Computer System Modelling And Analysis

Laboratory #0
September 7th, 2000

(This lab will *not* count in your term marks)

Purpose

In this laboratory period, you should exercise your computing accounts on ECF and CDF, and make sure that you can invoke Csim and MAP, the two software packages that will be used extensively in the course. You will be asked to do some preliminary experimentation with each package.

Preparation

1. Login to your ECF account, then rlogin to CDF using your new account there. Change your initial password to one of your own choosing.
2.
   (a). Type "map" to check that the MAP header and prompt appears.
   (b). Type "470demo", and observe the commands required to define a very simple MAP model.
3.
   (a). Copy the program /homes/u1/kcs/histo.c into your directory.
   (b). Compile and execute the program using the command "csim" (followed by a.out).
   (c). Observe the distribution of values generated by the uniform pseudo-random number generator.
   (d). Edit the program to replace the call "uniform (0.0, 10.00)" by simply "5.0" (to observe the effect of a deterministic "distribution").

The program *histo.c* generates a number (DRAWS) of samples pseudo-randomly from a Uniform distribution over the interval (0, 10). It uses the STREAM capability of Csim to produce a stream of pseudo-random numbers, and it uses the HIST capability to record the samples drawn in a histogram. The defined variable, SEED, determines the starting value for the pseudo-random number generator, and the defined variable RUNS determines the number of time to repeat the experiment.

If you wish, you may alter the values of DRAWS, RUNS, and SEED to observe the effects.

Computer System Modelling And Analysis

Laboratory #0
September 12th and 14th, 2000

(This lab will *not* count in your term marks)

Assignment

1.

(a). Enter MAP, and execute the command "journal on" to capture the session in a file (called maplog.mapjrnl).
Activate the file server model using the "read" command:

```
MAP> read file_server
```

Examine the hardware devices and workload classes that form the model:

```
MAP> list
```

Observe the throughputs and response times of this baseline model:

```
MAP> performance
```

(b). Investigate the effect on performance measures of a 20% increase in workload volume. This change to the model can be made with the command:

```
MAP> class every arrival_rate 1.2*
```

(c). Investigate the effect of replacing the disk with one that is 50% faster. This change can be made with the command:

```
MAP> center disk class every loading 1.5/
```

(d). Re-establish the original baseline model (by reading it again), then graph the response time for reads as a function to the read request arrival rate. Use the command:

```
MAP> class reads
MAP> graph response wi  5   30   5
```

2. Modify the "histo.c" program to observe the distribution of values generated by various pseudo-random number generation routines in Csim. To see the effect of three different random number seeds, set the value of RUNS to 3. Replace the call to uniform (0.0, 10.0) in the original program by calls to the routines indicated below. In each case, save the results in a file.

   (a). stream_normal (prng, 5.0, 2.0)

   (b). stream_expntl (prng, 5.0)

   (c). stream_erlang (prng, 5.0, 5.0)

   (d). stream_hyperx (prng, 5.0, 100.0)

3. Copy the file /homes/u1/kcs/Lab0.ans into your directory, and insert into it at the indicated places the answers to parts 1 and 2. The file should include "performance" reports for parts 1a), 1b), and 1c), the graph from part 1d), and one histogram from each of the four parts of question 2. Use the "submit" command to submit your file of answers to the tutors for marking:

```
submit -N LAB0 csc470h Lab0.ans
```