

## Actividad 1. Generación de números pseudoaleatorios

Genera los números aleatorios solicitados en cada caso, ingresa al foro y explica a tus compañeros(as), paso a paso, el proceso que seguiste para calcular tres de ellos (uno de cada grupo de ejercicios). No olvides justificar tus respuestas. Realiza aportaciones a tres de tus compañeros(as) como mínimo.

(Grupo 1) Determina cinco números pseudoaleatorios entre cero y uno, en cada caso, usando la semilla indicada y el método congruencial.

1) Semilla: 53.

$$a=489, c=19 \text{ y } m=902$$

$$r_1 = (489 + 19(53)) \bmod 902 = (1496) \bmod 902 = 594$$

$$r_2 = (489 + 19(594)) \bmod 902 = (11775) \bmod 902 = 49$$

$$r_3 = (489 + 19(49)) \bmod 902 = (1420) \bmod 902 = 518$$

$$r_4 = (489 + 19(518)) \bmod 902 = (10331) \bmod 902 = 409$$

$$r_5 = (489 + 19(409)) \bmod 902 = (8260) \bmod 902 = 142$$

$$m=902-1=901$$

$$\{0.6593, 0.0544, 0.5749, 0.4539, 0.1576\}$$

2) Semilla: 47.

$$a=563, c=37 \text{ y } m=1632$$

$$r_1 = (563 + 37(47)) \bmod 1632 = (2302) \bmod 1632 = 670$$

$$r_2 = (563 + 37(670)) \bmod 1632 = (25353) \bmod 1632 = 291$$

$$r_3 = (563 + 37(291)) \bmod 1632 = (11330) \bmod 1632 = 769$$

$$r_4 = (563 + 37(769)) \bmod 1632 = (29016) \bmod 1632 = 53$$

$$r_5 = (563 + 37(53)) \bmod 1632 = (2530) \bmod 1632 = 223$$

$$m=1632-1=1631$$

$$\{0.4107, 0.1784, 0.4714, 0.0324, 0.1367\}$$

3) Semilla: 63.

$$a=843, c=29 \text{ y } m=1589$$

$$r_1 = (843 + 29(63)) \bmod 1589 = (2670) \bmod 1589 = 1081$$

$$r_2 = (843 + 29(1081)) \bmod 1589 = (32192) \bmod 1589 = 412$$

$$r_3 = (843 + 29(412)) \bmod 1589 = (12791) \bmod 1589 = 79$$

$$r_4 = (843 + 29(79)) \bmod 1589 = (3134) \bmod 1589 = 1545$$

$$r_5 = (843 + 29(1545)) \bmod 1589 = (45648) \bmod 1589 = 1156$$

$$m=1589-1=1588$$

$$\{0.6807, 0.2594, 0.0497, 0.9729, 0.7279\}$$

4) Semilla: 87.

