

D denotes Democratic party and R denotes Republican party. Does it appear that we elect Democrat and Republican candidates in a sequence that is not random?

R R D R D R R R R D D R R R D D D
D D R R D D R R D R R R D D R R D

6. Odd and Even Digits in π A *New York Times* article about the calculation of decimal places of π noted that “mathematicians are pretty sure that the digits of π are indistinguishable from any random sequence.” Given below are the first 30 decimal places of π . Test for randomness of odd (O) and even (E) digits.

1 4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7 9

7. Draft Lottery In 1970, a lottery was used to determine who would be drafted into the U.S. Army. The 366 dates in the year were placed in individual capsules, they were mixed, then capsules were selected to identify birth dates of men to be drafted first. The first 30 results are listed below. Test for randomness before and after the middle of the year, which is July 1.

Sept. 14 Apr. 24 Dec. 30 Feb. 14 Oct. 18 Sept. 6 Oct. 26 Sept. 7 Nov. 22
Dec. 6 Aug. 31 Dec. 7 July 8 Apr. 11 July 12 Dec. 29 Jan. 15 Sept. 26
Nov. 1 June 4 Aug. 10 June 26 July 24 Oct. 5 Feb. 19 Dec. 14 July 21
June 5 Mar. 2 Mar. 31

8. Newspapers Media experts claim that daily newspapers are declining because of Internet access. Listed below are the numbers of daily newspapers in the United States for a recent sequence of 20 years. Shown below those numbers are letters indicating whether the number is above (A) the median of 1514.5 or below (B) that median. Test for randomness of the numbers above and below the median. What do the results suggest?

1645 1642 1626 1611 1586 1570 1556 1548 1533 1520 1509 1489 1483 1480 1468 1457 1456 1457 1452 1437
↓
A A A A A A A A A A B B B B B B B B B B

Runs Test with Large Samples. In Exercises 9–12, use the runs test with a significance level of $\alpha = 0.05$. (All data are listed in order by row.)

9. Testing for Randomness of Super Bowl Victories Listed below are the conference designations of teams that won the Super Bowl, where N denotes a team from the NFC and A denotes a team from the AFC. Do the results suggest that either conference is superior?

N N A A A N A A A A A N A A A N N A N N N N N N N N N N N
N N A A N A A N A A A A N A N N

10. Baseball World Series Victories Test the claim that the sequence of World Series wins by American League and National League teams is random. Given below are recent results (as of this writing), with American League and National League teams represented by A and N, respectively.

A N A N N N A A A A N A A A A N A N N A A N N A
A A A N A N N A A A A A N A N A N A A A A A
A A N N A N A N N A A N N N A N A N A N A A A N
N A A N N N N A A A N A N A N A A A N A A A A
N A N A A N A N A N