2024학년도 2학기 중간과제물(온라인 제출용)

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|  | **학번** | : | 202234-153799 |
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EMB000023580f65 ※ A4용지 편집 사용

1. 조건

학번: 202234-153799

SEED값: 153799

사용한 언어: C언어 (VSCode로 작업)

1. 소스코드 복사
2. // SIMULATION FOR A QUEUEING SYSTEM TO EVALUATE MEAN QUEUE LENGTH  //
3. // AND MEAN WAITING TIME                                           //
4. // TLIMIT   : the time limit expressed in minutes                  //
5. // TIME     : the time expressed in minutes                        //
6. // TSTEP    : the time increment in minutes                        //
7. // TPUMP    : the service time that a custom has left              //
8. // PRARR    : the probability of a custom arriving in any minute   //
9. // AVEQUE   : the average queue length                             //
10. // TOTQUE   : the totals of queue length                           //
11. // TOTARR   : the totals of arrivals                               //
12. // AVGWT    : average of waiting time                              //
13. // PROGRAM  EX3-3                                                  //
14. #include<stdio.h>
15. #include<math.h>
16. #define SEED 153799;
17. float mean=5;
18. //  RANDOM NUMBER GENERATOR  //
19. void random(long \*np, float \*up)
20. {
21. \*np = \*np \* 843314861 + 453816693;
22. if(\*np < 0)
23. { \*np = \*np +2147483647;
24. \*np = \*np + 1;
25. }
26. \*up = \*np \* 0.4656612e-9;
27. }
28. //  POISSON RANDOM VARIABLE GENERATOR  //
29. void poissn(long \*np, int \*pp)
30. {
31. float prod,b,u;
32. \*pp = 0;
33. b = exp(-mean);
34. prod = 1;
35. random(np,&u);
36. prod=prod\*u;
37. while (prod >= b)
38. { random(np,&u);
39. prod = prod \* u;
40. ++(\*pp);
41. }
42. }
43. //  MAIN PROGRAM  //
44. void main()
45. {
46. long seed,nseed;
47. int  p, queue=0, totque=0, arrive, tstep=1,totarr=0;
48. float prarr=20.0/60.0, tpump=0.0, time=0.0, tlimit=50, u=0, aveque=0,avgwt;
49. FILE \*output;
50. errno\_t err;
51. seed=SEED;
52. nseed=SEED;
53. avgwt = 0.0;
54. err = fopen\_s(&output, "c:\\work\\ex3-3.out", "wt");
55. // output=fopen("c:\\work\\ex3-3.out","wt");
56. if (err == 0)
57. {
58. printf("The file 'ex3-3.out' was opened\n");
59. }
60. else
61. {
62. printf("The file 'ex3-3.out' was not opened\n");
63. }
64. fprintf(output,"      SIMULATION FOR A QUEUEING SYSTEM \n\n");
65. fprintf(output,"THE TIME STEP            =  %d \n",tstep);
66. fprintf(output,"THE TIME LIMIT           =  %3.0f \n",tlimit);
67. fprintf(output,"THE ARRIVAL PROBABILITY  =  %4.2f \n",prarr);
68. fprintf(output,"THE POISSON MEAN         =  %1.0f \n",mean);
69. fprintf(output,"THE SEED                 =  %ld \n\n",seed);
70. fprintf(output,"   TIME    ARRIVAL    QUEUE     TPUMP\n");
71. while (time < tlimit)
72. {
73. time = time + tstep;
74. arrive = 0;
75. random(&seed, &u);
76. if (u < (prarr\*tstep))
77. { arrive = 1;
78. queue = queue + arrive;
79. totarr = totarr + 1.0;
80. }
81. if (tpump > 0.0)
82. { tpump = tpump - tstep;
83. if (tpump < 0.0) tpump = 0.0;
84. }
85. if ((tpump == 0) && (queue != 0))
86. { queue = queue - 1;
87. poissn(&nseed, &p);
88. tpump = p;
89. }
90. totque = totque + queue;
91. fprintf(output,"   %3.0f        %d         %d        %2.0f \n",time,arrive,queue,tpump);
92. }
93. fprintf(output,"  THE SIMULATED TIME =   %5.1f \n",tlimit);
94. fprintf(output,"  THE TOTAL ARRIVALS =   %d \n",totarr);
95. fprintf(output,"  THE TOTAL QUEUE =  %d \n",totque);
96. aveque = totque / (tlimit/tstep);
97. avgwt = totque /(float)totarr;
98. fprintf(output,"  MEAN QUEUE LENGTH  =   %4.2f \n",aveque);
99. fprintf(output,"  MEAN WAITING TIME  =   %9.7f \n",avgwt);
100. fclose(output);
101. }

(3) 출력결과 복사

SIMULATION FOR A QUEUEING SYSTEM

THE TIME STEP = 1

THE TIME LIMIT = 50

THE ARRIVAL PROBABILITY = 0.33

THE POISSON MEAN = 5

THE SEED = 153799

TIME ARRIVAL QUEUE TPUMP

1 0 0 0

2 0 0 0

3 0 0 0

4 1 0 7

5 0 0 6

6 0 0 5

7 1 1 4

8 1 2 3

9 1 3 2

10 0 3 1

11 1 3 2

12 1 4 1

13 1 4 3

14 0 4 2

15 1 5 1

16 0 4 7

17 0 4 6

18 1 5 5

19 0 5 4

20 0 5 3

21 0 5 2

22 0 5 1

23 0 4 3

24 0 4 2

25 1 5 1

26 1 5 4

27 1 6 3

28 0 6 2

29 0 6 1

30 1 6 1

31 1 6 4

32 0 6 3

33 1 7 2

34 1 8 1

35 1 8 5

36 0 8 4

37 1 9 3

38 0 9 2

39 0 9 1

40 0 8 3

41 0 8 2

42 1 9 1

43 1 9 2

44 1 10 1

45 0 9 4

46 1 10 3

47 0 10 2

48 0 10 1

49 0 9 4

50 0 9 3

THE SIMULATED TIME = 50.0

THE TOTAL ARRIVALS = 22

THE TOTAL QUEUE = 275

MEAN QUEUE LENGTH = 5.50

MEAN WAITING TIME = 12.5000000

**(4)결과 분석표**

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