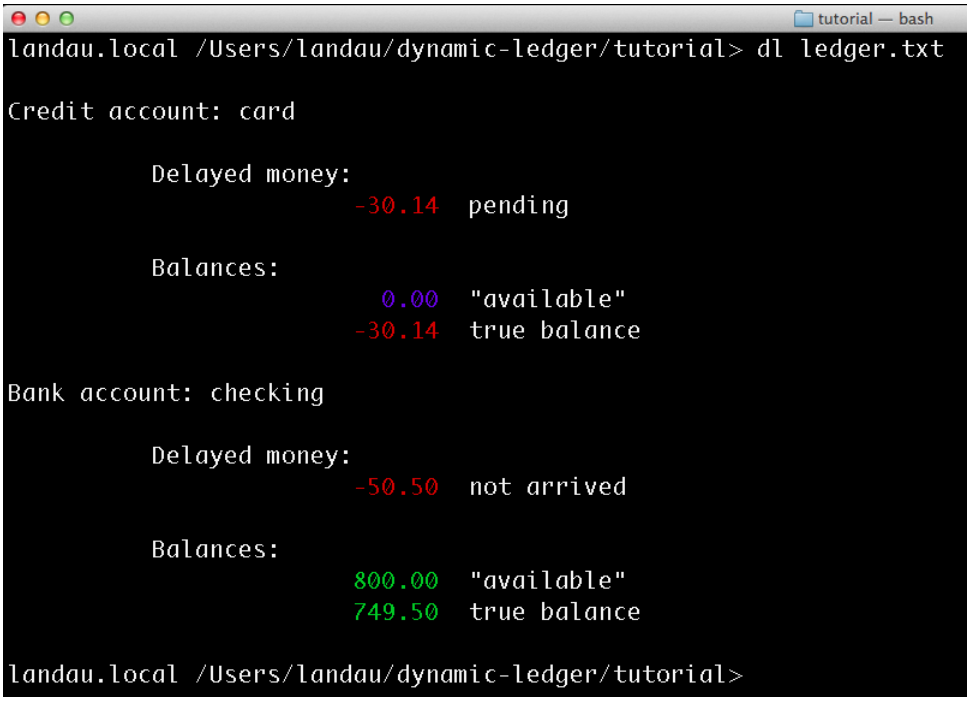


Since some charges have cleared, I can now make a credit card payment. I now pay my "available" debt of $20.36. (I cannot pay for pending charges). I now think of the food and paper transactions as a single charge of $20.36 en route to my checking account. When I make the payment and it clears on the credit company's website, I update the ledger file.

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking		gas
−15.36	n	card	checking		food (cred pmnt $20.36)
−5	n	card	checking		paper (cred pmnt $20.36)
800			checking		

The "n" statuses means that the credit payment has not shown up on my bank account's website yet. The summary from the program is now

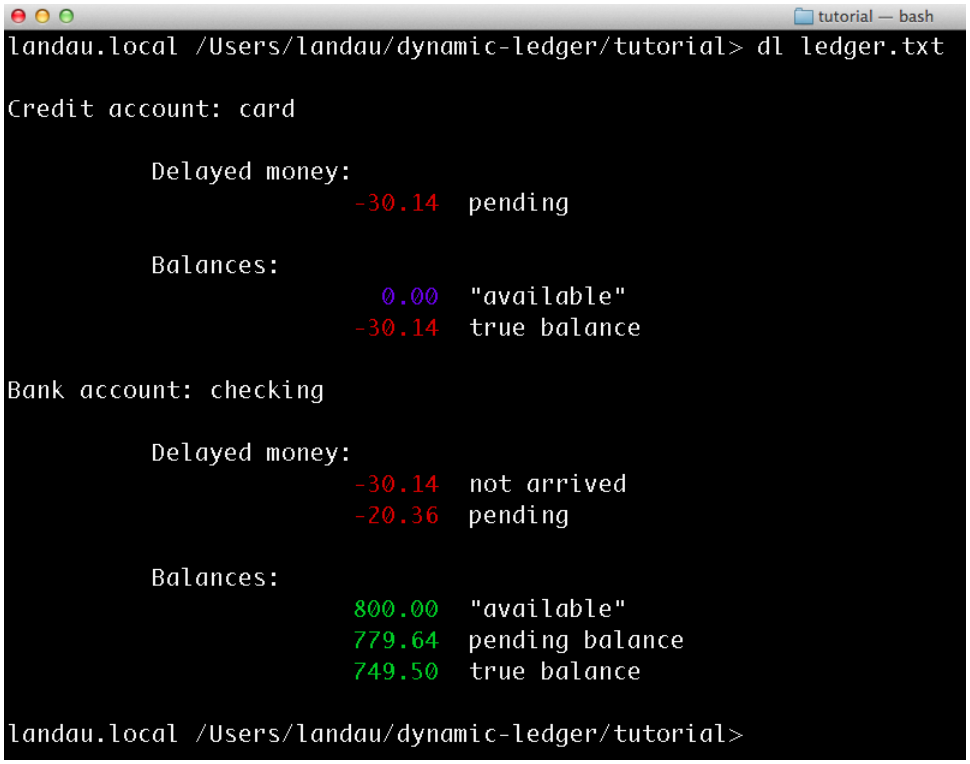


I wait a day or two, and then I log on again and see that my credit card payment shows up as "pending". Now, I change the n's to p's.

