

```
o 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
```

```
o 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%
```

```
o 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

```
o 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.
```

```
o 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
```

```
o 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

```

```
o 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
```

```
o 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 - [Bishnu ChaliseLABjoe1.3.1 - REPORT]

File

Edit









Search

View

Command

Window

Help



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	0
	2	QUEUE	29	0	0	0
	3	SEIZE	29	0	0	0
	4	DEPART	29	0	0	0
	5	ADVANCE	29	0	0	0
	6	RELEASE	29	0	0	0
	7	TERMINATE	29	0	0	0
TIMER	8	GENERATE	1	0	0	0
	9	TERMINATE	1	0	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 - [Bishnu ChaliseLABjoe2.1.1 - REPORT]

File Edit Search View Command Window Help



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		

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 - [Bishnu ChaliseLABjoe1.3.1 - REPORT]

File Edit Search View Command Window Help



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

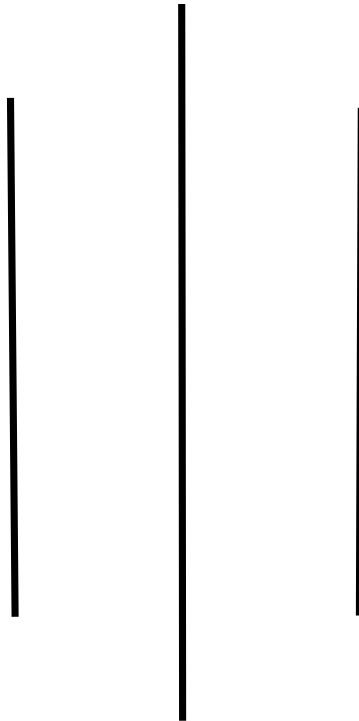
QUEUE	MAX CONT.	ENTRY	ENTRY(0)	AVE.CONT.	AVE.TIME	AVE.(-0)	RETRY
SEAT	1	0	29	22	0.034	0.636	2.636 0

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

Amrit Science Campus
Thamel, Kathmandu
AFFILIATED WITH TU



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	

