Simulation **University of the Ryukyus**
3-rd year undergraduate **Faculty of Engineering**
2003-2-17 **Department of Information Eng.**
Time: 90 minutes (write answers in boxes) **Prof. M.R. Asharif**
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Use the table-look-up method to simulate random variables X from U(0,1).

Where the p.d.f of X is: $f(x)=2x/(1+x^2)$, $0=< x=<(e-1)^{1/2}$ *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%*

3- The mixed congruential generator: EMBED Equation.3 (mod 8)
has full 8 cycle-length. With seed EMBED Equation.3 , simulate all cycles, one after each.

15%

(Hint: See page 61)

4- Simulate the normal distributed random variables (N1, N2) by using The Box-Muller method from the following U1, U2 uniform distributed random variables: U1=0.4, U2=0.6 *15%*

(Hint: See page 78 Eq. 4.1)

5- Simulate a Binomial random variable X with B(8,0.75) from a set of uniform random variables U (0,1), by using Bernouli random variable, where:
U1=0.8, U2=0.2, U3=0.7, U4=0.5, U5=0.9, U6=0.6, U7=0.3, U8=0.4 *10%*

(Hint: See page 82)

p=0.75

6-Simulate random variable X with geometric distribution and p=0.5 from U(0,1)=0.2

(Hint: See page 93 Eq. 5.4) *10%*

7- Simulate a Poisson distribution random variable, K, with parameter λ=1 from the following uniform random variables: U={0.7, 0.8, 0.9, 0.5}

(Hint: See page 84) *10%*

8- In randomized response technique (RRT), if we have P0=0.4, and Pr[N | Yes]=0.8, and total probability from survey is: Pr[Yes]=0.9, find the Pr[E | Yes] =?

(Hint: See page 51) *10%*

I	0	1	2	3	4	5	6
Pr [X<I]	0.15	0.24	0.37	0.58	0.75	0.95	0.99

X=

Pr[E | Yes] =

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

(N1= ,N2=

X=

X=

U	0.94	0.85	0.16	0.68	0.35	0.56	0.97
X							

K=