```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=1; gcc ${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc ${n}.png
Monte Carlo estimate of Pi: 3.138612
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=2; gcc ${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc ${n}.png
Average Waiting Time: 4.70
Average Response Time: 9.90
Server Utilization: 92.86%
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=6; gcc -lm ${n}.c -o /tmp/a.out -lm && /tmp/a.out && ssc ${n}.png && clear
Generating 10 random numbers using the Mid-Square Method:
Random Number 1: 1522
Random Number 2: 2316
Random Number 3: 5363
Random Number 4: 2876
Random Number 5: 8271
Random Number 6: 6840
Random Number 7: 4678
Random Number 8: 2188
Random Number 9: 4787
Random Number 10: 2291
```

Bishnu Chalise (15 mi

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=7; gcc -lm ${n}.c -o /tmp/a.out -lm && /tmp/a.out && ssc ${n}.png && clear
KS Statistic: 0.150000
The sample follows the uniform distribution.
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=10; gcc -lm ${n}.c -o /tmp/a.out -lm && /tmp/a.out && ssc ${n}.png && clear
Generated Random Sequence:
0 0 1 1 1 1
1 1 0 1 0
0 1 1 0 0
1 1 0 0 1
1 0 1 0 1
1 1 1 0 0
0 1 1 1 0
0 0 1 0 0
1 1 1 0 1
1 0 0 1 0
1 0 0 0 1
1 1 0 0 1
0 0 0 1 1
1 1 0 0 0
0 0 1 1 0
0 0 0 0 1
0 1 0 0 1
1 1 0 1 0
1 0 0 0 1
0 1 1 0

Gap Distribution (Gap length: Frequency):
Gap length 1: 9 occurrences
Gap length 2: 8 occurrences
Gap length 3: 5 occurrences
Gap length 5: 2 occurrences

Total Gaps Found: 24
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=9; gcc -lm ${n}.c -o /tmp/a.out -lm && /tmp/a.out && ssc ${n}.png && clear
Chi-Square Statistic: 5.444444
Degrees of Freedom: 4
Critical Value (from Chi-Square distribution table): 9.488000
Fail to reject the null hypothesis: The data fits the expected distribution.
```

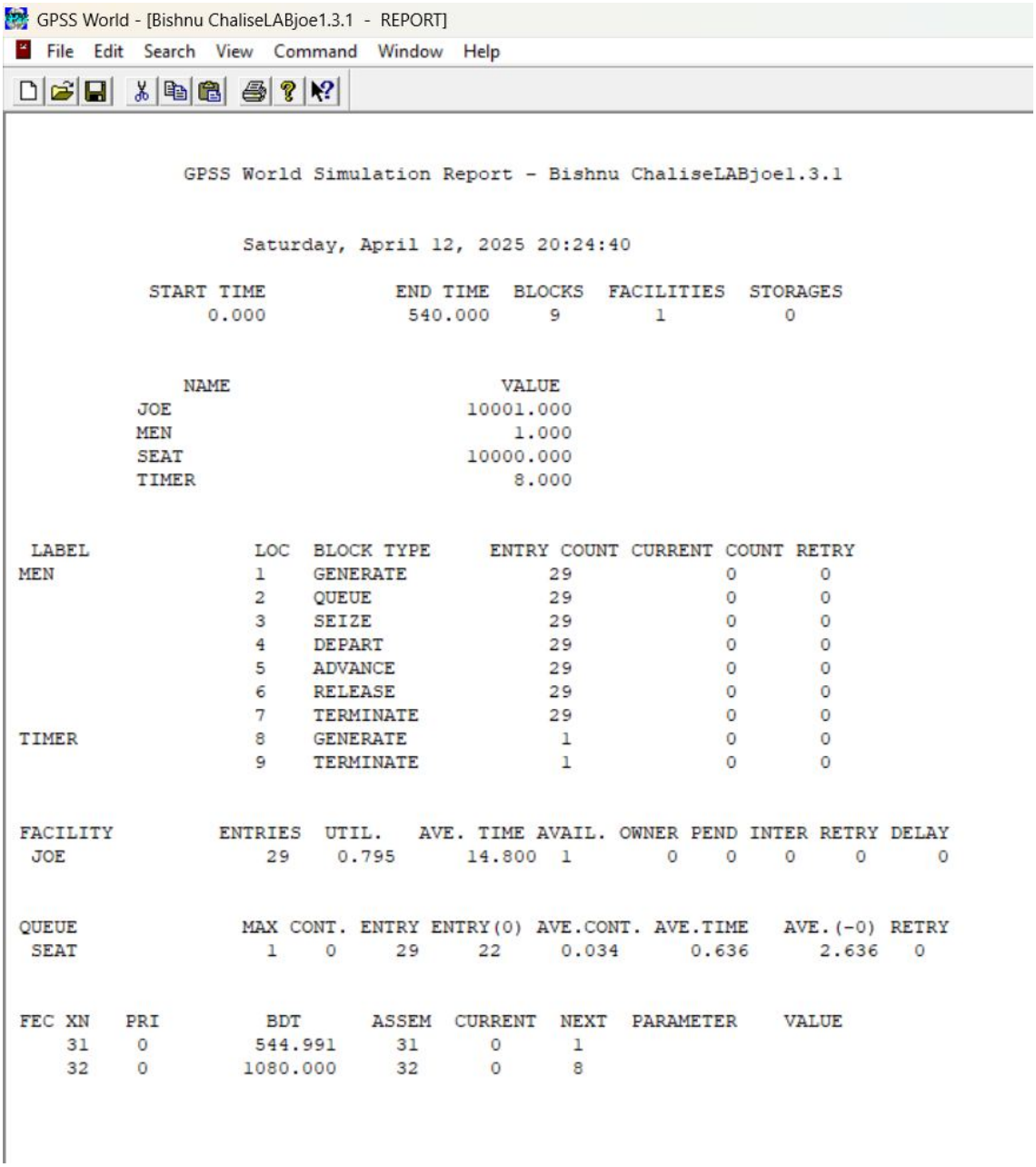
```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=3; gcc ${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc ${n}.png
 Step 0:
 State S0 Probability: 1.0000
 State S1 Probability: 0.0000
 State S2 Probability: 0.0000

