

EXCELSIOR™

The Destination of Choice for Discerning Comics Fans

Project Whitepaper

Chuck E. Knutsack, Jnr.

Chairman Emeritus,

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Enter A New World of Comics



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1. Excelsior: A New Destination in Comics

Excelsior is an online retailer of comic books that specializes in new comics and in “past issues” of interest to collectors. Since their inception in 1938 with the arrival of *Superman*, comics have long been a target for collectors. Originally designed to be cheap and disposable reading matter for children, this disposability has added to their value as collectibles, because so few of the earliest comics have survived to this day. The comics industry is cyclical and has undergone many periods of boom and bust. Marvel Comics is currently riding high due to the success of its Marvel Cinematic Universe (MCU), but the company went bankrupt in the late 1990s after the industry created its own “tulip craze” in the early 1990s. Comics in the ‘50s and ‘60s also suffered after they were demonized as causes of juvenile delinquency in the senate hearings of the mid-1950s, and the arrival of the Comics Code soon after did much to rob them of their original vibrancy and appeal.

In others words, the comics business is a complex one, and its database needs are complex too. This whitepaper outlines the issues that shape the design of a comics database for a company such as Excelsior. We shall use as our reference point an existing comics retailer with an active online presence, *Mile High Comics* in Denver, Colorado. The company maintains a physical warehouse of comics, and a superstore in which fans can browse the goods in person. But it also operates a successful web store at <https://www.milehighcomics.com/>. Readers of this paper are encouraged to visit the web site and browse its offerings for themselves so that they may familiarize themselves with the particulars of the comics business.

Let's begin by asking the most obvious question: what is a comic book? A comic is essentially a story magazine in which the stories are illustrated as sequences of panels. A panel offers a snapshot of the action, and a sequence of panels, called a *comic strip*, unfolds the story one snapshot at a time. Panels are arranged into pages, often six or nine to a page, and each story is told over multiple pages. In the beginning, comics were coloured using a primitive four-colour *dot* process which was mimicked by earlier pop artists such as Roy Lichtenstein. These comics were printed on cheap paper, of the same kind used to print newspapers, but had glossy covers to market the thrills within. This essential cheapness means that many old comics have degraded physically over time, and this effects their present value.



Figure 1. Examples of comic book issues from 1938 to 1975.

So what is a “graphic novel”? In a sense, this is just a fancy name for a comic book that tries to elevate the medium away from its inauspicious origins as a diversion for children. However, we now use *graphic novel* to denote something larger than a single issue of a comic. A novel stands alone, and so is not numbered. Often, the graphic novel is a collected version of a comic book series. For instance, *Watchmen* is a stand-alone graphic novel by Alan Moore, Dave Gibbons and John Higgins, but it was also published as a 12-issue limited series in 1986/1987. So we can speak of *Watchmen* #3, the third issue of the limited series, or of *Watchmen* the graphic novel, which has no number and which collects all 12 issues of the limited series. Since Excelsior stocks both comics issues and graphic novels, your database must distinguish between the two in a way that does not complicate a user’s queries.

What factors influence the value of a comic or graphic novel? Naturally, the first issue of a series tends to be the most valuable. Issue #1 of *Action Comics*, in which *Superman* made his first appearance in 1938, is more valuable than issue #100. But issue #100 of *Superman* is more valuable than issue #1 of *The Destructor*, a forgettable character introduced in a short-lived comic in 1975. So the comic series itself, whether *Superman* or *Batman* or *Hellboy* or *The Destructor*, is also a key factor. Certain issues will be worth more than others because they begin or conclude a popular storyline, or because they introduce a certain character (e.g., *Wolverine* was first introduced in *The Incredible Hulk* issue #181), or because they were written or drawn by a fan-favourite writer (e.g., Stan Lee) or artist (e.g., Jack Kirby). Perhaps the comic is signed by one of these creators? This can also increase its value to collectors. Or perhaps the comic was once owned by a famous person, and comes from their personal collection (e.g., Stan Lee, or the television host Jonathan Ross). Finally, the physical condition of the comic will impact on its value.

