



# Déjà Review

This month CROSSTALK echoes the clarion call back to basics. Been there, done that? Not so fast; while the bleeding edge of technology can be exciting, every engineer understands the importance of a good technical foundation.

Confucius reminds us: “Study the past if you would define the future.”<sup>1</sup>

In our case (engineers), study the essential ingredients, principles, and procedures learned in our formative years that form the heart of our profession. A technical déjà vu or déjà review.

This summer, I experienced an academic déjà vu. My son decided to start his college career early by enrolling in a chemistry class at the BCS<sup>2</sup>-busting University of Utah. Chemistry in the summer? I give him credit – the summer of my high school senior year social bonds trumped covalent bonds.

Nevertheless, I accompanied him to his first class. His mother instructed him to sit in the front of the class. I corrected him by offering him the advantages of a good seat in the back of the lecture hall: 1) a quick exit to the next class; 2) easy to step out for a snack, and 3) a good buffer from the explosions, recalling most chemistry professors are closet pyromaniacs.

We settled into our seats. Why are college seats smaller these days? In typical academic fashion, the professor started in the middle of a lecture with no set-up, explanation, or introduction. Bam! He is rambling on about Sig Figs. Although the term was familiar, to be honest, I was not sure if he was promoting tobacco products, a local fraternity, or soft chewy cookies rumored to be named after Sir Isaac Newton.

Gaining my bearings, I ascertained the lecture to be a primer on Significant Figures (Sig Figs), a basic concept used in chemistry, physics, engineering, and disciplines that rely on measurements. It was a nice refresher. The following are sample questions used in the lecture. They are simple and you are a professional, so have a go at them.

Identify the number of significant figures:

- a) 0.00072
- b) 2.07200
- c) 500
- d) 210.0

Answer according to the rules of significant figures:

- e)  $4.7832 + 1.234 + 2.02$
- f)  $1.0236 - 0.97268$
- g)  $2.8723 \times 1.6$
- h)  $45.2 \div 6.3578$

Write down your answers. Before checking your answers, review the following Sig Fig rules:

- *Non-zero digits are always significant.*
- *Leading zeros are never significant.*
- *Zeros between two significant digits are significant.*
- *Trailing zeros are significant only if the decimal point is specified.*
- *For addition and subtraction, the last digit retained is set by the first doubtful digit.*
- *For multiplication and division, the answer contains no more significant figures than the least accurately known number.*

Review the questions and your answers and make any corrections based on the Sig Fig rules. Now check your answers against

the answers below<sup>3</sup>.

How did you fare initially? How did you fare after a quick review of the rules? Did your answers improve or was there little to improve upon? For those still confused a few examples of applying each rule would bring you onboard. That is the power of technical déjà review.

The Sig Fig rules provide a veiled insight on revitalizing and reinforcing your technical foundation.

Engineering is an amalgamation of several disciplines – mathematics, physics, chemistry, and electronics to name a few. Like non-zero digits, foundational disciplines are always significant in an engineer’s performance.

Constantly exposed to unproven theories, products and solutions, engineers should dismiss unfounded approaches like a scientist disregards leading and trailing zeros. Stick with proven, verified, and documented technologies. There is a reason it is called the bleeding edge.

Just as zeroes between significant digits are significant, an engineer’s true value lies in understanding the interrelationships, limitations, and synergy between various system technologies and the foundational disciplines they are based upon.

Engineers have strengths and weaknesses. Strong skills lead to specialization while pride downplays weaknesses. In the vein of the Sig Fig rule for addition and subtraction, an engineer is only as effective as his most doubtful skill, and akin to the Sig Fig rule for multiplication and division, an engineering team contains no more effectiveness than the least accurate member. Hence, surround yourself with colleagues who complement your strengths and offset your weaknesses.

Do not let your engineering/management skills rust. Map out your own déjà review, revitalize your technical skills and lay a sound foundation for your career.

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## Notes

1. Confucius, a Chinese philosopher and reformer (551-479 B.C.).
2. Bowl Championship Series, a system that selects the college football matchups for five prestigious bowl games.
3. Answers: a) two; b) six; c) one; d) four; e) 8.04; f) 0.0509; g) 4.6; h) 7.11.

## Can You BACKTALK?

Here is your chance to make your point, even if it is a bit tongue-in-cheek, without your boss censoring your writing. In addition to accepting articles that relate to software engineering for publication in CROSSTALK, we also accept articles for the BACKTALK column. BACKTALK articles should provide a concise, clever, humorous, and insightful perspective on the software engineering profession or industry or a portion of it. Your BACKTALK article should be entertaining and clever or original in concept, design, or delivery. The length should not exceed 750 words.

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