 Step 1:
 State S0 Probability: 0.6000
 State S1 Probability: 0.2000
 State S2 Probability: 0.3000

 Step 2:
 State S0 Probability: 0.4500
 State S1 Probability: 0.3100
 State S2 Probability: 0.3500

 Step 3:
 State S0 Probability: 0.3980
 State S1 Probability: 0.3500
 State S2 Probability: 0.3640

 Step 4:
 State S0 Probability: 0.3802
 State S1 Probability: 0.3638
 State S2 Probability: 0.3686

 Step 5:
 State S0 Probability: 0.3741
 State S1 Probability: 0.3685
 State S2 Probability: 0.3702

 Step 6:
 State S0 Probability: 0.3720
 State S1 Probability: 0.3701
 State S2 Probability: 0.3707

 Step 7:
 State S0 Probability: 0.3713
 State S1 Probability: 0.3707
 State S2 Probability: 0.3709

 Step 8:
 State S0 Probability: 0.3711
 State S1 Probability: 0.3709
 State S2 Probability: 0.3709

 Step 9:
 State S0 Probability: 0.3710
 State S1 Probability: 0.3709
 State S2 Probability: 0.3710

 Step 10:
 State S0 Probability: 0.3710
 State S1 Probability: 0.3710
 State S2 Probability: 0.3710

 Selection was cancelled by keystroke or right-click.
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ ssc 3.png
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=8; gcc program/${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc outputs/${n}.png && clear
 Autocorrelation at lag 1: 0.574138
 Autocorrelation at lag 2: 0.352299
 Autocorrelation at lag 3: 0.136207
 Autocorrelation at lag 4: -0.171839
 Autocorrelation at lag 5: -0.204023
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=4; gcc ${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc ${n}.png && clear
Generating 10 random numbers using the Linear Congruential Method:
Random Number 1: -1098993258
Random Number 2: 638681367
Random Number 3: 965945604
Random Number 4: 390061805
Random Number 5: -194227934
Random Number 6: 1965234099
Random Number 7: 1486606704
Random Number 8: -1597473559
Random Number 9: 1352818030
Random Number 10: -22184945
```

