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Accounting for Developers 101

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This is a double-entry accounting primer for software developers who write code to track money. It distills the essence of accounting in an effort to help developers bridge the vocabulary and conceptual divide that exists between engineering and finance. There's nothing specifically about Subledger until Accounting for Developers 103.

Background

Both of us have known for a very long time that accountants used double-entry accounting (hereafter accounting) to track money. We knew it was the language of business, and that Warren Buffett considers it essential.

Even though we knew these things, we never once considered using it as a technique in software that we wrote. It's probably a good thing: everything we thought we understood we actually misunderstood!

Having implemented Subledger, we're amazed by accounting's elegance and simplicity. Our goal for this series of documents is to allow you to appreciate it as we do.

History

If you look at or use modern accounting software it's easy to overlook the elegance and simplicity. These packages make accounting appear broad, deep and mysterious. Architecturally, most of them appear to be business document databases that produce accounting reports, as opposed to pure accounting systems. In fact, the most popular packages violate some of the basic tenets of accounting in an effort to make them "simpler" to use.

Luca Pacioli, often referred to as "The Father of Accounting," wrote, printed and distributed the first complete description of double-entry accounting in 1494. It was written in vernacular Italian, which made it widely consumable.

It is tragic that the actual creator of accounting, which is known to have been in use for at least 2 centuries(!) before Luca described it, will likely never receive the recognition that she/he deserves. Some historians believe that its use led directly to the

Renaissance by increasing trust, allowing more capital to be raised, and improving the efficiency of putting the capital to work.

Luca's *Particularis de Computis et Scripturis* (Details of Calculation and Recording) was an appendix to the math text *Summa de Arithmetica, Geometria, Proportioni et Proportionalità* (Summary of Arithmetic, Geometry, Proportion, and Proportionality). It's hard to imagine that one book introduced Algebra, Geometry, and Accounting to Europe!

Luca mentored Leonardo da Vinci, who drew the illustrations of the regular solids used in another Pacioli work, *De Divina Proportione* (The Divine Proportion). Apparently, genius really does love company!

The fundamentals of accounting predate, yet bear striking resemblance to, Newton's Third Law of Motion: "For every action, there is an equal and opposite reaction," and Lavoisier's Law of Conservation of Mass: "Mass can neither be created nor destroyed, only rearranged or converted to other forms."

Accounting is a 700+ year old technology. How many technologies have survived that length of time, let alone flourish unchanged! **Accounting is the universally accepted gold standard for tracking the flow of value, works for every business model, and has no apparent successors**.

To put its durability into perspective, double entry accounting was created to manage financial concerns before negative numbers were in widespread use in Europe. Knowing that helped us understand the commonly encountered, yet rarely defined terms debit, credit and balance in an entirely new light.

Given its position as the bedrock of finance, we find it very strange that few applications use accounting to track money.

Why is Accounting Important?

Nearly every business in the world is required to maintain records and pay taxes based on their accounting records. For many inexperienced entrepreneurs this tarnishes accounting with a bitter taste of "taxiness." This is exceedingly unfortunate because it is far more valuable than that!

Accounting allows businesses to compute critical metrics, most fundamentally, what the business:

- has and expects to receive
- owes to vendors and customers
- owes to shareholders (owners)
- has earned
- has spent

Accounting exposes where value is stored within, and how it flows through a business. It does so with great accuracy which inspires great confidence. Business metrics and ratios such as gross and net income, gross and net margin and ROI should be based upon a quality accounting record. When such metrics are not based on accounting they are considered suspect and likely unreliable. **Quality accounting is a sign of, and the fundamental basis to prove, the trustworthiness of an entity's financial records**.

What is Accounting?

Accounting is a methodology of tracking the movement of value through a system of accounts.

The fundamental rule of accounting is that what the business owns and is owed must always EXACTLY EQUAL what it owes to others. We found this highly counterintuitive. It's easy to imagine transactions that appear to violate this rule, until you understand that accounting demands that any value that accumulates within the business is owed to the shareholders of the business -- in developer's terms, accounting maintains very strict separation of concerns.

This fundamental rule is expressed by the accounting equation:

THE ACCOUNTING EQUATION

What the Business Has and Expects to Receive	Must Equal	What the Business Owes to Vendors and Customers	Plus	What the Business Owes to Shareholders
Assets	=	Liabilities	+	Equity

Debit and Credit

Perhaps the most difficult vocabulary words in accounting are debit and credit. This is likely due to their use in consumer financial products such as bank statements, debit cards, and credit cards.

Let's define debit and credit from scratch. They translate from Italian, perhaps unsurprisingly given the accounting equation, as "owed to" and "owed by." While accurate and instructive, we've found the translations to be less useful than they could be, so we've included mnemonics that we've find quite useful.