An issue that is in perfect or near-perfect condition will be worth more than another copy of the same issue (e.g., *Hulk* #181) that is in a poor condition. When it comes to graphic novels, these are graded using the same criteria, but we must also consider whether a given copy is a first printing (a first edition) or a later reprinting. If you buy *Watchmen* in a regular bookstore today, you will certainly be buying a late reprinting, as the graphic novel has never been out of print. To buy a first edition of the graphic novel, you will need to visit a site like Excelsior.

2. Grading a Comic Book

We say a collectible is in “mint” condition when it preserves its original condition of sale. So an old comic in mint condition should thus be indistinguishable from a new one that is currently sitting on a sales rack. In practice, however, this is rarely the case. The very act of buying and reading a comic reduces its condition to one we call “Near Mint.” In practice, this makes *Near Mint* (NM) the highest rating that a past issue can be given by collectors or by a vendor, while we expect all new issues of comic to be rated as *Mint* (MT) when they roll off the printing presses.

Prices change over time, as with any collectible, so official price guides must be updated regularly. The Overstreet price guide (by Robert Overstreet) is updated every year, and reports on the current prices being offered for various comics of different quality grades. The grade assigned to a particular issue can be symbolic (such as NM) or numeric (such as 9.8 out of 10). Overstreet provides a means of mapping from one to the other. To better understand grading criteria, readers should visit the website https://www.comicconnect.com/article/grading_criteria

The agreed symbolic labels for an issue’s quality rating are:

MT (Mint)	Indistinguishable from new. Applies to new comics.
NM (Near-Mint)	A past issue with only the smallest of imperfections allowed.
VF (Very Fine)	Some aging of the paper, but very few signs of wear.
FN (Fine)	Good quality but has some obvious signs of wear and tear.
Very Good (VG)	Some wear and tear, and some creasing or other defects.
Good (GD)	Good condition overall, but some tears, stains, creases, etc.
Fair (FR)	In one piece, but very obviously soiled, ragged and/or torn.

Poor (PR) Badly damaged, mouldy, torn, ripped, battered and decrepit.

Buyers obviously want to know the quality of an issue before they buy it online, so storing these grading labels in a database is of prime importance. Symbolic labels are easy to understand, but numeric grades allow for more sophisticated queries. Here is the Overstreet mapping from symbolic to numeric quality grades:

MT (10), **NM** (9.5), **VF** (8.0), **FN** (6.0), **VG** (4.0), **GD** (2.2), **FR** (1.0), **PR** (0.5)

Numbers also allow for finessed scores, e.g., a score of 9.0 would count as VF/NM. Remember, comics are mass-produced. There are many copies of, say, *Hulk* #181 in circulation, but each copy may have a different condition and quality grade. There may be five copies of this issue for sale on Excelsior's web-site, and each copy may have a different symbolic or numeric quality grading. We must therefore distinguish between different copies of the same issue of the same comic book.

3. Comic Numbering

Comics are a sequential medium in more ways than one. Each issue is individually numbered, from issue #1 (usually the most prized by collectors) up to the current day. An issue of *Action Comics* in 2023 will have a considerably higher number and lower value than an early issue from 1942. However, the situation is much more complex than this. Consider the comic title *The Incredible Hulk* (a comic series with the same character and name is typically called a "title" in the industry) from 1962. Let's look at how this title is presented on *Mile High Comics* (by visiting the website <https://www.milehighcomics.com/cgi-bin/backissue.cgi?action=list&title=48172865216&snumber=1>)

First, let's confine ourselves to entries where the *Issue* column is just a number. The issues where this is not the case are somehow special (e.g., later reprints, etc.) and we will ignore them, here and in Excelsior generally. Notice that *Hulk* #1 is not currently for sale on Mile High Comics because it is not in stock. This is a rare and very valuable comic, so this is not at all surprising. Notice instead that *Hulk* #3 is available, and is priced at \$2,340 dollars for an issue in Fair (FR) condition. The

site mentions that an issue in Fine condition, which is currently not in stock (this is indicated by placing the price in parentheses) would sell for a mere \$13,163.