```
rudy@rudy:~/Desktop/5sem/bishnu-chalise/SM$ n=5; gcc ${n}.c -o /tmp/a.out &&  /tmp/a.out && ssc ${n}.png && clear
Generated random numbers using Multiplicative Congruential Generator:
3368691941
3169604001
3107932973
4153392969
2258947253
2107343665
653537149
3901175641
379340165
866092481
```

OUTPUT :



GPSS World Simulation Report - Bishnu ChaliseLABjoe1.3.1

Saturday, April 12, 2025 20:24:40

START TIME	END TIME	BLOCKS	FACILITIES	STORAGES
0.000	540.000	9	1	0

NAME	VALUE
JOE	10001.000
MEN	1.000
SEAT	10000.000
TIMER	8.000

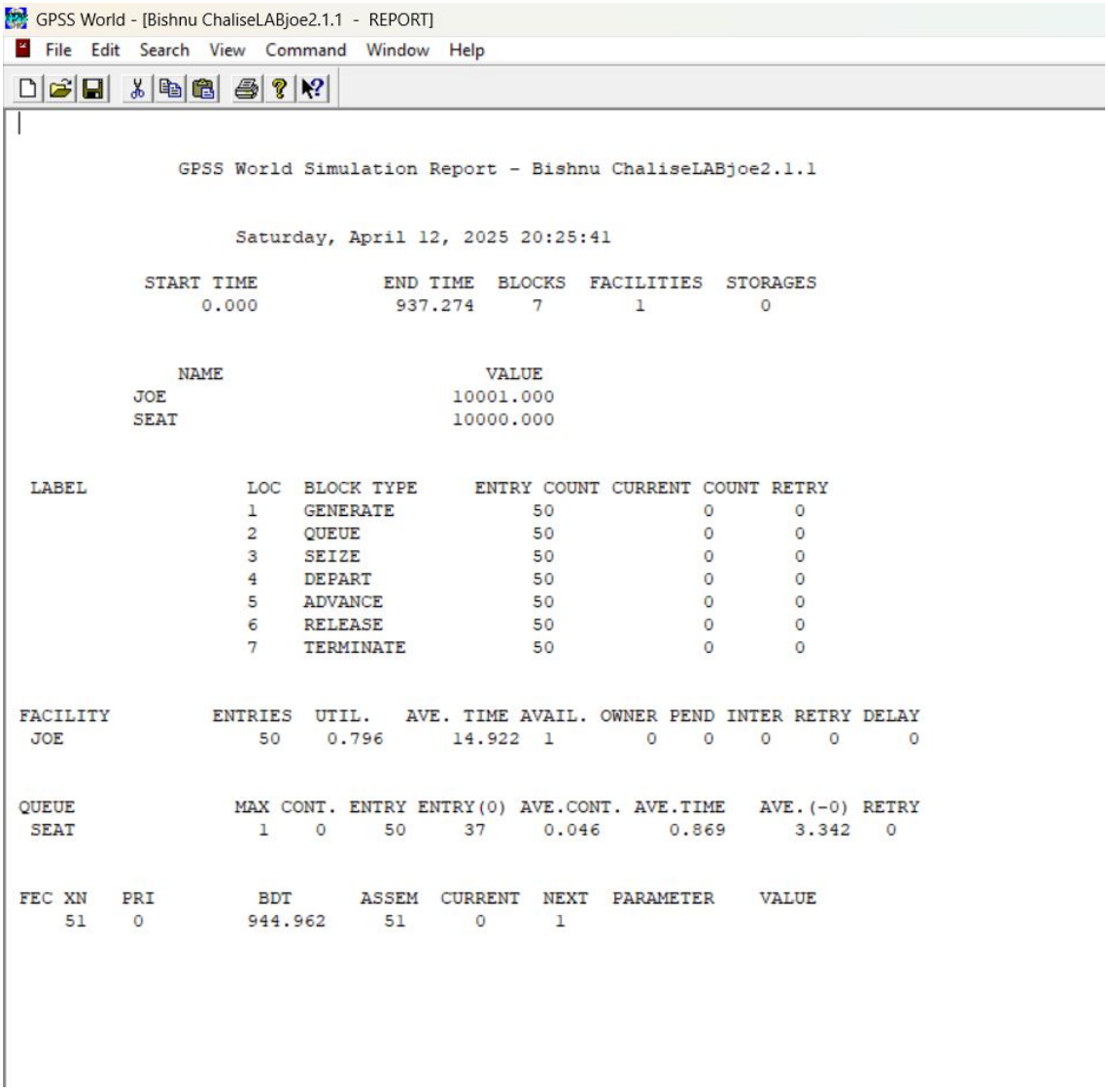
