Assignment 1 – Sample Outputs

Zach Domke

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Output for Problem 1:

Single-server queueing system

Mean interarrival time 1.000 minutes

Mean service time 0.500 minutes

Number of customers 1000

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Average delay in queue 0.430 minutes

Average number in queue 0.418

Server utilization 0.460

Time simulation ended 1027.915 minutes

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Average delay in queue 0.437 minutes

Average number in queue 0.438

Server utilization 0.489

Time simulation ended 997.530 minutes

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Average delay in queue 0.493 minutes

Average number in queue 0.506

Server utilization 0.508

Time simulation ended 975.401 minutes

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Average delay in queue 0.536 minutes

Average number in queue 0.538

Server utilization 0.504

Time simulation ended 997.672 minutes

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Average delay in queue 0.417 minutes

Average number in queue 0.412

Server utilization 0.491

Time simulation ended 1012.722 minutes

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Average delay in queue 0.411 minutes

Average number in queue 0.416

Server utilization 0.504

Time simulation ended 990.373 minutes

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Average delay in queue 0.515 minutes

Average number in queue 0.520

Server utilization 0.506

Time simulation ended 990.209 minutes

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Average delay in queue 0.394 minutes

Average number in queue 0.378

Server utilization 0.465

Time simulation ended 1042.094 minutes

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Average delay in queue 0.436 minutes

Average number in queue 0.426

Server utilization 0.487

Time simulation ended 1023.938 minutes

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Average delay in queue 0.549 minutes

Average number in queue 0.588

Server utilization 0.514

Time simulation ended 940.969 minutes

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Output for Problem 2:

Double-server queueing system with fixed run length

Mean interarrival time 1.000 minutes

Mean service time 1 0.700 minutes

Mean service time 2 0.900 minutes

Length of the simulation 480.000 minutes

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Average delay in queue 1 1.038 minutes

Average delay in queue 2 2.059 minutes

Average number in queue 1 1.950

Average number in queue 2 2.775

Server 1 utilization 0.764

Server 2 utilization 0.722

Number of delays completed 902

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Average delay in queue 1 0.784 minutes

Average delay in queue 2 1.082 minutes

Average number in queue 1 1.325

Average number in queue 2 1.232

Server 1 utilization 0.701

Server 2 utilization 0.616

Number of delays completed 801

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Average delay in queue 1 0.569 minutes

Average delay in queue 2 0.658 minutes

Average number in queue 1 0.891

Average number in queue 2 0.641

Server 1 utilization 0.640

Server 2 utilization 0.477

Number of delays completed 741

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Average delay in queue 1 1.157 minutes

Average delay in queue 2 1.851 minutes

Average number in queue 1 2.126

Average number in queue 2 2.103

Server 1 utilization 0.752

Server 2 utilization 0.650

Number of delays completed 882

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Average delay in queue 1 0.771 minutes

Average delay in queue 2 1.350 minutes

Average number in queue 1 1.335

Average number in queue 2 1.716

Server 1 utilization 0.704

Server 2 utilization 0.649

Number of delays completed 831

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Average delay in queue 1 0.826 minutes

Average delay in queue 2 1.170 minutes

Average number in queue 1 1.481

Average number in queue 2 1.165

Server 1 utilization 0.742

Server 2 utilization 0.613

Number of delays completed 817

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Average delay in queue 1 0.997 minutes

Average delay in queue 2 2.444 minutes

Average number in queue 1 1.666

Average number in queue 2 3.049

Server 1 utilization 0.695

Server 2 utilization 0.675

Number of delays completed 802

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Average delay in queue 1 0.937 minutes

Average delay in queue 2 2.526 minutes

Average number in queue 1 1.614

Average number in queue 2 3.378

Server 1 utilization 0.681

Server 2 utilization 0.595

Number of delays completed 814

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Average delay in queue 1 1.279 minutes

Average delay in queue 2 2.880 minutes

Average number in queue 1 2.324

Average number in queue 2 3.722

Server 1 utilization 0.751

Server 2 utilization 0.721

Number of delays completed 872

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Average delay in queue 1 0.961 minutes

Average delay in queue 2 1.978 minutes

Average number in queue 1 1.602

Average number in queue 2 2.465

Server 1 utilization 0.705

Server 2 utilization 0.621

Number of delays completed 781

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Output for Problem 3.1:

Double-server queueing system with fixed run length

Mean interarrival time 0.425 minutes

Mean service time 1 0.425 minutes

Mean service time 2 0.900 minutes

Length of the simulation 2000.000 minutes

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Average delay in queue 1 9.752 minutes

Average delay in queue 2 164.286 minutes

Average number in queue 1 33.950

Average number in queue 2 1091.470

Server 1 utilization 0.978

Server 2 utilization 0.998

Number of delays completed 6959

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Average delay in queue 1 17.451 minutes

Average delay in queue 2 159.413 minutes

Average number in queue 1 63.165

Average number in queue 2 1057.548

Server 1 utilization 0.968

Server 2 utilization 0.999

Number of delays completed 6808

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Average delay in queue 1 18.184 minutes

Average delay in queue 2 174.666 minutes

Average number in queue 1 61.807

Average number in queue 2 1230.605

Server 1 utilization 0.993

Server 2 utilization 0.999

Number of delays completed 6739

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Average delay in queue 1 22.764 minutes

Average delay in queue 2 167.029 minutes

Average number in queue 1 78.521

Average number in queue 2 1119.815

Server 1 utilization 0.994

Server 2 utilization 1.000

Number of delays completed 6745

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Average delay in queue 1 6.079 minutes

Average delay in queue 2 170.609 minutes

Average number in queue 1 20.910

Average number in queue 2 1175.845

Server 1 utilization 0.989

Server 2 utilization 0.999

Number of delays completed 6817

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Average delay in queue 1 26.127 minutes

Average delay in queue 2 176.120 minutes

Average number in queue 1 90.444

Average number in queue 2 1188.164

Server 1 utilization 0.996

Server 2 utilization 0.996

Number of delays completed 6891

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Average delay in queue 1 29.427 minutes

Average delay in queue 2 168.079 minutes

Average number in queue 1 105.508

Average number in queue 2 1114.352

Server 1 utilization 0.996

Server 2 utilization 0.998

Number of delays completed 6754

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Average delay in queue 1 9.240 minutes

Average delay in queue 2 168.480 minutes

Average number in queue 1 31.386

Average number in queue 2 1177.655

Server 1 utilization 0.979

Server 2 utilization 0.999

Number of delays completed 6784

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Average delay in queue 1 11.621 minutes

Average delay in queue 2 152.942 minutes

Average number in queue 1 40.433

Average number in queue 2 1074.362

Server 1 utilization 0.989

Server 2 utilization 0.999

Number of delays completed 6823

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Average delay in queue 1 17.629 minutes

Average delay in queue 2 161.550 minutes

Average number in queue 1 60.138

Average number in queue 2 1133.097

Server 1 utilization 0.989

Server 2 utilization 0.999

Number of delays completed 6726

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