

Simulation Exam(B) Name:
3-rd year undergraduate No:
2004-2-16

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Time: 90 minutes (write answers in boxes)

1- In the mixed congruential generator: EMBED Equation.3
simulate the first seven numbers with seed EMBED Equation.3 . Then find the
correlation between two successive numbers. 5%

10%

(Hint: See page 60-61)

2- Simulate the normal distributed random variables (N1, N2) by using Polar-Marsaglia
method (rejection method) from each pair of the following uniform distributed random
variables: *(Hint: See page 80)*
(V1,V2)=(0.4,0.6) , (V1,V2)=(0.5,0.9), (V1,V2)=(0.6,-0.8)

10%

Use the table-look-up method to simulate random variables X from U(0,1).
Where the p.d.f of X is: $f(x)=\log_e x$ (implicit form)

10%

(Hint: see page 95)

Simulate the random variable X with the following probabilities:
(Hint: see page 93)

From a U(0,1) in the following table:

10%

5- Simulate a Binomial random variable X with B(9,0.72) from a set of uniform random
variables U (0,1), by using Bernouli random variable, where:

U1=0.9, U2=0.7, U3=0.6, U4=0.2, U5=0.4, U6=0.5, U7=0.3, U8=0.8, U9=0.1

(Hint: See page 82)

10%

p=0.72

6-Simulate random variable X with geometric distribution and p=0.8 from U(0,1)=0.9

(Hint: See page 93 Eq. 5.4)

10%

7- Simulate a Poisson distribution random variable, K, from the following exponential random variables: E1= 0.1, E2= 0.7, E3= 0.3, E4= 0.2 10%

(Hint: See page 84)

8- In randomized response technique (RRT), if we have $P_0=0.5$, and $\Pr[N | \text{Yes}]=0.8$, and total probability from survey is: $\Pr[\text{Yes}]=0.6$, find the $\Pr[E | \text{Yes}] = ?$

(Hint: See page 51) 10%

9- Describe control variates in the variance reduction techniques. 5%

I	0	1	2	3	4	5	6
Pr [X<I]	0.01	0.21	0.31	0.48	0.56	0.58	0.62

$X = \dots \log_e \dots - \dots$

$\Pr[E | \text{Yes}] =$

$(N1, N2) =$, $(N1, N2) =$, $(N1, N2) =$

EMBED Equation.3

X=

X=

U	0.55	0.49	0.28	0.18	0.38	0.46	0.02
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X

K=

$x(0)=0$, $x(1)=$, $x(2)=$, $x(3)=$, $x(4)=$, $x(5)=$, $x(6)=$, $x(7)=$