LABEL	LOC	BLOCK TYPE	ENTRY COUNT	CURRENT COUNT	RETRY
MEN	1	GENERATE	29	0	0
	2	QUEUE	29	0	0
	3	SEIZE	29	0	0
	4	DEPART	29	0	0
	5	ADVANCE	29	0	0
	6	RELEASE	29	0	0
	7	TERMINATE	29	0	0
TIMER	8	GENERATE	1	0	0
	9	TERMINATE	1	0	0

FACILITY	ENTRIES	UTIL.	AVE. TIME	AVAIL.	OWNER	PEND	INTER	RETRY	DELAY
JOE	29	0.795	14.800	1	0	0	0	0	0

QUEUE	MAX	CONT.	ENTRY	ENTRY(0)	AVE.CONT.	AVE.TIME	AVE.(-0)	RETRY
SEAT	1	0	29	22	0.034	0.636	2.636	0

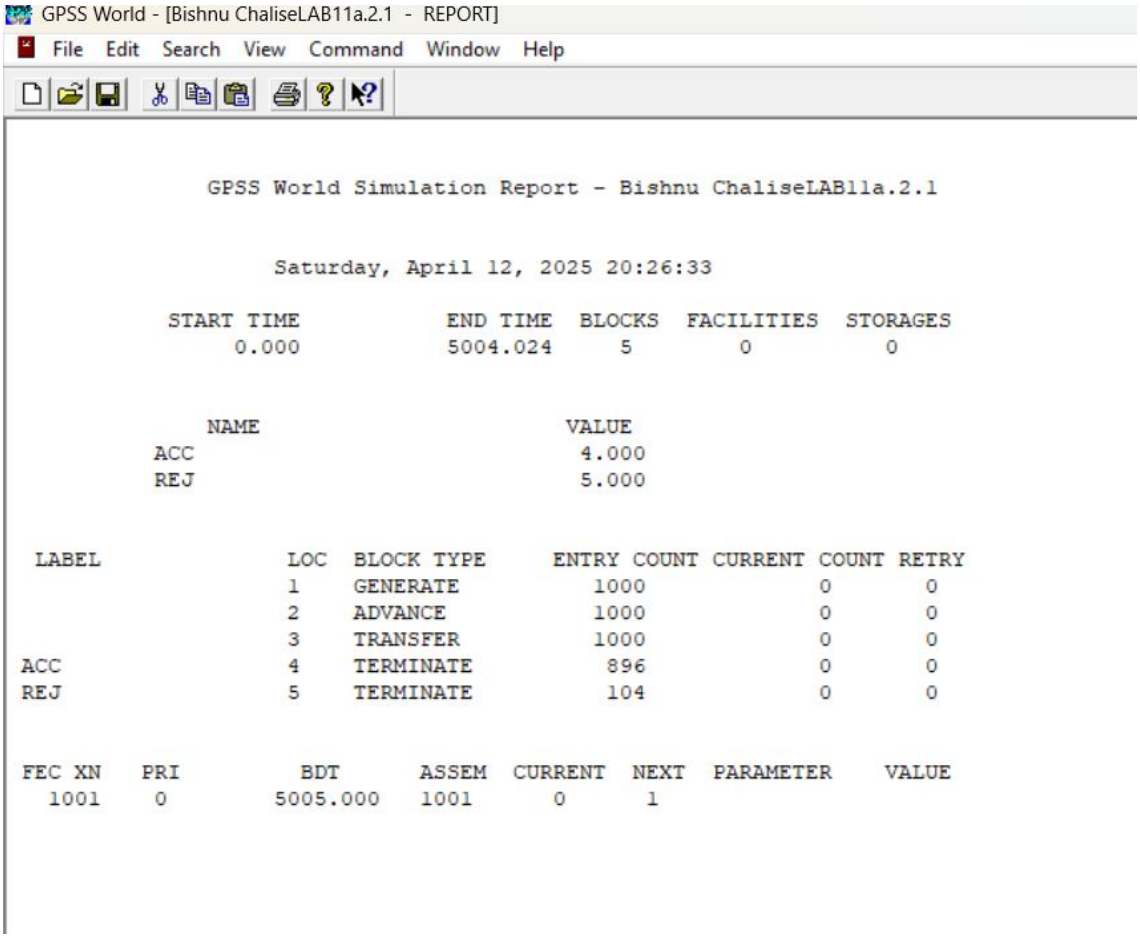
FEC XN	PRI	BDT	ASSEM	CURRENT	NEXT	PARAMETER	VALUE
31	0	544.991	31	0	1		
32	0	1080.000	32	0	8		

OUTPUT :

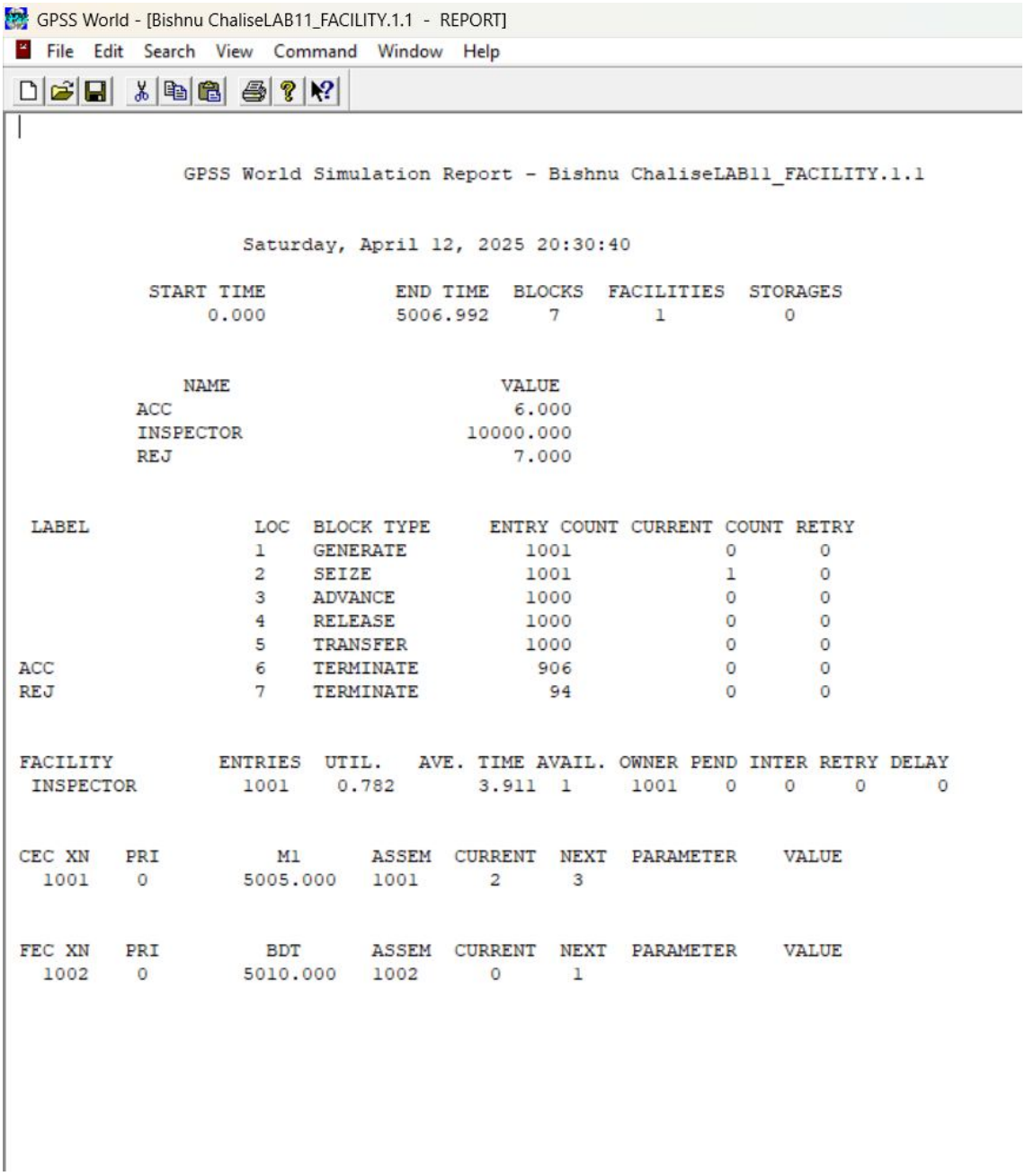



