All students should read §1.3 of the textbook in preparation for the next lecture.

The following numbered questions should be split across your group and the solutions discussed during the next lecture period. Students should review the learning goals for the day, determine which are applicable to their questions and provide answers or commentary to their group members. When using the Internet to formulate answers (some questions may require this), keep track of **where** you find your information on the web. You may be asked for, and are expected to have (in Email-able form), URLs supporting your investigations.

The questions below refer to specific data files and either an `ssq1` program or the "provided ssq programs." These were reviewed in lecture and can be downloaded `here` or from the course schedule page.

Download the tarball, unravel it, and check the `README.txt`

```
workdir$ tar xjf coding-ssqs.tar.bz2
workdir$ cd coding-ssqs
workdir$ more README.txt
```

in your preferred working directory on an alamode machine (CT B60 Linux Lab).

For all programming questions, you should be prepared to walk your group through the changes made to the given baseline code for your particular question, as well as the results generated.

1. Question 1.2.1 (§1.2.5) Instead of limiting your solution to a contrived table of 10 jobs, modify one of the **provided ssq programs** to emit the simulation times at which $l(t)$ changes. As the book question says, **DO NOT** simply store all the required job data in memory or disk and post process after all the jobs are known. You **ARE** permitted to add a simple data structure (hint, hint) that stores the minimal amount of job data required to answer the question.

2. Question 1.2.2 (§1.2.5) Hints and clarifications:

   1. Use the `ssq1.dat` data file.
   2. Recall from lecture that when you know $\bar{r}$ and $\bar{s}$ it is straightforward to calculate a constant scaling factor for the s_i such that a particular traffic intensity is presented to the SSQ. I recommend changing the given code so that it accepts *two* command line parameters, the second one being the aforementioned scaling factor.
   3. If you modify the program so that it prints out on a single line: traffic intensity, $\bar{l}$, $\bar{q}$, and $\bar{x}$ it will be easy to present the tabulated results to your learning group. **And your group will want tabulated results for the next lecture!**
   4. For the last part of the book question, think *binary search* — (don't code it, just sit at the terminal for a thoughtful 90s and you'll have the answer).

3. (a) Using the same "indicator function" approach shown in lecture, show the third part of Little's Theorem:

$$\int_0^{c_n} x(t)\,\mathrm{d}t = \sum_{i=1}^{n} s_i$$

   (b) Question 1.2.6 (§1.2.5) Clarification: I'd like you to modify one of the **provided ssq programs** so that instead of processing a data file with a_i and s_i, it reads a file (`ac.dat`) of a_i and c_i values. Report the summary statistics required by the question.

4. Question 1.2.8 (§1.2.5) Hints and clarifications:

    1. I recommend changing the given code so that it accepts *two* command line parameters, the second one being the *constant service time* stipulated by the question text. This can then be chosen so that the SSQ simulation "sees" a particular traffic intensity.
    2. If you modify the program so that it prints out on a single line: traffic intensity, $\bar{l}$, $\bar{q}$, and $\bar{x}$ it will be easy to present the tabulated results to your learning group. **And your group will want tabulated results for the next lecture!**