

1. Chapter 7, Exercise 6. Use the multiplicative congruential method to generate a sequence of 4 random integers. Let $X_0 = 117$, $a = 43$, and $m = 1000$.

$$X_{i+1} = aX_i \bmod m$$

$$X_0 = 117$$

$$X_1 = 43 \cdot 117 \bmod 1000 = 5031 \bmod 1000 = 31$$

$$X_2 = 43 \cdot 31 \bmod 1000 = 1333 \bmod 1000 = 333$$

$$X_3 = 43 \cdot 333 \bmod 1000 = 14319 \bmod 1000 = 319$$

$$X_4 = 43 \cdot 319 \bmod 1000 = 13717 \bmod 1000 = 717$$

2. Chapter 7, Exercise 24. For 16-bit computers, L'Ecuyer [1988] recommends combining three generators with $m_1 = 32363$, $a_1 = 157$, $m_2 = 31727$, $a_2 = 146$, $m_3 = 31657$, and $a_3 = 142$. The period of this generator is approximately 8×10^{12} . Generate 5 random numbers with the combined generator using initial seeds $X_{i,0} = 100, 300, 500$ for the individual generators $i = 1, 2, 3$.

	m1=32363 a1=157 X1,0=100	m2=31727 a2=146 X2,0=300	m3=31657 a3=142 X3,0=500	Xi1-Xi2+Xi3	Wi	Ri
Xi,1	15700	12073	7686	11313	11313	0.349566
Xi,2	5312	17673	15074	2713	2713	0.08383
Xi,3	24909	10371	19489	34027	1665	0.051448
Xi,4	27153	22997	13279	17435	17435	0.538733
Xi,5	23468	26227	17855	15096	15096	0.466459
Xi,6	27457	21902	2850	8405	8405	0.25971
Xi,7	6470	24992	24816	6294	6294	0.194481
Xi,8	12537	227	9945	22255	22255	0.687668
Xi,9	26529	1415	19282	44396	12034	0.371844
Xi,10	22589	16228	15542	21903	21903	0.676791
Xi,11	18906	21490	22631	20047	20047	0.619442
Xi,12	23209	28294	16245	11160	11160	0.344838
Xi,13	19157	6414	27486	40229	7867	0.243086
Xi,14	30253	16361	9201	23093	23093	0.713562
Xi,15	24723	9181	8605	24147	24147	0.74613
Xi,16	30314	7892	18944	41366	9004	0.278219
Xi,17	1937	10060	30860	22737	22737	0.702562
Xi,18	12842	9318	13454	16978	16978	0.524611
Xi,19	9688	27894	11048	-7158	25204	0.778791
Xi,20	32318	11468	17623	38473	6111	0.188827