$$a=493, c=16 \text{ y } m=949$$

$$r_1 = (493 + 16(87)) \bmod 949 = (1885) \bmod 949 = 936$$

$$r_2 = (493 + 16(936)) \bmod 949 = (15469) \bmod 949 = 285$$

$$r_3 = (493 + 16(285)) \bmod 949 = (5053) \bmod 949 = 308$$

$$r_4 = (493 + 16(308)) \bmod 949 = (5421) \bmod 949 = 676$$

$$r_5 = (493 + 16(676)) \bmod 949 = (11309) \bmod 949 = 870$$

$$m = 949 - 1 = 948$$

{0.9873, 0.3006, 0.3248, 0.7113, 0.9177}

5) **Semilla: 92.**

$$a=346, c=13 \text{ y } m=793$$

$$r_1 = (346 + 13(92)) \bmod 792 = (1542) \bmod 792 = 750$$

$$r_2 = (346 + 13(750)) \bmod 792 = (10096) \bmod 792 = 592$$

$$r_3 = (346 + 13(592)) \bmod 792 = (8042) \bmod 792 = 122$$

$$r_4 = (346 + 13(122)) \bmod 792 = (1932) \bmod 792 = 348$$

$$r_5 = (346 + 13(348)) \bmod 792 = (4870) \bmod 792 = 118$$

$$m = 793 - 1 = 792$$

{0.9469, 0.7474, 0.1540, 0.4368, 0.1489}

6) **Semilla: 39.**

$$a=435, c=17 \text{ y } m=642$$

$$r_1 = (435 + 17(39)) \bmod 642 = (1098) \bmod 642 = 456$$

$$r_2 = (435 + 17(456)) \bmod 642 = (8187) \bmod 642 = 483$$

$$r_3 = (435 + 17(483)) \bmod 642 = (8546) \bmod 642 = 200$$

$$r_4 = (435 + 17(200)) \bmod 642 = (3835) \bmod 642 = 625$$

$$r_5 = (435 + 17(625)) \bmod 642 = (11060) \bmod 642 = 146$$

$$m = 642 - 1 = 640$$

{0.7125, 0.7546, 0.3125, 0.9765, 0.2281}

7) **Semilla: 44.**

$$a=389, c=27 \text{ y } m=841$$

$$r_1 = (389 + 27(44)) \bmod 841 = (1577) \bmod 841 = 736$$

$$r_2 = (389 + 27(736)) \bmod 841 = (20261) \bmod 841 = 77$$

$$r_3 = (389 + 27(77)) \bmod 841 = (2468) \bmod 841 = 786$$

$$r_4 = (389 + 27(486)) \bmod 841 = (13511) \bmod 841 = 55$$

$$r_5 = (389 + 27(55)) \bmod 841 = (1874) \bmod 841 = 192$$

$$m = 841 - 1 = 840$$

{0.8761, 0.0916, 0.9357, 0.0654, 0.2285}

8) **Semilla: 76.**

$$a=319, c=21 \text{ y } m=993$$

$$r_1 = (319 + 21(76)) \bmod 993 = (1915) \bmod 993 = 922$$

$$r_2 = (319 + 21(922)) \bmod 993 = (19681) \bmod 993 = 814$$

$$r_3 = (319 + 21(814)) \bmod 993 = (17413) \bmod 993 = 532$$

$$r_4 = (319 + 21(532)) \bmod 993 = (11491) \bmod 993 = 568$$

$$r_5 = (319 + 21(568)) \bmod 993 = (12247) \bmod 993 = 331$$
$$m=993-1=992$$

{0.9294, 0.8205, 0.5362, 0.5725, 0.3336}

(Grupo 2) Determina cinco números pseudoaleatorios entre cero y uno, en cada caso, usando la semilla indicada y el método de cuadrados medios.

9) Semilla: 29.

$$29^2 = 841 = 0841 = 0.0841$$
$$841^2 = 707281 = 0.0728$$
$$728^2 = 529984 = 0.2998$$
$$2998^2 = 08988004 = 0.9880$$
$$9880^2 = 97614400 = 0.6144$$

10) Semilla: 52.

$$52^2 = 2704 = 0.2704$$
$$2704^2 = 07311616 = 0.3116$$
$$3116^2 = 09709456 = 0.7094$$
$$7094^2 = 50324836 = 0.3248$$
$$3248^2 = 10549504 = 0.5495$$

11) Semilla: 39.

$$39^2 = 1521 = 0.1521$$
$$1521^2 = 02313441 = 0.3134$$
$$3134^2 = 09821956 = 0.8219$$
$$8219^2 = 67551961 = 0.5519$$
$$5519^2 = 30459361 = 0.4593$$

12) Semilla: 54.

$$54^2 = 2916 = 0.2916$$
$$2916^2 = 08503056 = 0.5030$$
$$5030^2 = 25300900 = 0.3009$$
$$3009^2 = 09054081 = 0.0540$$
$$540^2 = 123904 = 0.2390$$

13) Semilla: 85.

$$85^2 = 7225 = 0.7225$$
$$7225^2 = 52200625 = 0.2006$$
$$2006^2 = 04024036 = 0.0240$$
$$240^2 = 025600 = 0.2560$$
$$2560^2 = 06553600 = 0.5536$$

14) Semilla: 43.

$$43^2 = 1849 = 0.1849$$

$$1849^2 = 03418801 = 0.4188$$

$$4188^2 = 17539344 = 0.5393$$

$$5393^2 = 29084449 = 0.0844$$

$$844^2 = 712336 = 0.1233$$

15) Semilla: 67.

$$67^2 = 4489 = 0.4489$$

$$4489^2 = 20151121 = 0.1511$$

$$1511^2 = 02283121 = 0.2831$$

$$2831^2 = 08014561 = 0.0145$$

$$145^2 = 021025 = 0.2102$$

16) Semilla: 70.

$$70^2 = 4900 = 0.4900$$

$$4900^2 = 24010000 = 0.0100$$

$$100^2 = 010000 = 0.1000$$

$$1000^2 = 01000000 = 0.0000$$

$$0^2 = 0 = 0$$

(Grupo 3) Determina tres números pseudoaleatorios entre cero y uno usando la semilla que creas conveniente y tu método preferido a través de cuatro procesos diferentes.

17) Determina tres números pseudoaleatorios entre cero y uno usando la semilla que creas conveniente y el método congruencial.

Semilla 197,  $a=143$ ,  $c=23$  y  $m=2412$

$$r_1 = (143 + 23(197)) \bmod 2412 = (4674) \bmod 2412 = 2262$$

$$r_2 = (143 + 23(2262)) \bmod 2412 = (52169) \bmod 2412 = 1517$$

$$r_3 = (143 + 23(1517)) \bmod 2412 = (35034) \bmod 2412 = 1266$$

$$m=2412-1=2411$$

$$\{0.9381, 0.6291, 0.5250\}$$

18) Determina tres números pseudoaleatorios entre cero y uno usando la misma semilla que la empleada en el ejercicio 17 y el método de cuadrados medios.

Semilla 197

$$197^2 = 038809 = 0.3880$$

$$3880^2 = 15054400 = 0.0544$$

$$544^2 = 295936 = 0.9593$$

19) Determina cuatro números pseudoaleatorios entre cero y uno usando la semilla que creas conveniente, pero diferente a la del ejercicio 17, y el método congruencial.

Semilla 203,  $a=249$ ,  $c=12$  y  $m=1455$

$$r_1 = (249 + 12(203)) \bmod 1455 = (2685) \bmod 1455 = 1230$$

$$r_2 = (249 + 12(1230)) \bmod 1455 = (15009) \bmod 1455 = 459$$

$$r_3 = (249 + 12(459)) \bmod 1455 = (5757) \bmod 1455 = 1392$$

$$r_4 = (249 + 12(1392)) \bmod 1455 = (16953) \bmod 1455 = 948$$

$$m=1455-1454$$

$$\{0.8459, 0.3156, 0.9573, 0.6519\}$$

20) Determina cuatro números pseudoaleatorios entre cero y uno usando la misma semilla que la empleada en el ejercicio 19, y el método de cuadrados medios.

Semilla 203

$$203^2 = 041209 = 0.4120$$

$$4120^2 = 1698181681 = 0.8181$$

$$8181^2 = 66928761 = 0.9287$$

$$9287^2 = 86248369 = 0.2483$$