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking		gas
−15.36	p	card	checking		food (cred pmnt $20.36)
−5	p	card	checking		paper (cred pmnt $20.36)
800			checking		

My summary shows

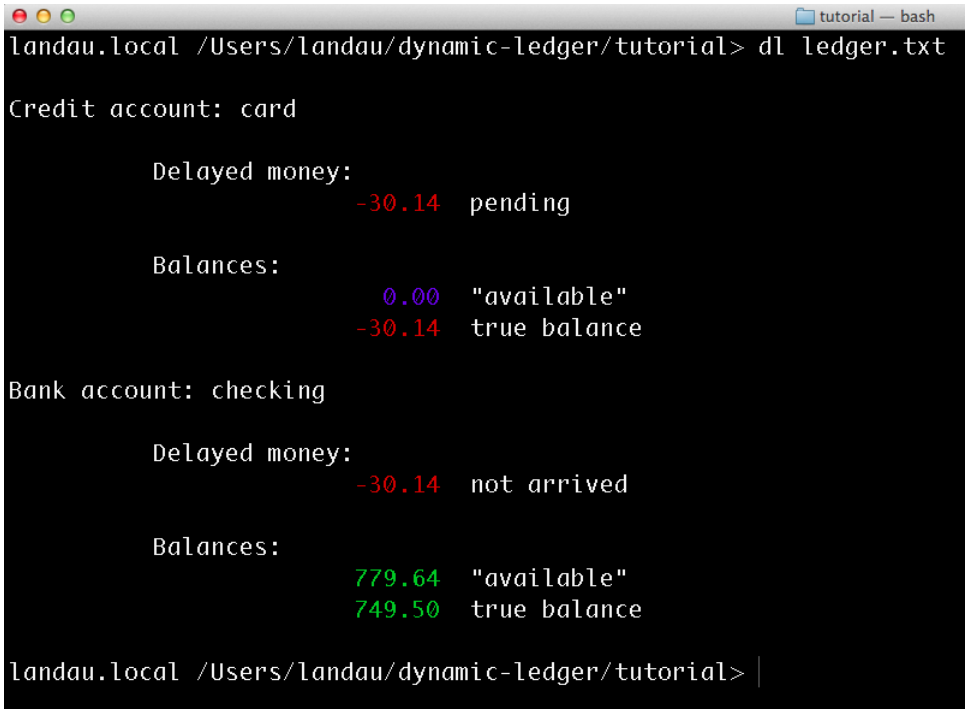


Finally, when the credit card payment clears, I can delete the p's to show that the food and paper charges have completely cleared all my accounts.

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking		gas
−15.36		card	checking		food (cred pmnt $20.36)
−5		card	checking		paper (cred pmnt $20.36)
800			checking		

My updated summary is now



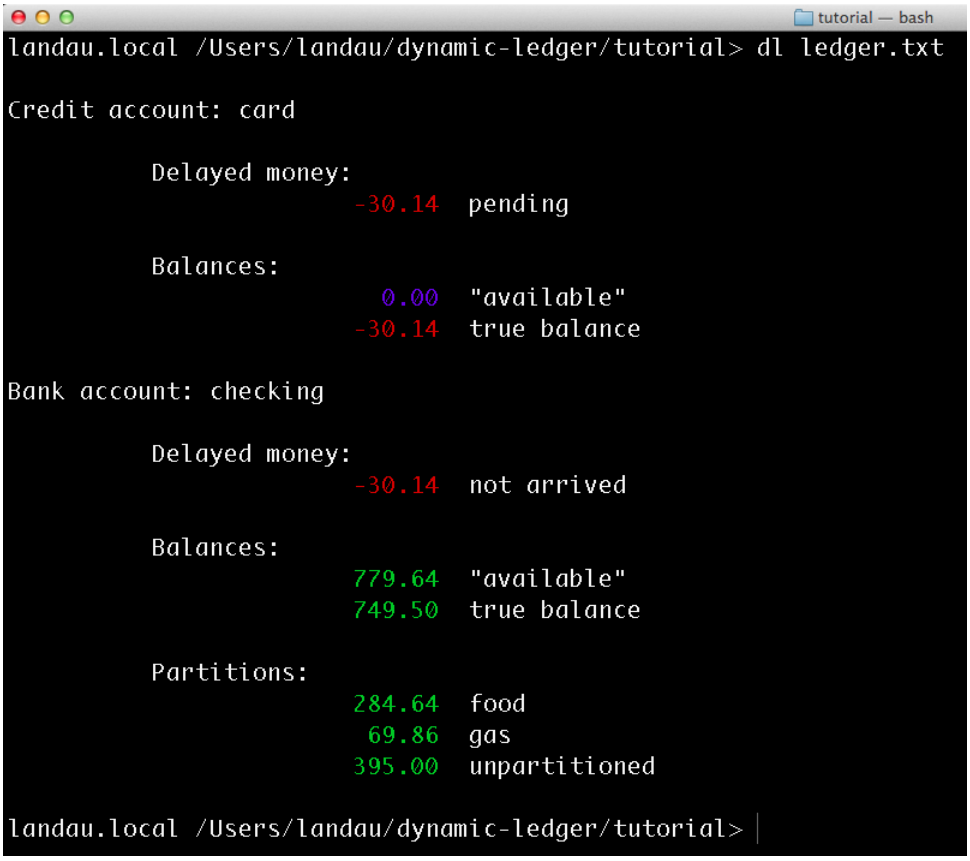
4.3 Partitioning bank accounts

The program lets the user divide bank accounts into partitions. For example, if I make special partitions in my bank account for food and gas, I might write

ledger.txt

amount	status	credit	bank	partition	description
−30.14	cp	card	checking	gas	gas
−15.36		card	checking	food	food (cred pmnt $20.36)
−5		card	checking		paper (cred pmnt $20.36)
400			checking		
300			checking	food	
100			checking	gas	

And my summary would look like



Notice that only the true final balances for the partitions are shown. In other words, partition balances are calculated as if all transactions have completely cleared. This feature encourages you to avoid spending more money than you actually have.