```
              GPSS World Simulation Report - Bishnu ChaliseLABjoe2.1.1


                   Saturday, April 12, 2025 20:25:41

           START TIME           END TIME  BLOCKS  FACILITIES  STORAGES
                0.000            937.274     7        1          0


              NAME                       VALUE
          JOE                          10001.000
          SEAT                         10000.000


 LABEL              LOC  BLOCK TYPE     ENTRY COUNT CURRENT COUNT RETRY
                    1    GENERATE            50             0       0
                    2    QUEUE               50             0       0
                    3    SEIZE               50             0       0
                    4    DEPART              50             0       0
                    5    ADVANCE             50             0       0
                    6    RELEASE             50             0       0
                    7    TERMINATE           50             0       0

FACILITY         ENTRIES  UTIL.   AVE. TIME AVAIL. OWNER PEND INTER RETRY DELAY
 JOE                50    0.796      14.922  1        0    0    0     0      0

QUEUE              MAX CONT. ENTRY ENTRY(0) AVE.CONT. AVE.TIME   AVE.(-0) RETRY
 SEAT                1    0     50      37     0.046      0.869      3.342   0

FEC XN    PRI         BDT      ASSEM  CURRENT  NEXT  PARAMETER    VALUE
    51    0         944.962     51      0      1
```

OUTPUT :


GPSS World - [Bishnu ChaliseLAB11a.2.1 - REPORT]
File Edit Search View Command Window Help
GPSS World Simulation Report - Bishnu ChaliseLAB11a.2.1
Saturday, April 12, 2025 20:26:33
START TIME END TIME BLOCKS FACILITIES STORAGES
0.000 5004.024 5 0 0
NAME VALUE
ACC 4.000
REJ 5.000
LABEL LOC BLOCK TYPE ENTRY COUNT CURRENT COUNT RETRY
1 GENERATE 1000 0 0
2 ADVANCE 1000 0 0
3 TRANSFER 1000 0 0
ACC 4 TERMINATE 896 0 0
REJ 5 TERMINATE 104 0 0
FEC XN PRI BDT ASSEM CURRENT NEXT PARAMETER VALUE
1001 0 5005.000 1001 0 1

OUTPUT :

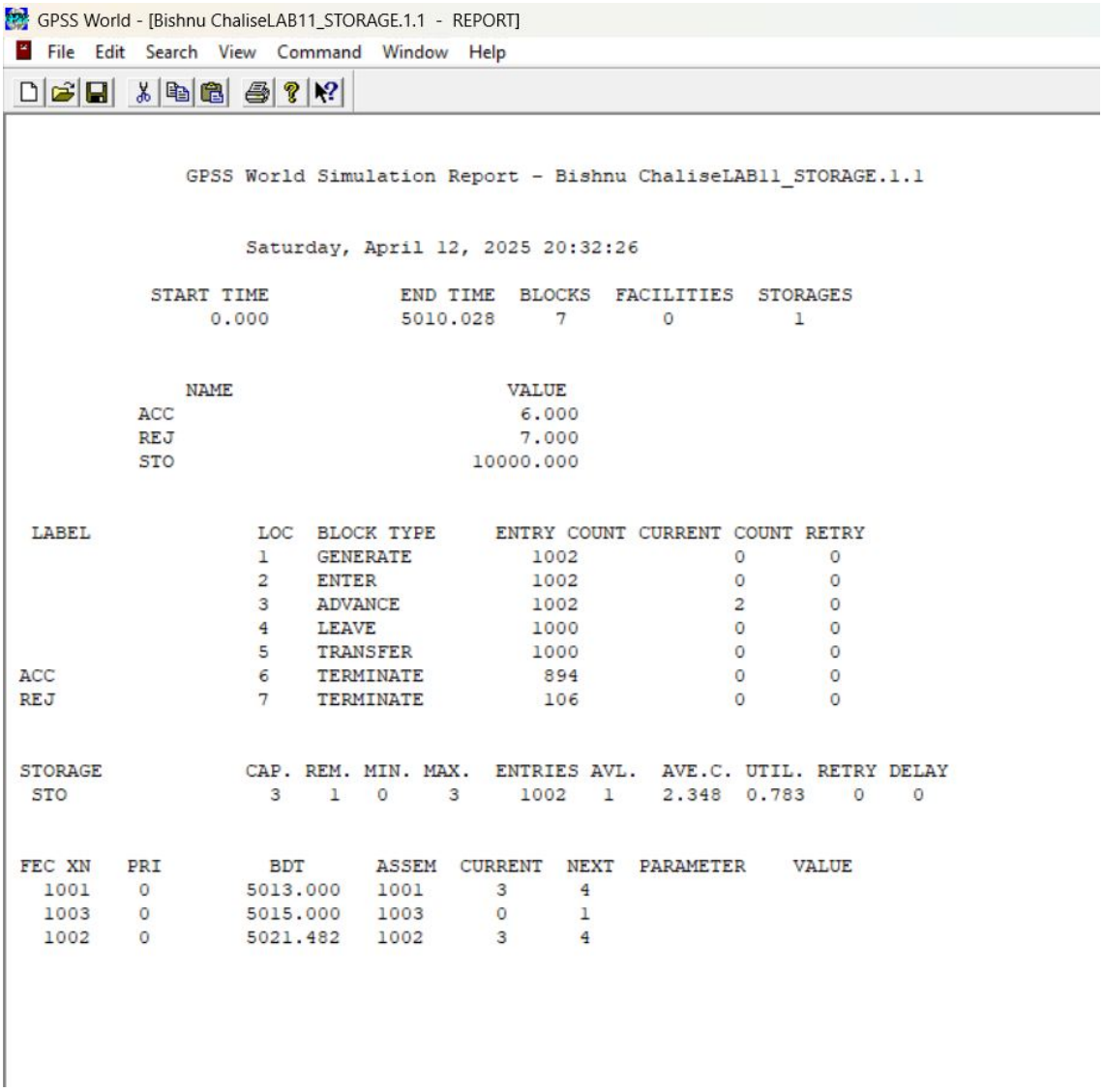


GPSS World - [Bishnu ChaliseLAB11_FACILITY.1.1 - REPORT]

File Edit Search View Command Window Help