DEBIT AND CREDIT TRANSLATIONS

Vernacular Italian	Translation	Useful Mnemonics
Debito	Owed to	To / Destination
Credito	Owed by	From / Source

Accounts

Accounts exist in two basic forms: those that are expected to have a preponderance of debit (debit normal balance), and those that are expected to have a preponderance of credit (credit normal balance).

ACCOUNTING EQUATION AND NORMAL BALANCE

What the Business Has and Expects to Receive	Must Equal	What the Business Owes to Vendors and Customers	Plus	What the Business Owes to Shareholders
Assets	=	Liabilities	+	Equity
Debit Normal	=	Credit Normal	+	Credit Normal

Adding a debit to a debit normal account increases the value in that account. Conversely, adding a credit to a debit normal account decreases the value in that account.

Accounts are used to measure value as it flows through the business. Accounts can represent internal views of external relationships such as bank accounts, or they may be used purely for internal managerial purposes such as inventory accounts.

Balance

The next fundamental concept in accounting is balance. Balance in accounting is that of an old-fashioned balance scale. Rather than weighing physical objects, accounting weighs debit and credit.

All debit and credit in an accounting system MUST balance. If you've ever heard about an accountant losing sleep at night because they were off by a penny, it's not the penny they're worried about! It's knowing that their system is out of balance. Accountants, like software developers, do not like inconsistent data!

While we think of account balances as a single value, but they are not. Balances in accounting are composed of two values: the sum of debit and the sum of credit to that point in time. The single value we're familiar with is the net balance, which is the smaller amount of the two subtracted from the larger:

debit(5):credit(10) = credit(10-5) = credit(5)

credit(5):debit(10) = debit(10-5) = debit(5)

Net balances in accounts are considered normal if the larger value (debit or credit) matches the normal balance of the account, or the account is perfectly in-balance, i.e. sum of debit equals sum of credit, i.e. is in balance, i.e. has a zero net balance. If the larger sum does not match the normal balance of the account, then the balance is considered abnormal and is displayed in parenthesis. **From a mathematical perspective, abnormal balances are essentially negative balances, though in accounting negative numbers should never be used or allowed**.

Accounts and Balances

Cash is an asset account. Asset accounts have debit normal balances. When cash is received accountants debit the cash account to increase it. When cash is spent, they credit the cash account to decrease it.

ASSET/CASH DEBIT NORMAL EXAMPLE

				0
		0		0
			0	0
			0	(0)

Notice the last line where we credit (decrease) 10 from a balance of 5. The balance is in parenthesis because the balance is abnormal: it has more credit (5+10) than debit (10). The result is NOT negative 5, as accounting has no negative numbers. Instead, it is a net credit balance of 5 in an account that normally should have a preponderance of debit, i.e. is a debit normal account.

This probably seems like a subtle point at first, but it is VERY important: double entry accounting is fundamentally based on the entire system being in balance just like that old-fashioned balance scale.

Everything works the opposite for credit normal accounts, i.e. a credit increases the balance, and a debit decreases the balance.

Debit and credit are simply the opposite of each other. This was a hard concept for us since we were used to looking at bank statements, where a debit always decreased the balance of the account and credit always increased the balance. We didn't know that bank account statements are literally just transcriptions of the bank's liability (credit normal balance) accounts!

Journal Entries

Journal Entries are how entries are made into accounts. Since the entire system must remain in balance at all times, each journal entry must also be in balance.

This means that entries are made in at least two accounts, hence the name double-entry accounting. One entry for the account the value is going **to** (debit) and one for the account the value came **from** (credit). Notice how our bolded mnemonics make it easy to understand which account needs to be debited, and which credited.

More subtle splits are possible, as we'll see in Accounting for Developers 102. This fundamental use of offsetting entries makes it unlikely that innocent mistakes – or larceny – will go unnoticed.

Let's say you borrow $5 from your friend Sam for lunch. How would you record this as a journal entry?

Here is a journal entry that records where the $5 went to (debit), and where the $5 came from (credit):

JOURNAL ENTRY EXAMPLE #1: BORROW CASH

Since this journal entry has 5 debit and 5 credit, it is in balance, and applying it to the system will keep the system in balance as well.

If you deposit that $5 **to** (debit) your checking account **from** (credit) petty cash, here's a journal entry that describes that transaction:

JOURNAL ENTRY EXAMPLE #2: DEPOSIT $5 CASH

Notice that we always list debit before credit. This is an industry standard dating back to (at least) Pacioli. While we respect the standard, it's clearly a stylistic issue that has no effect on the data.

In the next post, Accounting for Developers 102, we'll take these concepts forward and explain the chart of accounts, reporting in general, the balance sheet and income statement specifically, cash -vs- accrual accounting, and the accounting cycle.

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