Likewise, issue #6 is only available in Good (GD) condition, for \$3,536. Although the Hulk is a very successful Marvel character, his comic book was not originally a financial success, much like the character's two standalone movies. Marvel soon realized that the Hulk worked better as a guest character in other comics, like *The Avengers*, and cancelled his original run in 1963 with issue #6. When the character returned in his own comic in 1968, the new issue was heralded as a "Big Premiere Issue" but was numbered #102, even though there were no issues #7-#101. Why? Because Marvel counted the 101 issues of the comic book *Tales To Astonish*, which guest-featured the Hulk in various team-ups and face-offs, as the first 101 issues of *The Incredible Hulk*. It is all very bizarre and does not endure logical scrutiny. In 2017, Marvel retroactively revised all of its earlier "legacy" issue numbers, to bring together various miniseries collections under a single numbering system. What does this mean for you, as the architect of the Excelsior database system?

We are going to ignore Marvel's attempt at legacy renumbering, and store each comic with its stated cover number at the time it was published. This means that the issues stored in the database must be numbered according to the way that collectors expect to retrieve them. On Mile High Comics, each title includes a year as a disambiguation term. For instance, *Invincible Iron Man* (1968) denotes the original run of the comic title starring Marvel's Iron Man. This run lasted from issue #1 (heralded as a "Big Premiere Issue") to issue 332 (heralded on the cover as an "End of an Era Epic!"). Yet the character continued in his own title without interruption, in a 13-issue run *Iron Man* (1996), followed by an 89-issue run *Iron Man* (1998), followed by the 35-issue run *Iron Man* (2004), and so on. Numbering is complex, and the best way to handle it is to track each new run of the comic (when the numbering returns to #1) by its start year. Look at how Mile High Comics manages its list of comics to see how this makes the most sense.

4. The Excelsior Database

So what is expected of the Excelsior database design? In reality, Excelsior is a store for comics fans that operates in much the same way as Mile High Comics. It works

with the same products, serves the same customer base, and has exactly the same database needs as its Denver-based competitor. As you peruse the Mile High site, you will encounter table after table of comics, with their prices, quality gradings, and so on. But the tables you see in your browser are merely HTML views onto the underlying SQL tables and views that populate the database itself. It is your job to infer the best design for that underlying database, to support the high-level views that are shown to users in the browser. At its core, the design is that of a product inventory tracking system. Your tables must keep track of all the comics in the Excelsior warehouse, whether new (from the publisher) or old (back issues). A user may wish to buy the current issue of a particular comic, or look through the store's inventory of past issues. The condition of each comic must be recorded in both symbolic and numeric coding scales (see section 2), and this will affect the price of a comic. Naturally, all new comics are in Mint (MT) condition. Your tables must thus track the sale price of every comic in the system. You may also wish to store the purchase price of every comic in the system (that is, the price paid for the comic by Excelsior itself) so that profit and loss can be calculated later.

This basic inventory-tracking functionality will allow SQL users to do something that visitors to the Mile High Comics site cannot: write SQL queries to find exactly what they are looking for. For instance, a power user might write a query to find the earliest (i.e., with the lowest-number) issue of *The Incredible Hulk* that is in Fine condition or better and that costs less than \$25. Or the same user might ask how many issues of The Invincible Iron Man of quality Very Good or higher, before issue 150, can be bought as a group for \$100 or less in total.

To support incisive queries like these, the system will benefit from additional tables of your own design, that go beyond basic inventory tracking. For instance, do you provide tables to map between symbolic and numeric quality codes, so that a query can ask for comics of grade Very Fine or higher? Do you track the main creative people on each issue, so that one look for issues of *Daredevil* in the 1980s written and pencilled by Frank Miller? Perhaps you wish to search for comics by character rather than by title? Or you wish to search by publisher? The two main publishers are DC Comics (owners of *Superman*, *Batman*, *Wonder Woman*, etc) and Marvel Comics (owners of *Spider-Man*, *Iron Man*, *Thor*, etc), but other, smaller

publishers exist too, such as Dark Horse Comics (publisher of *Hellboy*) and Image Comics (publisher of *Spawn*). Or perhaps you are looking for the comic in which *The Punisher* first made an appearance (that would be issue 129 of *The Amazing Spider-Man*, cover dated February 1974). Perhaps you want to know how many different writers worked on *The Amazing Spider-Man* in the 1970s and so wish to write a year-specific query in SQL which will require the database to track the year of every comic as well as its issue number. Perhaps you want to find the people that created a particular character, like *Daredevil* or *The Punisher*, by using existing tables (via joins)? The benefit of Excelsior for power users, over a site like Mile High Comics, is that it allows you to write complex queries to immediately find highly-specific answers without a great deal of browsing.