```
              GPSS World Simulation Report - Bishnu ChaliseLAB11_FACILITY.1.1


                    Saturday, April 12, 2025 20:30:40

           START TIME           END TIME  BLOCKS  FACILITIES  STORAGES
                0.000           5006.992     7        1          0


               NAME                         VALUE
          ACC                               6.000
          INSPECTOR                     10000.000
          REJ                               7.000


 LABEL              LOC  BLOCK TYPE     ENTRY COUNT CURRENT COUNT RETRY
                    1    GENERATE          1001             0       0
                    2    SEIZE             1001             1       0
                    3    ADVANCE           1000             0       0
                    4    RELEASE           1000             0       0
                    5    TRANSFER          1000             0       0
ACC                 6    TERMINATE          906             0       0
REJ                 7    TERMINATE           94             0       0


FACILITY         ENTRIES  UTIL.   AVE. TIME AVAIL. OWNER PEND INTER RETRY DELAY
 INSPECTOR         1001    0.782       3.911  1     1001    0    0     0       0


CEC XN   PRI          M1      ASSEM  CURRENT  NEXT  PARAMETER    VALUE
  1001    0        5005.000   1001      2      3


FEC XN   PRI          BDT     ASSEM  CURRENT  NEXT  PARAMETER    VALUE
  1002    0        5010.000   1002      0      1
```

OUTPUT :



GPSS World - [Bishnu ChaliseLAB11_STORAGE.1.1 - REPORT]

File Edit Search View Command Window Help

GPSS World Simulation Report - Bishnu ChaliseLAB11_STORAGE.1.1

Saturday, April 12, 2025 20:32:26

START TIME	END TIME	BLOCKS	FACILITIES	STORAGES
