Feedback on EAS 372 Assignments, 2013

Assignment 3

- One of the challenges of this exercise was the use of terminology — we had to compute the minimum of a series of (daily) maxima, for instance. Inventing and/or using terminology effectively is often a challenge in science, and good choices of symbols and notation may ease comprehensibility for a reader. The skill of decoding meanings of sentences and equations is what used to be called "comprehension," and it an important one. Similarly, one's ability to *accurately describe what one has done* is paramount in science work. Thus much of the instructor's red scribbling will be directed towards bringing your attention to places where your writing did not convey what you actually did (or were tasked to do)

- The instruction suggested taking (max-min)/30 *as a starting point* for the bin width of your histogram(s). It was appropriate to round the resulting figure, not use it mechanically. Furthermore in some cases this gave a very "spiky" (noisy, irregular) histogram and PDF. That would suggest using a wider bin to get a smoother shape. (This is a subjective choice: too narrow, and the PDF is spiky; too wide, and details of its shape that might be real may be obscured).

- Did you understand (and show that you understand) that we constructed the TRUE PDF (to some extent arbitrary, but only to the degree that we were free to choose the bin width) and then compared it with a Normal (Gaussian) PDF that we had "fitted" to the data by providing it the correct (measured) mean and standard deviation? There was a tendency to state that the Normal PDF was a close approximation to (or good representation of) the empirical PDF, even when the differences were rather striking. Sometimes it's normal to be abnormal. The normal PDF is in no sense the "proper" or "correct" or "expected" PDF for any and every random variable we might rub noses with. (An example: what about daily total rainfall? Can this be normally distributed? No: because a Normal distribution has infinitely wide tails about the mean, implying the impossible possibility of negative daily rainfall.)

- How to get the 33rd and 66th percentiles from the applicable normal distribution: let $\overline{T}, \sigma_T$ be your mean and std. dev. The 33rd and 66th percentiles for $(T - \overline{T})/\sigma_T$ are -0.43, +0.43. Thus your 33rd percentile for T is $\overline{T} - 0.43\,\sigma_T$ and your 66th is $\overline{T} + 0.43\,\sigma_T$. Not everyone did this correctly, nor was it always made clear that the exercise was understood. Surprisingly, even though the empirical PDF often deviated very visibly from the Gaussian, it turned out in most cases that the 33rd & 66th percentiles of the sample were not very different from those of the (fitted) Gaussian distribution.

- Don't forget to round your results, when presenting them, to an appropriate number of significant figures.

- Many students have not mastered a writing technique that smoothly integrates equations into text – examples were given after Assignment 1.