5. Database Design

All tables must be fully normalized to remove redundancy and to minimize the risk of data inconsistency. You are required to demonstrate that all tables have been normalized up to BNCF (Boyce-Codd Normal Form). You can use a mixed approach in your demonstration, by appealing to general characteristics of your design and by subjecting specific tables and their issues to closer inspection. All columns should have appropriate types, and all foreign key relationships should be explicitly defined. To communicate the design of your database, you will create ER diagrams that clearly show the relationship between all entities in the system.

All views should be explicitly defined, with a rationale for why they exist. You should populate all tables with sufficient rows to demonstrate their purpose and to allow for meaningful results in sample queries and views. You will define a number of sample queries to demonstrate the value of your design and the power it offers to its users (over and above that which is offered by Mile High Comics). You will also define a number of procedural/functional/triggered elements in the MySQL equivalent of PL/SQL, to demonstrate how a DB Admin can achieve certain program-like functionality within the database itself.

6. Project Reporting

An accompanying document provides a template for the report you will submit

alongside your SQL definitions for this database. In addition, a marking guide is provided so as to help you focus your efforts on what is expected of you and in what areas you can expect to receive the most scrutiny and the most marks.

Do not skimp on the report, or on the sections that you believe are mere filler. Your report is a proposal – a whitepaper of your own – that will go to the board of Excelsior Inc. for a thorough evaluation. As a DBA it is your responsibility to not merely design a database, but to advocate for your design, making it clear why certain design choices were taken. A DBA’s job requires *hard* skills (for SQL and related coding tasks) and *soft* skills (to explain and justify the former, to your team, to clients, and to non-DB staff).

Your report should contain your thoughts and your insights. It should not just recycle the content of this preliminary whitepaper, or just fill space with generic discussions of the role of a database in the enterprise. Be specific and on-point, and outline your vision for the project and your database clearly. Be sure to read this white paper carefully, so as to understand the demands that will be placed upon your design. You should also be careful to communicate this design well, in the report that will accompany your SQL content. Motivate each of your design decisions, explain why they are sound (e.g., by demonstrating the normalization of all tables up to BCNF), and provide ample examples of the design being used to support queries and procedures that are of obvious use in the Excelsior pipeline.

7. Conclusions

When I was made Chairman Emeritus of Excelsior Inc. in 2019, I naturally asked my successor as chair of the board, “What does ‘Emeritus’ mean?” I was given one of the frankest answers of my career, the candour of which still rankles and inspires: “*Well, Chad*”, I was told, “The ‘E’ means ‘exit’. So you’re out! And the ‘meritus’ means you bloody well deserve it!” I fear I had spent far too much of the company’s precious reserves on expensive fan-service vanity projects – does anyone now remember *Predator Vs. Tellytubbies?* – and far too little on growing our platform’s core functionality. But this project gives you the opportunity to rectify my biggest mistake, by creating an information architecture to carry the company and its content offerings into a more competitive and data-rich future.

So what is expected of you, on a project my erstwhile colleagues of the board have nicknamed “*The Knutjob*”? At this stage, no one expects a complete solution. Rather, you are to view this project as an opportunity to paint your vision of the information architecture of the enhanced Excelsior platform. What is required is ample evidence of this vision, not a done deal, so tables need only be fleshed out to work as illustrations. Ensure each table has at least 10 entries to showcase its purpose, that each view has enough to showcase its value, that any procedural elements (triggers, procedures, or functions) perform a useful service well, and that your sample queries are neither overly simple or pointlessly complex. For these queries, you may take inspiration from the suggestions discussed here, but do also use this opportunity to show off your own imagination. As to the number of demonstrations in each case, of queries, views, procedural items and whatnot, I myself have always been a believer in the “rule of four.” So, as I take my leave of you now, I wish you the very best on your Excelsior adventure. *Ever upwards!*