0.000	5010.028	7	0	1

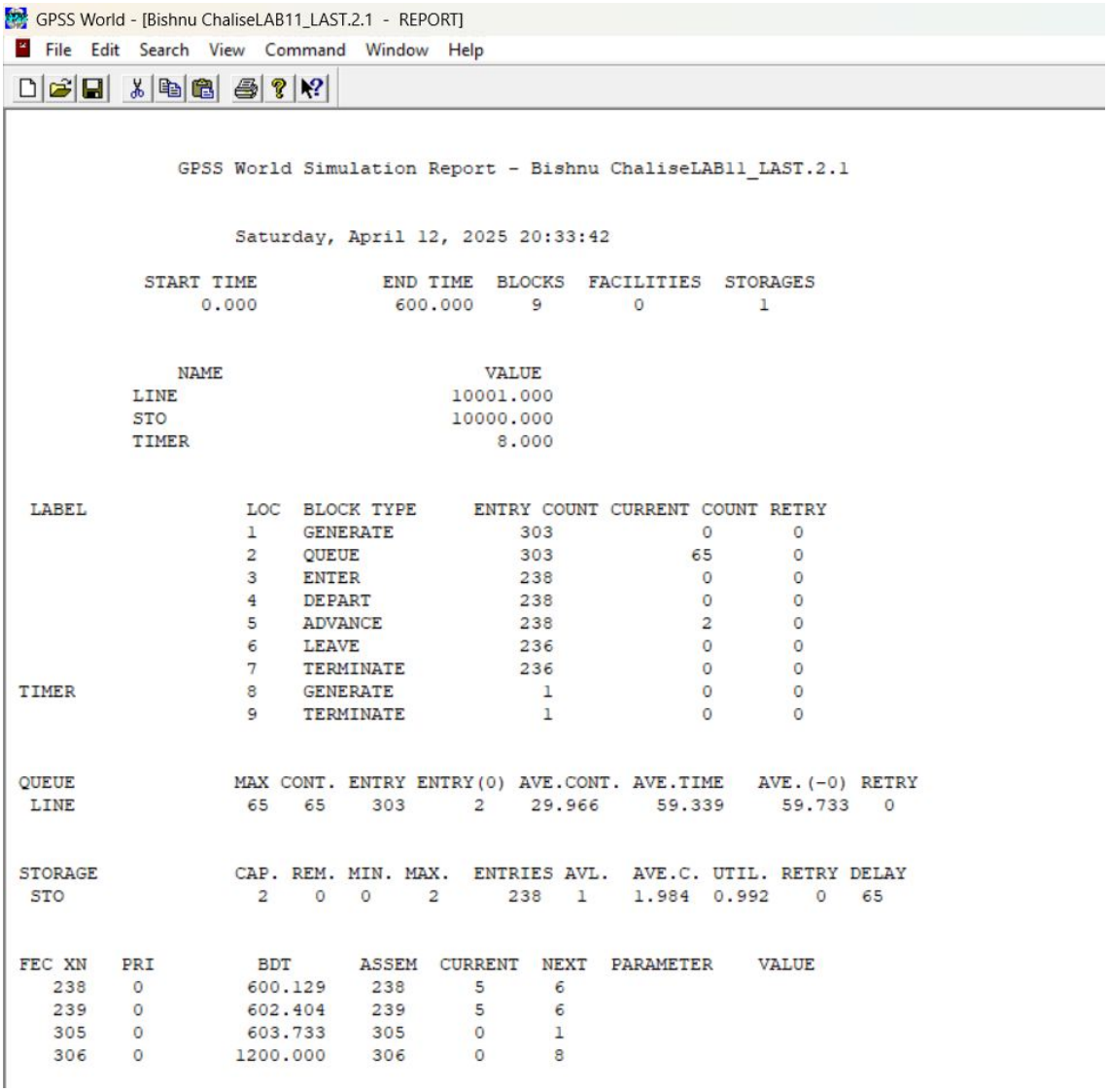
NAME	VALUE
ACC	6.000
REJ	7.000
STO	10000.000

LABEL	LOC	BLOCK TYPE	ENTRY COUNT	CURRENT COUNT	RETRY
	1	GENERATE	1002	0	0
	2	ENTER	1002	0	0
	3	ADVANCE	1002	2	0
	4	LEAVE	1000	0	0
	5	TRANSFER	1000	0	0
ACC	6	TERMINATE	894	0	0
REJ	7	TERMINATE	106	0	0

STORAGE	CAP.	REM.	MIN.	MAX.	ENTRIES	AVL.	AVE.C.	UTIL.	RETRY	DELAY
STO	3	1	0	3	1002	1	2.348	0.783	0	0

FEC XN	PRI	BDT	ASSEM	CURRENT	NEXT	PARAMETER	VALUE
1001	0	5013.000	1001	3	4		
1003	0	5015.000	1003	0	1		
1002	0	5021.482	1002	3	4		

OUTPUT :



GPSS World - [Bishnu ChaliseLAB11_LAST.2.1 - REPORT]

File Edit Search View Command Window Help

GPSS World Simulation Report - Bishnu ChaliseLAB11_LAST.2.1

Saturday, April 12, 2025 20:33:42

START TIME	END TIME	BLOCKS	FACILITIES	STORAGES
0.000	600.000	9	0	1

NAME	VALUE
LINE	10001.000
STO	10000.000
TIMER	8.000

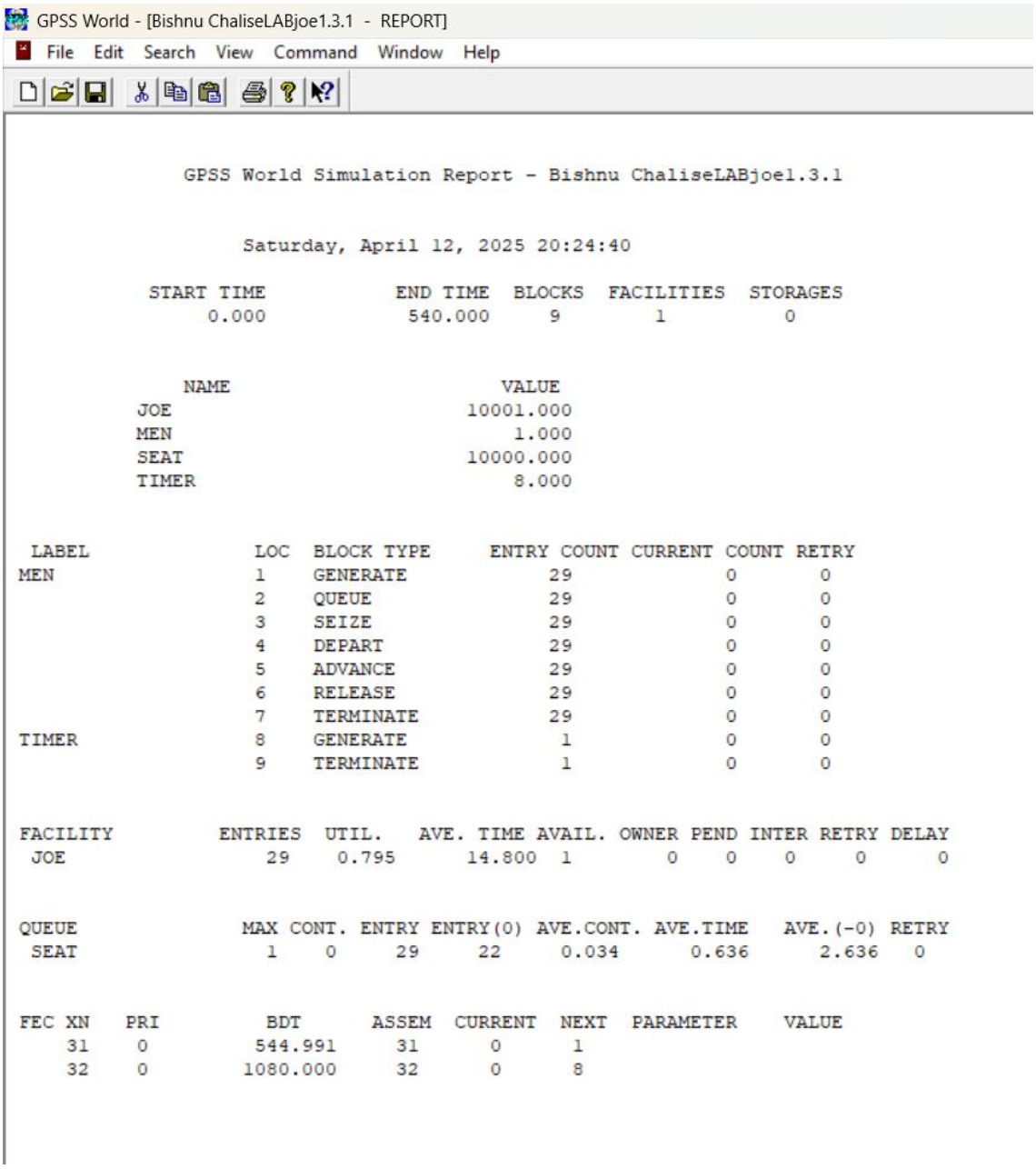
LABEL	LOC	BLOCK TYPE	ENTRY COUNT	CURRENT COUNT	RETRY
	1	GENERATE	303	0	0
	2	QUEUE	303	65	0
	3	ENTER	238	0	0
	4	DEPART	238	0	0
	5	ADVANCE	238	2	0
	6	LEAVE	236	0	0
	7	TERMINATE	236	0	0
TIMER	8	GENERATE	1	0	0
	9	TERMINATE	1	0	0

QUEUE	MAX	CONT.	ENTRY	ENTRY(0)	AVE.CONT.	AVE.TIME	AVE.(-0)	RETRY
LINE	65	65	303	2	29.966	59.339	59.733	0

STORAGE	CAP.	REM.	MIN.	MAX.	ENTRIES	AVL.	AVE.C.	UTIL.	RETRY	DELAY
STO	2	0	0	2	238	1	1.984	0.992	0	65

FEC XN	PRI	BDT	ASSEM	CURRENT	NEXT	PARAMETER	VALUE
238	0	600.129	238	5	6		
239	0	602.404	239	5	6		
305	0	603.733	305	0	1		
306	0	1200.000	306	0	8		

OUTPUT :



GPSS World Simulation Report - Bishnu ChaliseLABjoe1.3.1

Saturday, April 12, 2025 20:24:40

START TIME	END TIME	BLOCKS	FACILITIES	STORAGES
0.000	540.000	9	1	0

NAME	VALUE
