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program 4 extra credit

**Bottom line up front: Alternative A is the optimal solution.**

Below are snippets of the results produced for each alternative:

**Alternative A:**

609 Simulation Complete for Alternative A

Average Queue Time for Server 1 = 130.4

Average Queue Time for Server 2 = 3.0

Average Time in System = 167.5

**Alternative B:**

951 Simulation Complete for Alternative B

Average Queue Time for Server 1 = 319.8

Average Time in System = 350.5

**Alternative C:**

1055 Simulation Complete for Alternative C

Average Queue Time for Server 1 = 352.2

Average Time in System = 386.2

The total time a widget spends in a system for proposal alternative A is roughly half of the time it spends in its current layout and proposed alternative B. As the number of widgets in the system increases the total time spent in the system is great for both Alternatives B and C. This is illustrated below.

**Last five widgets and their time spent in the system:**

**Alternative A:**

494 25 Exit system, in system 251

530 27 Exit system, in system 277

547 26 Exit system, in system 294

563 28 Exit system, in system 295

578 29 Exit system, in system 306

591 30 Exit system, in system 309

609 31 Exit system, in system 311

**Alternative B:**

769 25 Exit system, in system 526

804 27 Exit system, in system 551

846 26 Exit system, in system 593

869 28 Exit system, in system 601

892 29 Exit system, in system 620

915 30 Exit system, in system 633

951 31 Exit system, in system 653

**Alternative C:**

847 25 Exit system, in system 604

897 27 Exit system, in system 644

924 26 Exit system, in system 671

951 28 Exit system, in system 683

972 29 Exit system, in system 700

1019 30 Exit system, in system 737

1055 31 Exit system, in system 757

Summary: As the simulation continues to run and more widgets are processed, the times spent in the system increases for each proposal. Widgets processed using Alternatives B and C spend well over twice as much time in the system as Alternative A. At best Alternative B is a slight improvement over the current implementation (alternative C) but it is greatly out performed by Alternative A. By far the best and most optimal solution is Alternative A.