JOE	10001.000
MEN	1.000
SEAT	10000.000
TIMER	8.000

LABEL	LOC	BLOCK TYPE	ENTRY COUNT	CURRENT COUNT	RETRY
MEN	1	GENERATE	29	0	0
	2	QUEUE	29	0	0
	3	SEIZE	29	0	0
	4	DEPART	29	0	0
	5	ADVANCE	29	0	0
	6	RELEASE	29	0	0
	7	TERMINATE	29	0	0
TIMER	8	GENERATE	1	0	0
	9	TERMINATE	1	0	0

FACILITY	ENTRIES	UTIL.	AVE. TIME	AVAIL.	OWNER	PEND	INTER	RETRY	DELAY
JOE	29	0.795	14.800	1	0	0	0	0	0

QUEUE	MAX	CONT.	ENTRY	ENTRY(0)	AVE.CONT.	AVE.TIME	AVE.(-0)	RETRY
SEAT	1	0	29	22	0.034	0.636	2.636	0

FEC XN	PRI	BDT	ASSEM	CURRENT	NEXT	PARAMETER	VALUE
31	0	544.991	31	0	1		
32	0	1080.000	32	0	8		

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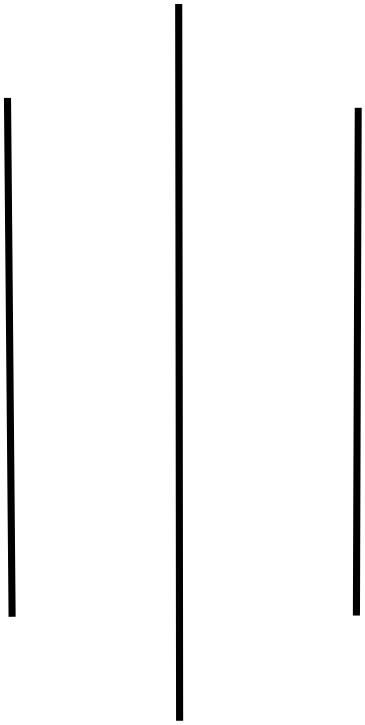
Simulation and Modeling 5th Semester Lab Report 2082



Submitted By:

Bishnu Chalise

Roll no: 79010174

Section: A

Shift: Morning

Internal Examiner

Submitted To:

Arjun Gautam

Simulation and Modeling Professor -ASCOL

External Examiner

INDEX

SN	Title	Date	Signature
1	Write a program to implement Monte Carlo's Simulation.	2081-10-10	
2	Write a program to implement queueing system and calculate different queue parameters.	2081-10-21	
3	Write a program to implement Markov Chain.	2081-10-29	
4	Write a program to generate random number using Linear Congruential Method.	2081-11-03	
5	Write a program to generate random number using multiplicative Congruential Method.	2081-11-13	
6	Write a program to generate random number using mid-square method.	2081-11-18	
7	Write a program to implement KS-Test.	2081-11-22	
8	Write a program to test autocorrelation test.	2081-11-27	
9	Write a program to implement Chi-Square test.	2081-12-03	
10	Write a program to implement gap-test	2081-12-07	
11	GPSS Program	2081-12-15	